ADDENDUM NO. 2

Elkhorn Elementary School Inc 1 Phase 2 Modernization LLB RFQP No. 0915-8215-470-95

September 4, 2026

Clarifications

1) Schedule/critical deliverables: This project includes critical performance criteria where below-grade utilities are all connected, tested, and full working order prior to the start of school at the end of July 2027. All off-site work (including but not limited to off-site utilities and laterals to the site) must be complete prior to Summer Break 2027. All on-site utility work (including but not limited to existing utility demolition, removal of existing leach fields and septic tanks, installation and connection of new sewer, storm drain, domestic water, and fire water systems to off-site connections) must be complete prior to the start of school at the end of July 2027. Please reference the District's academic calendar for exact dates. All of these dates should be reflected as critical milestones in any and all corresponding schedules and are a mandatory requirement of this contract.

2) Notice for bid alternates: This project includes bid alternates as listed on sheets 1G0.02 and 2G0.02. All bid alternates should be itemized separately for District review.

3) Notice for Building F itemized bid cost: Due to DSA requirements, all costs related to Building F will need to be submitted to DSA in order to show that it does not exceed the valuation threshold. For the bidding phase, provide an itemized bid cost for all related Building F costs for review and submittal to DSA.

4) Agency-approved drawings: The drawings and specifications included in this addendum are preliminary documents that have not yet been approved by the authority having jurisdiction. Final agency-approved documents will be provided prior to final GMP negotiations.

5) Drawing sets/Responsibility Matrix: The scope of work for this project includes scope from three different document sets: Off-sites, Increment 1 Sitework, and Increment 2 Renovations. See the included Appendix D for the Responsibility Matrix outlining the delineation of work.

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Purpose:	To delineate and define the scope of work between three different contractors.
Intention:	The organization of this document is laid out with the intention that the Renovation Contractor is the prime contractor responsible for the health, safety, and overall management of the site. Under the Renovation Contractor would be both the Site and Modular Contractors. The Site Contractor is intended to capture the scope of the Offsites and the sitework in Increments 1 and 2, while the Modular Contractor is primarily responsible for the Increment 3 Modular scope. Their intended individual responsibilities are delineated below.

Reviewed By:	**Signature:**	**Signature:**	**Signature:**
	Firm: Lodi USD	**Firm:** JLC	**Firm:** LPA Design Studios
	Name:	**Name:** Kyle Chamberlain	**Name:** Kevin Concolino
	Date:	**Date:** 09/01/2026	**Date:** 09/01/2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
Division 1 - General Requirements					
Temporary Facilities	X				
Temporary Site Fencing	X				For overall site area
Portable Toilets (2 minimum) for Renovation/Site	X				
Portable Toilets (2 minimum) for Modular			X		
Field Office for Inspector and CM	X				
Temporary Power Service	X				
Gas and electrical utility charges for startup and testing				X	
Temporary Water and Phone	X				
Temporary fire water	X				
Staging area for modular on site	X				Area to be coordinated and reserved for modular contractor
On-site Security	X				
Division 2 - Demolition					
On-site building demolition	X				
On-site demolition including pavement, utilities, structures, etc.		X			
Off-site demolition including pavement, utilities, structures, etc.		X			
Demolition and abandonment of existing storm-drain box culvert within Davis Road (off-site)		X			
Septic tank removal and coordination with local authorities		X			
Coordination with the City for all offsite work		X			
Division 3 - Concrete					
Building Concrete:					
Foundation Staking		X			
Off-haul Footing Spoils		X			
Footing & Slab On Grade			X		
Division 5 - Metals					
Covered Walkway/Canopies Connected to modular building			X		
Covered Walkway/Canopies at all other buildings		X			

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
Handrails	X				
Provide/install gutters and gutter guards on modular building.			X		
Provide/install gutters and gutter guards on all other buildings.	X				As applicable
DI Grates		X			
Division 8 - Openings					
Doors / Frames on modular building			X		
Doors / Frames on all other buildings	X				As applicable
Windows / Frames on modular building			X		
Windows / Frames on all other buildings	X				As applicable
Division 9 - Finishes					
Interior and Exterior:					
All finishes on modular building			X		
All finishes on all other buildings	X				
Division 11 - Equipment					
Division 13 - Special Construction					
Modular Buildings:					
All Engineering/Architectural DSA Approval			X		
Manufacturer Buildings			X		
DSA Fees				X	
In Plant inspection fee's				X	
Division 22 - Plumbing					
Modular building interior plumbing including all piping, equipment, and structures			X		Extend out to 5 feet beyond building
Division 23 - Mechanical					
Stub condensate drain to exterior just above finish floor			X		
Connect Condensate Drain and run to Drywell		X			
Energy management system			X		
HVAC Unit			X		
HVAC Ducting & Grills			X		
HVAC Thermostats if connected/controlled by EMS system			X		
Power for EMS system			X		
EMS system, conductors & site conduits, controls			X		
Division 26 - Electrical					
Electrical Service:					
Trench and conduit to transformer		X			
Transformer Pad		X			
Trench and conduit to MSB		X			
Main switch board		X			
Conductors to meter		X			
Power & Distribution:					
Transformers		X			
Distribution switch boards		X			
Power to buildings		X			Wire feeders
Building electrical sub panels			X		

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
Provide conduit/conductor to energize modular subpanels and conductor from sub-panel to subpanel interior of building		X			
Connect to building panel including ground rod and ground rod test		X			
Circuit monitoring		X			
Panel ID/Circuit ID Labeling			X		
All electrical within buildings - Less conductors from switchgear to sub-panel and from sub-panel to sub-panel			X		Including breakers within sub panels
Provide/pull conductors from main panel to subpanels		X			
Lighting:					
Site Lighting		X			
All Building Exterior Lighting to EMS			X		That are attached to the building (soffit/walls)
EMS Controls Panel		X			
Interior Light Programming			X		
Site Exterior Light Programming		X			That are not attached to the building
Conduits Connecting Building Wings		X			
Interior LED Lights at modular building			X		
Interior LED Lights at all other buildings	X				
Exterior LED Lights at modular building			X		
Exterior LED Lights at all other buildings	X				
Int. Occupancy Sensors/Photo Sensors at modular building			X		
Int. Occupancy Sensors/Photo Sensors at all other buildings	X				
Lighting control & integration to classroom lighting control at modular building			X		
Lighting control & integration to classroom lighting control at all other buildings	X				
Division 27 / 28 - Communications and Safety					
Voice/Data/Clocks/TV/Intercom/Security:					
Conduit & Back boxes-in walls			X		stubbed 6" above T-bar
Clock/Speaker				X	
Conduit to building/ STC Cabinet		X			
STC at building	X				
Wires/Controls	X				
IDF cabinet	X				
Door Security Contact Conduit	X				Wiring and devices
Security Devices	X				Wiring and devices
CATV Systems	X				Wiring and devices
J Hooks for wiring in plenums	X				
Wi-Fi, Data, Fire Alarm, Voice	X				
Intrusion Alarm, CCTV & Clocks				X	
All low voltage conduits in hard lid ceilings at modular building			X		
All low voltage conduits in all ceilings at all other buildings	X				
Fire Alarm:					
Building Conduit & Back boxes and supports for devices at modular building			X		
Building Conduit & Back boxes and supports for devices at all other buildings	X				
Conduit to building STC Cabinet		X			
All fire alarm control, and annunciator panels	X				
Power for FACP/FAEP			X		

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
Terminal Cabinets	X				
Devices/Conductors/Controls	X				
FS Flow & Tamper Switches at building riser	X				
FS Flow & Tamper Switches outside buildings (i.e. backflow device, PIC, etc.)	X				
FS Alarm Bell	X				
Conduit Wire for FS Devices	X				
Connect FS Devices to FA	X				
Fire extinguisher cabinet - semi recessed at modular building			X		
Division 31 / 33 - Site Work					
Earthwork:					
Excavation / backfill / compaction		X			
Spoils offhaul for pad / foundations excavation		X			
Rough grading at building perimeter		X			
Finish grade, including slopes to drain (if applicable) within the building pad area and re-grading after the form work is removed		X			
Import / Export fill		X			
Bioretention basins, including excavation, backfill, and subdrainage/structures installation		X			
Excavate modular building foundation pad		X			Excavate 5 ft. horizontally past building perimeter
Excavate building/foundation footings			X		
Provide/install engineered fill per soils report		X			if applicable
Asphalt concrete:					
On-site asphalt, including hard courts, parking lot areas, etc.		X			
Off-site asphalt (roadway improvements) including City coordination		X			
Striping		X			
Coordination with the City for all off-site work		X			
Site Concrete:					
On-site flatwork, including curbs, seatwalls, and other minor concrete		X			Slope away from building
Site entrance driveways and connection to offsite paving, including City coordination		X			
Off-site flatwork including sidewalks, utility pads, minor concrete, etc. including City coordination		X			
Storm Drains:					
On-site storm drain system, including piping, structures, and equipment		X			Extend up to face of building. Modular Contractor to provide cleanout and connection.
Off-site storm drain system, including piping, structures, and equipment		X			
On-site to off-site piping connection		X			
Coordination with the City for all off-site work		X			
Provide/install gutters on modular building			X		
Domestic Water:					
On-site water system, including piping, structures, and equipment		X			Extend up to within 5 feet of the building
Off-site water system, including piping, structures, and equipment		X			
On-site to off-site piping connection		X			
On-site shut-off valve (SOV) at buildings		X			within 5' of building

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
On-site connection from building domestic piping to site water system		X	X		Final connection responsibility to be determined following sequencing of modular building and site utility work.
Coordination with the City for all off-site work		X			
Domestic piping within buildings.			X		
Chlorination and testing - All Lines at modular building			X		
Chlorination and testing - All Lines at all other buildings		X			
Sanitary Sewer:					
On-site sewer system, including piping, structures, and equipment		X			Extend up to within 5 feet of the building
Off-site sewer system, including piping, structures, and equipment		X			
On-site to off-site piping connection		X			
On-site connection from building sewer to site sewer system		X	X		Final connection responsibility to be determined following sequencing of modular building and site utility work.
Landscaping:					
Irrigation		X			
Planting		X			
Fencing footings and columns		X			
Site Accessories/Planters		X			
Marquee Sign		X			Relocate
Fire Service:					
On-site fire system, including piping, structures, and equipment		X			
Off-site fire system, including piping, structures, and equipment		X			
On-site to off-site piping connection		X			
Fire sprinkler system within modular buildings			X		
Fire sprinkler Riser in modular building to 6" AFF		X			
Fire sprinkler main connection on-site water system		X			
Fire sprinkler engineering and design including calculations for DSA approval			X		
Fire sprinkler from site to building POC		X			Site contractor to bring FS line to point of connection inside building.
Flush site fire service - All Lines		X			
Various					
Modular:					
Provide/install gutters			X		
Classroom accessories			X		
Thermostats			X		
Construction Keying			X		
Doors, Door Frames, Door Hardware			X		
Permanent/Master Keying	X				
Temporary Lock Cores			X		
Permanent Lock Cores	X				
Door Card Readers	X				Owner Furnished
Provide unobstructed truck/crane access to building pads -must support 200 ton crane	X				Maintained by the modular building manufacturer once they start construction activities on-site.
Building floor protection covering			X		
Floor Sealing/Waxing			X		
Window coverings			X		
Dishwasher			X		
Refrigerator				X	

APPENDIX D

Lodi Unified School District

Elkhorn Elementary School: Offsites, Sitework, Renovation, and Modular Building

Responsibility Matrix
September 1, 2026

Description	Renovation GC	Site GC	Modular Contractor	District	Comments
Furniture				X	
All blocking needed to install wall mount fixtures, TV's, markerboards, cabinets, etc.			X		
Building mounted exterior hose bibbs (2 min.)			X		
Roof hose bibbs (2 min.)			X		
Building casework and counters			X		
Markerboards			X		
Transport cost to site for modular			X		
Crane (capacity as necessary)			X		
AV Systems	X				
All Interior signage rooms ID and code required			X		Match campus, anticipate 8" x 12"
All Exterior signage rooms ID and code required			X		Match campus, anticipate 8" x 12"
Interactive Visual Display TV				X	Modular contractor installed
All Other Buildings:					
Provide/install/modify gutter	X				As applicable
Classroom accessories	X				As applicable
Thermostats	X				As applicable
Construction Keying	X				As applicable
Doors, Door Frames, Door Hardware	X				
Permanent/Master Keying	X				
Temporary Lock Cores	X				As applicable
Permanent Lock Cores	X				
Door Card Readers	X				Owner Furnished
Establish/maintain building corners/surveying		X			
Building floor protection covering	X				
Floor Sealing/Waxing	X				
Window coverings	X				
Dishwasher	X				As applicable
Refrigerator				X	
Furniture				X	
All blocking needed to install wall mount fixtures, TV's, markerboards, cabinets, etc.	X				
Exterior wall/roof hose bibbs	X				As applicable
Building casework and counters	X				
Markerboards	X				As applicable
AV Systems	X				
All Interior signage rooms ID and code required	X				Match campus, anticipate 8" x 12"
All Exterior signage rooms ID and code required	X				Match campus, anticipate 8" x 12"
Interactive Visual Display TV				X	Modular contractor installed
Dust Control	X				
SWPPP		X			
Traffic Control	X				Include plans for off-site work in Davis Road as well as on-site work
Encroachment permits (off-site work)		X			

ELKHORN ELEMENTARY SCHOOL CAMPUS
MODERNIZATION INCREMENT 2
DSA SUBMITTAL

10505 DAVIS ROAD, STOCKTON, CA 95209

PROJECT NUMBER
31942

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

PRELIMINARY

LPA
ARCHITECTURE ENGINEERING INTERIORS
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17/DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

COVER SHEET

2G0.00

SHEET INDEX - INC 2

SHEET NUMBER	SHEET NAME
GENERAL	
2G0.00	COVER SHEET
2G0.01	SHEET INDEX
2G0.02	GENERAL PROJECT INFORMATION
2G0.31	TYPICAL ACCESSIBILITY NOTES AND DETAILS
2G0.32	TYPICAL ACCESSIBILITY NOTES AND DETAILS
2G1.01	SITE PLAN
2G1.03	SITE ACCESSIBILITY PLAN
2G2.03	CODE ANALYSIS PLAN - BLDG F
CIVIL	
2C0.01	CIVIL NOTES
2C0.02	KEY MAP
2C0.03	EXISTING CONDITIONS
2C1.01	DEMOLITION PLAN
2C2.01	GRADING PLAN
2C2.02A	GRADING PLAN, ADD ALTERNATIVE 2 AND 3
2C3.01	STORM DRAIN PLAN
2C3.02A	STORM DRAIN PLAN, ADD ALTERNATIVE 2 AND 3
2C5.01	HORIZONTAL CONTROL AND PAVING PLAN
2C5.02A	HORIZONTAL CONTROL AND PAVING PLAN, ADD ALTERNATIVE 2 AND 3
2C6.01	EROSION CONTROL PLAN
2C6.02A	EROSION CONTROL PLAN, ADD ALTERNATIVE 2 AND 3
2C7.01	DETAILS
LANDSCAPE	
2L0.01	LANSCAPE NOTES AND LEGENDS
2L1.01	MATERIALS AND LAYOUT PLAN
2L3.01	ENLARGEMENT PLAN
2L5.01	CONSTRUCTION DETAILS
2L5.02	CONSTRUCTION DETAILS
2L5.03	CONSTRUCTION DETAILS
2L6.01	IRRIGATION PLAN
2L6.02	IRRIGATION PLAN
2L6.03	IRRIGATION NOTES AND LEGEND
2L6.04	IRRIGATION DETAILS
2L6.05	IRRIGATION DETAILS
2L6.06	IRRIGATION DETAILS
2L6.07	WATER USAGE CALCULATIONS
2L7.01	PLANTING PLAN
2L7.02	PLANTING PLAN
2L7.03	PLANTING DETAILS
ARCHITECTURE	
2A2.01	DEMO FLOOR PLAN & DEMO RCP - BLDG A
2A2.02	FLOOR PLAN, RCP, & FINISH PLAN - BLDG A
2AA3.01A	EXTERIOR ELEVATIONS - BLDG A
2AA4.01	ENLARGED RESTROOM PLANS - BLDG A
2AA5.01	INTERIOR ELEVATIONS - BLDG A
2AD2.01	DEMOLITION FLOOR PLAN & RCP - BLDG D - ADD ALT SCOPE
2AD2.02	FLOOR PLAN, RCP, & FINISH PLAN - BLDG D - ADD ALT SCOPE
2AD3.01	EXTERIOR ELEVATIONS - BLDG D
2AD5.01	INTERIOR ELEVATIONS - BLDG D
2AE3.01	EXTERIOR ELEVATIONS - BLDG E
2AF2.01	DEMO FLOOR PLAN & DEMO RCP - BLDG F
2AF2.02	FLOOR PLAN, RCP, AND FINISH PLAN - BLDG F
2AF2.03	ROOF PLAN - BLDG F
2AF3.01	EXTERIOR ELEVATIONS - BLDG F
2AF6.11	DOOR SCHEDULES & TYPES
2AF9.01	PARTITION TYPES
2AF9.10	INTERIOR DETAILS
2AF9.20	CEILING DETAILS
2A10.31	SIGNAGE FLOOR PLAN
STRUCTURAL	
2S0.01	GENERAL NOTES
2S0.02	GENERAL NOTES
2SF2.01	BUILDING F - FOUNDATION AND ROOF FRAMING PLANS
2S6.01	TYP FOUNDATION AND SOG DETAILS
2S6.81	TYP WOOD FRAMING DETAILS
2S6.82	TYP WOOD FRAMING DETAILS
2S6.83	TYP WOOD FRAMING DETAILS
2S9.01	TYP EQUIPMENT ANCHORAGE DETAILS
2S9.02	TYPICAL EQUIPMENT ANCHORAGE DETAILS
2S9.02A	TYPICAL EQUIPMENT ANCHORAGE DETAILS
2S9.02B	TYPICAL EQUIPMENT ANCHORAGE DETAILS
MECHANICAL	
2M0.01	MECHANICAL LEGENDS AND GENERAL NOTES
2MA2.01	MECHANICAL PLANS - BLDG A
2MF2.01	MECHANICAL HVAC PLANS - BLDG F
2MF2.02	MECHANICAL HVAC PLANS - BLDG F
2MF2.10	MECHANICAL PIPING & CONTROLS PLANS
2MF3.00	MECHANICAL SECTIONS
2M5.10	MECHANICAL CONTROL DIAGRAMS
2M6.00	MECHANICAL SCHEDULES
2M7.00	MECHANICAL DETAILS
2M7.01	MECHANICAL DETAILS
2M8.00	MECHANICAL ENERGY COMPLIANCE DOCUMENTATION
2M8.01	MECHANICAL ENERGY COMPLIANCE DOCUMENTATION
PLUMBING	
2P0.00	PLUMBING LEGENDS & GENERAL NOTES
2PA2.20	PLUMBING FLOOR PLANS - BLDG A
2PF2.20	PLUMBING FLOOR PLANS - BLDG F
2P6.00	PLUMBING SCHEDULES & DETAILS
ELECTRICAL	
2E0.01	ELECTRICAL LEGENDS
2E0.02	ELECTRICAL GENERAL NOTES
2E1.01	ELECTRICAL SITE PLAN
2EA2.10	ELECTRICAL REMODEL PLANS - BLDG A
2EA2.20	LIGHTING DEMO & REMODEL REFLECTED CEILING PLANS - BLDG A
2EE2.01	ELECTRICAL POWER PLAN - BLDG E
2EF2.00	ELECTRICAL LIGHTING & POWER PLANS - BLDG F
2EF2.20	ELECTRICAL POWER/MECHANICAL PLANS - BLDG F
2E5.00	ELECTRICAL SINGLE LINE DIAGRAM & PANEL SCHEDULES
2E5.01	ELECTRICAL MECHANICAL/POWER SCHEDULES
2E5.10	LIGHTING CONTROL DIAGRAMS
2E6.10	LIGHTING FIXTURE SCHEDULE
2E6.20	LIGHTING CONTROL SCHEDULES
2E7.00	ELECTRICAL DETAILS
2E7.10	LIGHTING DETAILS
2E8.00	ELECTRICAL ENERGY COMPLIANCE DOCUMENTATION
FIRE ALARM	
2FA0.01	FIRE ALARM LEAD SHEET
2FA0.20	FIRE ALARM SITE PLANS
2FAA2.00	FIRE ALARM DEMO & REMODEL PLANS - BUILDING A
2FAD2.01	FIRE ALARM DEMO & REMODEL PLANS - BUILDING D
2FAE2.01	FIRE ALARM DEMO & MODERNIZATION PLANS - BUILDING E
2FAF2.01	FIRE ALARM DEMO & REMODEL PLANS - BUILDING F
2FA5.00	FIRE ALARM RISER DIAGRAMS & CALCULATIONS
2FA6.00	FIRE ALARM CALCULATIONS
2FA7.00	FIRE ALARM DETAILS
TECHNOLOGY	
2T0.01	TECHNOLOGY NOTES
2T0.02	TECHNOLOGY LEGENDS
2TA2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG A
2TA5.01	TECHNOLOGY MDF-1.0 RACK ELEVATION AND SCHEDULE - BLDG A
2TE2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG E
2TE5.02	TECHNOLOGY IDF 1.4 RACK ELEVATION & SCHEDULE - BLDG E
2TF2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG F
2TF3.01	TECHNOLOGY EXTERIOR ELEVATION - BLDG F
2TF5.03	TECHNOLOGY IDF-1.3 RACK ELEVATION AND SCHEDULE - BLDG F
2T7.01	TECHNOLOGY SYSTEM ONE LINE DIAGRAM
2T8.01	TECHNOLOGY MDF/IDF EQUIPMENT DETAILS
2T8.02	TECHNOLOGY HORIZONTAL PATHWAYS DETAILS
2T8.03	TECHNOLOGY DETAILS
2T8.04	TECHNOLOGY SECURITY DETAILS
2T8.05	TECHNOLOGY RATED ASSEMBLY PENETRATIONS
Grand total: 123	

SHEET INDEX - INC 1 (FOR REFERENCE)

SHEET NUMBER	SHEET NAME
GENERAL	
1G0.00	COVER SHEET
1G0.01	SHEET LIST
1G0.02	GENERAL PROJECT INFORMATION
1G1.01	SITE PLAN
1G1.02	FIRE ACCESS SITE PLAN
1G1.03	SITE ACCESSIBILITY PLAN
CIVIL	
1C0.01	CIVIL NOTES
1C0.02	KEY MAP
1C0.03	EXISTING CONDITIONS
1C0.04	EXISTING CONDITIONS
1C1.01	DEMOLITION PLAN
1C1.02	DEMOLITION PLAN
1C1.03A	DEMOLITION PLAN ADD ALTERNATIVE 5
1C2.01	GRADING PLAN
1C2.02	GRADING PLAN
1C2.03	GRADING PLAN
1C2.04	GRADING PLAN
1C2.05	GRADING PLAN
1C2.06A	GRADING PLAN ADD ALTERNATIVE 5
1C3.01	STORM DRAIN PLAN
1C3.02A	STORM DRAIN PLAN ADD ALTERNATIVE 5
1C4.01	UTILITY PLAN
1C5.01	HORIZONTAL CONTROL, PAVING, SIGNAGE AND STRIPING PLAN
1C6.01	EROSION CONTROL PLAN
1C6.02	EROSION CONTROL PLAN
1C7.01	DETAILS
1C7.02	DETAILS
LANDSCAPE	
1L0.01	LANDSCAPE NOTES AND LEGENDS
1L1.01	MATERIALS PLAN
1L2.01	LAYOUT PLAN
1L3.01	ENLARGEMENT PLAN
1L4.01	SITE SECTIONS AND ELEVATIONS
1L5.01	CONSTRUCTION DETAILS
1L5.02	CONSTRUCTION DETAILS
1L5.03	CONSTRUCTION DETAILS
1L5.04	CONSTRUCTION DETAILS
1L5.05	CONSTRUCTION DETAILS
1L6.01	IRRIGATION PLAN
1L6.02	IRRIGATION NOTES AND LEGEND
1L6.03	IRRIGATION DETAILS
1L6.04	IRRIGATION DETAILS
1L6.05	IRRIGATION DETAILS
1L6.06	WATER USAGE CALCULATIONS
1L7.01	PLANTING PLAN
1L7.02	PLANTING DETAILS
ARCHITECTURE	
1A0.01	SITE PLAN
ELECTRICAL	
1E0.01	ELECTRICAL LEGENDS
1E0.02	ELECTRICAL GENERAL NOTES
1E1.01	EXISTING ELECTRICAL SITE PLAN
1E1.02	REMODEL ELECTRICAL SITE PLAN
1E1.11	LIGHTING SITE PLAN
1E4.01	ENLARGED ELECTRICAL SITE PLAN
1E5.01	ELECTRICAL SINGLE LINE DIAGRAM
1E7.01	ELECTRICAL DETAILS
1E7.10	LIGHTING DETAIL
1E8.01	ENERGY COMPLIANCE FORMS
1E8.02	ENERGY COMPLIANCE FORMS
1E9.11	PHOTOMETRIC SITE PLAN
FIRE ALARM	
1FA0.20	FIRE ALARM SITE PLAN
TECHNOLOGY	
1T0.01	TECHNOLOGY NOTES
1T0.02	TECHNOLOGY SYMBOL LEGEND
1T0.20	TECHNOLOGY SITE PLAN
1T8.01	TECHNOLOGY BACKBONE PATHWAYS DETAILS
PRE-CHECK SHADE CANOPY	
1PC1.00	GENERAL INFO
1PC1.10	GENERAL INFO
1PC1.20	DSA 103
1PC1.30	DSA 103
1PC3.00	FOUNDATION PLAN
1PC3.10	FRAMING & CONNECTION DETAILS
1PC3.40	ROOFING PLAN
1PC5.00	OPTIONAL ELECTRICAL ACCESS
Grand total: 71	

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

SHEET INDEX

2G0.01

SYMBOLS

COLUMN LINES	0
SURFACE DRAINAGE ARROW INDICATES DIRECTION OF FLOW	
NORTH ARROW	N TRUE NORTH / N PROJECT NORTH
BUILDING SECTION SECTION ID SHEET NUMBER	1 / A101 TYP
WALL SECTION SECTION ID SHEET NUMBER	1 / A101 TYP
DETAIL CALLOUTS DETAIL ID SHEET NUMBER	1 / A101 SIM
DETAIL SECTION DETAIL ID SHEET NUMBER	1 / A101 SIM
DETAIL REFERENCE DETAIL ID SHEET NUMBER	1 / A101 SIM
INTERIOR ELEVATIONS DETAIL ID SHEET NUMBER	A, B, C, D, A101 SIM
ROOM DESIGNATION ROOM NUMBER ROOM AREA	Room 101 150 SF
REVISION CLOUD & TAG (OPTIONAL)	1
SHADED PORTION POINTS TO SIDE REFERENCED	MATCH LINE SEE SHEET A101
DATUM POINT	
KEYNOTE	?
WALL TYPE	SA2U
DOOR DESIGNATION	####
OPENING DESIGNATION	1t
EQUIPMENT TAG	1i
FINISH TAG	XX-##
LEVEL LINE, CONTROL POINT EL: 12'-8" = ELEVATION/SECTION	
STAIR DIRECTION	DN / UP
CENTER LINES, LEVEL LINES	
HIDDEN CONSTRUCTION FEATURE	
BREAK LINE	
EXTERIOR ASSEMBLY REFER TO A8.11	R1

ADA CONSTRUCTION SUPPORT FACILITIES

ACCESSIBLE CONSTRUCTION SUPPORT FACILITIES

11B-201.4 CONSTRUCTION SUPPORT FACILITIES. These requirements shall apply to temporary or permanent construction support facilities for uses and activities not directly associated with the actual processes of construction, including but not limited to offices, meeting rooms, plan rooms, other administrative or support functions. When provided, toilet and bathing facilities serving construction support facilities shall comply with 11B-213. When toilet and bathing facilities serving construction support facilities are provided by portable units, at least one of each type shall be accessible and connected to the construction support facilities it serves by an accessible route.

EXCEPTION: During construction an accessible route shall not be required between site arrival points or the boundary of the area of construction and the entrance to the construction support facilities if the only means of access between them is a vehicular way not providing pedestrian access.

ABBREVIATIONS

&	AND
∠	ANGLE
@	AT
℄	CENTERLINE
∅	DIAMETER OR ROUND
#	POUND OR NUMBER
(E)	EXISTING
(P)	PAINT
(R)	REMOVE
+/-	DIM TOLERANCE
AC	ASPHALTIC CONCRETE
ACC	ACCESSIBLE
ACOUS	ACOUSTICAL
ACM	ALUM COMPOSITE MATERIAL
ACT	ACOUS CLG TILE
AD	AREA DRAIN
AED	AUTO EXT DEFIBRILLATOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISH FLOOR
AGGR	AGGREGATE
AHJ	AUTHORITY HAVING JURISDICTION
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ASF	ASSIGNABLE SF
ASPH	ASPHALT
BD	BOARD
BITUM	BITUMINOUS
BLDG	BUILDING
BLK	BLOCK
BLK'G	BLOCKING
BM	BEAM
BOC	BACK OF CURB
BOT	BOTTOM
BO	BOTTOM OF
BOC	BACK OF CURB
BOW	BOTTOM OF WALL
BS	BOTTOM OF SLOPE
CAB	CABINET
CB	CATCH BASIN
CEM	CEMENT
CER	CERAMIC
CI	CAST IRON
CIP	CAST IN PLACE
CIV ENG	CIVIL ENGINEER
CG	CORNER GUARD
CJ	CONTROL JOINT
CLG	CEILING
CLKG	CAULKING
CLO	CLOSET
CLR	CLEAR
CNTR	COUNTER
CO	CASED OPENING
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
CORR	CORRIDOR
CT	CERAMIC TILE
CTR	CENTER
CTSK	COUNTERSUNK
DA	DISABLED ACCESS
DBL	DOUBLE
DEPT.	DEPARTMENT
DESC	DESCRIPTION
DF	DRINKING FOUNTAIN
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DISP	DISPENSER
DN	DOWN
DO	DOOR OPENING
DR	DOOR
DWR	DRAWER
DS	DOWNSPOUT
DSP	DRY STANDPIPE
DWG	DRAWING
E	EAST
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
EP	ELECTRICAL PANELBOARD
EQ	EQUAL
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXPO	EXPOSED
EXP	EXPANSION
EXT	EXTERIOR
FA	FIRE ALARM
FB	FLAT BAR
FD	FLOOR DRAIN
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FIN	FINISH
FLR	FLOOR
FLASH	FLASHING
FLUOR	FLUORESCENT
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOV	FACE OF VENEER (BRICK OR PRECAST)
FOW	FACE OF WALL
FR	FIRE RETARDANT
FPRF	FIREPROOF
FS	FINISH SURFACE
FT	FOOT OR FEET
FTG	FOOTING
FURR	FURRING
FUT	FUTURE
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GI	GALVANIZED IRON
GL	GLASS
GND	GROUND
GR	GRADE
GYP	GYPSUM
HB	HOSE BIB
HC	HOLLOW CORE
HDWD	HARDWOOD
HDW	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HR	HOUR
HGT/HT	HEIGHT
ID	INSIDE DIAMETER
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR
JT	JOINT
KIT	KITCHEN
LAB	LABORATORY
LAM	LAMINATE
LAND ARCH	LANDSCAPE ARCHITECT
LAV	LAVATORY
LKR	LOCKER
LT	LIGHT
MATL	MATERIAL
MAX	MAXIMUM
MC	MEDICINE CABINET
MECH	MECHANICAL
MEMB	MEMBRANE
MET	METAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTD	MOUNTED
MUL	MULLION
N	NORTH
NIC	NOT IN CONTRACT
NO/#	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OVERALL
OA	OUTSIDE AIR
OBS	OBSCURE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFF	OFFICE
OPNG	OPENING
OPP	OPPOSITE
OSA	OUTSIDE AIR
PA	PLANTING AREA
PRCST	PRECAST
PH	PANIC HARDWARE
PL	PLATE
P LAM	PLASTIC LAMINATE
PLAS	PLASTER
PLYWD	PLYWOOD
POT	PATH OF TRAVEL
PR	PAIR
PT	PAINT
PTD	PAPER TOWEL DISPENSER
PTD/R	COMBINATION PAPER TOWEL DISPENSER & RECEPTACLE
PTN	PARTITION
PTR	PAPER TOWEL RECEPTACLE
QT	QUARRY TILE
R	RISER
RAD	RADIUS
RD	ROOF DRAIN
REF	REFERENCE
REFR	REFRIGERATOR
RGTR	REGISTER
REINF	REINFORCED
REQD	REQUIRED
RESIL	RESILIENT
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RWD	REDWOOD
RWL	RAIN WATER LEADER
S	SOUTH
SC	SOLID CORE
SCD	SEAT COVER DISPENSER
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SF	SQUARE FEET
SH	SHELF
SHR	SHOWER
SHT	SHEET
SIM	SIMILAR
SND	SANITARY NAPKIN DISPENSER
SNR	SANITARY NAPKIN RECEPTACLE
SPEC	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL
S SK	SERVICE SINK
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRUCTURAL
SUSP	SUSPENDED
SYM	SYMMETRICAL
T	TREAD
TB	TOWEL BAR
TC	TOP OF CURB
TEL	TELEPHONE
TER	TERRAZZO
T&G	TONGUE & GROOVE
THK	THICK
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOW	TOP OF WALL
TOP	TOP OF PARAPET
TPD	TOILET PAPER DISPENSER
TS	TOP OF SLOPE
TV	TELEVISION
TYP	TYPICAL
UNF	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
W	WEST
W/	WITH
WC	WATER CLOSET
WD	WOOD
W/O	WITHOUT
WP	WATERPROOF
WR	WATER RESISTANT
WSCT	WAINSCOT
WT	WEIGHT
WWF	WELDED WIRE FABRIC

NOTE TO CONTRACTOR

THE CALIFORNIA ENERGY CODE SECTION 10-103 REQUIRES ACCEPTANCE TESTING ON ALL NEWLY INSTALLED LIGHTING CONTROLS, MECHANICAL SYSTEMS, ENVELOPES, AND PROCESS EQUIPMENT AFTER INSTALLATION AND BEFORE PROJECT COMPLETION. AN ACCEPTANCE TEST IS A FUNCTIONAL PERFORMANCE TEST TO HELP ENSURE THAT NEWLY INSTALLED EQUIPMENT IS OPERATING AND IN COMPLIANCE WITH THE ENERGY CODE.

LIGHTING CONTROLS ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED LIGHTING CONTROLS ACCEPTANCE TEST TECHNICIAN (ATT).

MECHANICAL SYSTEM ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED MECHANICAL ATT FOR PROJECTS SUBMITTED ON OR AFTER OCTOBER 1, 2021.

A LISTING OF CERTIFIED ATTS CAN BE FOUND AT: HTTPS://WWW.ENERGY.CA.GOV/PROGRAMS-AND-TOPICS/PROGRAMS/ACCEPTANCE-TEST-TECHNICIAN-CERTIFICATION-PROVIDER-PROGRAM/ACCEPTANCE

THE ACCEPTANCE TESTING PROCEDURES MUST BE REPEATED, AND DEFICIENCIES MUST BE CORRECTED BY THE BUILDER OR INSTALLING CONTRACTOR UNTIL THE CONSTRUCTION/INSTALLATION OF THE SPECIFIED SYSTEMS CONFORM AND PASS THE REQUIRED ACCEPTANCE CRITERIA. PROJECT INSPECTORS WILL BE COLLECTING THE FORMS TO CONFIRM THAT THE REQUIRED ACCEPTANCE TESTS HAVE BEEN COMPLETED.

CONSTRUCTION NOTES

1. ALL CONSTRUCTION & MATERIALS SHALL BE AS SPECIFIED & IN ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, LAWS, PERMITS & THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURATE PLACEMENT OF ALL NEW CONSTRUCTION ON THE SITE.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL EXG SURVEY MONUMENTS WHICH MAY BE DISTURBED THROUGH CONSTRUCTION ACTIVITIES DEEMED NECESSARY FOR PRESERVATION BY THE CIVIL ENGINEER. IF SUCH MONUMENTS WERE DISTURBED, THE APPLICANT SHALL HAVE A LICENSED LAND SURVEYOR QUALIFIED CIVIL ENGINEER REESTABLISH ANY SUCH MONUMENTATION DAMAGED OR DESTROYED DURING THE CONSTRUCTION OF THE PROJECT & SUBMIT "PRELIMINARY CORNER RECORDS" TO THE CIVIL ENGINEER AFTER REPLACEMENT. AFTER APPROVAL BY THE CIVIL ENGINEER, THE APPLICANT SHALL FILE THE CORNER RECORDS WITH THE COUNTY SURVEYOR. PRIOR TO THE EXONERATION OF ANY SECURITY, EVIDENCE OF SUCH FILING SHALL BE FURNISHED TO THE CIVIL ENGINEER.
4. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT TRUCK ROUTES SHALL BE STEERED AWAY FROM RESIDENTIAL AREAS.
5. THE CONTRACTOR SHALL ENSURE THAT TRUCKS HAULING DIRT ON PUBLIC ROADS TO & FROM THE SITE SHALL BE COVERED OR WILL MAINTAIN A 6" DIFFERENTIAL BETWEEN THE MAX HGT OF ANY HAULED MATERIAL & THE TOP OF THE HAUL TRAILER. HAUL TRUCK DRIVERS SHALL WATER THE LOAD PRIOR TO LEAVING THE SITE TO PREVENT SOIL LOSS DURING TRANSPORT.
6. THE CONTRACTOR SHALL ENSURE THAT GRADED SURFACES USED FOR OFF ROAD PARKING, MATERIALS LAY-DOWN, OR AWAITING FUTURE CONSTRUCTION SHALL BE STABILIZED FOR DUST CONTROL AS NEEDED. FREQUENTLY ACCESSED UNPAVED AREAS SHALL BE PAVED AS EARLY AS POSSIBLE TO MINIMIZE DIRT TRACKOUT TO PUBLIC RIGHTS-OF-WAY.
7. THE CONSTRACTOR SHALL COORDINATE ANY LANE CLOSURES OR DETOURS WITH THE CITY/COUNTY. FLAG PERSONS & APPROPRIATE TRAFFIC CONTROL DEVICES SHALL BE USED AS NEEDED TO MINIMIZE CONSTRUCTION ACTIVITY INTERFERENCE WITH OFF-SITE-TRAFFIC.
8. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & SITE CONDITIONS BEFORE STARTING WORK. SHOULD A DISCREPANCY APPEAR IN THE CONTRACT DOCUMENTS OR BETWEEN THE CONTRACT DOCUMENTS & EXISTING CONDITIONS, NOTIFY THE ARCHITECT AT ONCE FOR INSTRUCTION ON HOW TO PROCEED.
9. SHOULD A CONFLICT OCCUR BETWEEN DWGS & SPECIFICATIONS, THE MORE COSTLY CONDITION SHALL TAKE PRECEDENCE, UNLESS A WRITTEN DECISION FROM THE ARCHITECT HAS BEEN OBTAINED WHICH DESCRIBES A CLARIFICATION OR ALTERNATE METHOD AND/OR MATERIALS.
10. THE CONTRACTOR SHALL CONFINE HIS OPERATION ON THE SITE TO AREAS PERMITTED BY OWNER.
11. THE JOBSITE SHALL BE MAINTAINED IN A CLEAN, ORDERLY CONDITION FREE OF DEBRIS & LITTER & SHALL NOT BE UNREASONABLY ENCUMBERED WITH ANY MATERIALS OR EQUIPMENT. EACH SUBCONTRACTOR IMMEDIATELY UPON COMPLETION OF EACH PHASE OF HIS WORK SHALL REMOVE ALL TRASH & DEBRIS AS A RESULT OF HIS OPERATION.
12. ALL MATERIAL STORED ON THE SITE SHALL BE PROPERLY STACKED & PROTECTED TO PREVENT DAMAGE & DETERIORATION. FAILURE TO PROTECT MATERIALS MAY BE CAUSE FOR REJECTION OF WORK.
13. THE CONTRACTOR SHALL DO ALL CUTTING, FITTING, AND/OR PATCHING OF HIS WORK THAT MAY BE REQ TO MAKE ITS SEVERAL PARTS FIT TOGETHER PROPERLY & SHALL NOT ENDANGER ANY OTHER WORK BY CUTTING, EXCAVATING, OR OTHERWISE ALTERING THE TOTAL WORK OR ANY PART OF IT. ALL PATCHING, REPAIRING AND REPLACING OF MATERIALS AND SURFACES, CUT OR DAMAGED IN EXECUTION OF WORK, SHALL BE DONE WITH APPLICABLE MATERIALS SO THAT SURFACES REPLACED WILL, UPON COMPLETION, MATCH SURROUNDING SIMILAR SURFACES.
14. STRUCTURAL OBSERVATION WILL BE PERFORMED BY THE STRUCTURAL ENGINEER. WHEN REQ, A STATEMENT IN WRITING SHALL BE GIVEN TO THE BUILDING OFFICIAL, STATING THAT THE SITE VISITS HAVE BEEN MADE & WHETHER OR NOT ANY OBSERVED DEFICIENCIES HAVE BEEN CORRECTED TO CONFORM TO THE APPROVED PLANS & SPECIFICATIONS.
15. SUBMITTAL DOCUMENTS FOR DEFERRED SUBMITAL ITEMS SHALL BE SUBMITTED TO THE ARCHITECT OR ENGINEER OF RECORD, WHO SHALL REVIEW THEM & RETURN THEM TO THE CONTRACTOR (WITH A NOTIFICATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED & THAT THEY HAVE BEEN FOUND TO BE IN GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING) FOR PLAN CHECK APPROVAL. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN & SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE AUTHORITY HAVING JURISDICTION.
16. PROVIDE ALL ACCESS PANELS AS REQ BY GOVERNING CODES TO ALL CONCEALED SPACES, VOIDS, ATTICS, ETC. VERIFY TYPE REQ WITH ARCHITECT PRIOR TO INSTALLATION.
17. NO PORTION OF WORK REQ A SHOP DWG OR SAMPLE SUBMISSION SHALL BE COMMENCED UNTIL THE SUBMISSION HAS BEEN REVIEWED BY THE ARCHITECT. ALL SUCH PORTIONS OF THE WORK SHALL BE IN ACCORDANCE WITH CORRECTED SHOP DWGS. AND SAMPLES.
18. DIMENSIONS:
    A. ALL DIMS SHALL TAKE PRECEDENCE OVER SCALE.
    B. ALL DIMS ARE TO FACE OF STUD / CONCRETE / MASONRY UNO
    C. CLG HGT DIMS ARE FROM FACE OF SLAB TO FACE OF FIN CLG MATERIAL UNO
19. DO NOT SCALE DRAWINGS
20. PROVIDE ALL NECESSARY BLOCKING, BACKING, & FRAMING FOR LIGHT FIXTURES, ELECTRIC UNITS, AC EQUIP, RECESSED ITEMS, AND ALL OTHER ITEMS AS REQ.
21. WHERE LARGER STUDS OR FURRING ARE REQ TO COVER PIPING AND CONDUITS, THE LARGER STUD SIZE OR FURRING SHALL EXTEND THE FULL SURFACE OF THE WALL WIDTH AND LENGTH WHERE THE FURRING OCCURS, UNO.
22. ALL DOORS SHALL BE OPERABLE FROM THE INSIDE W/O THE USE OF A KEY OR SPECIAL KNOWLEDGE OF EFFORT. EXIT SIGNS SHALL BE PROVIDED AT ALL EXITS AS REQ BY THE APPLICABLE CODES. ALL DOOR SWINGS SERVING AN OCCUPANT LOAD OF 50 OR GREATER SHALL SWING IN THE DIRECTION OF TRAVEL.
23. ALL GLASS AND GLAZING SHALL COMPLY WITH THE APPLICABLE CODES.
24. WALL AND CLG MATERIALS SHALL NOT EXCEED THE FLAME SPREAD CLASSIFICATIONS IN THE APPLICABLE CODES.
25. SURVEYORS CERTIFICATE REQ PRIOR TO FINAL COMPLETION.
26. THE CONTRACTOR SHALL COMPLY WITH THE APPLICABLE CODES FOR FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION.
27. A MINIMUM DSA CERTIFIED CLASS 2 PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT (DSA) SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, CALIFORNIA BUILDING STANDARDS ADMINISTRAIVE CODE (PART 1, TITLE 24, CCR)
28. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQ TESTS AND INSPECTIONS FOR THE PROJECT.
29. CHANGE TO THE APPROVED DWGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY DSA, AS REQ BY SECTION 4-338, PART 1, TITLE 24, CCR.
30. SUBSTITUTIONS AFFECTING ITEMS REGULATED BY THE DIVISION OF THE STATE ARCHITECT (DSA) REQUIRE DSA APPROVAL AS AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT (CCD). DSA APPROVAL SHALL BE OBTAINED PRIOR TO FABRICATION AND/OR INSTALLATION PER SECTION 4-338, PART 1, TITLE 24, CCR.
31. THE INTENT OF THESE DWGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXG CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQ WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(c), PART 1, TITLE 24, CCR)
32. ALL CONSTRUCTION AND DEMOLITION SHALL BE IN ACCORDANCE WITH CHAPTER 33 OF THE CBC AND CFC, **AND THE WRITTEN SITE SAFTEY PLAN**.

FIRE AND LIFE SAFETY NOTES

1. PLANS FOR THE FIRE SPRINKLER SYSTEMS MUST BE APPROVED BY THE AUTHORITY HAVING JURISDICTION (AHJ) PRIOR TO INSTALLATION. SUBMIT PLANS IN A MANNER WHICH WILL NOT IMPEDE THE PROGRESS OF CONSTRUCTION.
2. FIRE SPRINKLER SYSTEMS & INSTALLATION SHALL CONFORM W/ THE APPLICABLE STANDARDS AND CODES.
3. FIRE SPRINKLER SYSTEMS TO BE TIED INTO THE ALARM SYSTEM PER THE APPLICABLE CODES.
4. AUTOMATIC SPRINKLER SYSTEM(S) SHALL BE SUPERVISED BY AN APPROVED CENTRAL OR REMOTE STATION SERVICE, AND/OR SHALL BE PROVIDED W/ A LOCAL ALARM WHICH WILL GIVE AN AUDIBLE SIGNAL.
5. FIRE SPRINKLER SYSTEM(S) & ALL CONTROL VALVES SHALL BE SUPERVISED BY A U.L. LISTED CENTRAL ALARM STATION OR PER THE APPLICABLE CODES.
6. FIRE HYDRANT & FIRE SPRINKLER SYSTEM(S) SHALL BE FLUSHED THOROUGHLY BEFORE CONNECTION IS MADE TO EXISTING SYSTEM STUBOUTS & WITNESSED BY THE PROJECT INSPECTOR.
7. A HYDROSTATIC TEST (200 PSI PRESSURE FOR 2 HRS. OR @ 50 PSI IN EXCESS OF THE MIN. STATIC PRESSURE WHEN IT IS IN EXCESS OF 150 PSI) SHALL BE WITNESSED BY THE PROJECT INSPECTOR PRIOR TO COVERING PIPING JOINTS.
8. A 3' CLR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF FIRE HYDRANTS EXCEPT AS OTHERWISE REQ OR APPROVED PER THE APPLICABLE CODES.
9. THRUST BLOCKS SHALL BE PROVIDED WHEREVER PIPE CHANGES DIRECTION.
10. ALL PIPE SHALL BE UL LISTED FOR FIRE SERVICE SYSTEMS, CLASS 200 MIN.
11. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED W/I 100' FROM A PUBLIC FIRE HYDRANT PER THE APPLICABLE STANDARDS AND CODES.
12. FIRE SPRINKLER RISER SHALL BE LOCATED WITHIN 5 FT OF THE EXT WALL (OR AS REQ BY THE AHJ) AND TERMINATE 6" ABV FF
13. AN ALL-WEATHER FIRE ACCESS ROAD SHALL BE IN PLACE BEFORE ANY COMBUSTIBLE MATERIALS ARE PLACED ON THE SITE OR AS REQ BY THE AHJ.
14. STORAGE, DISPENSING, OR USE OF ANY FLAMMABLE & COMBUSTIBLE LIQUIDS, FLAMMABLE & COMPRESSED GASES & OTHER HAZARDOUS MATERIALS SHALL COMPLY W/ THE APPLICABLE CODES.
15. EXIT SIGNS SHALL BE POSTED OVER EXIT DOORS & DIRECTIONAL EXIT SIGNS SHALL BE LOCATED TO DIRECT PERSONS TOWARD EXIT DOORS.
16. EXIT SIGNS SHALL BE SELF-LUMINOUS TYPE OR ELECTRONICALLY ILLUMINATED & ENERGIZED FROM SEPARATE CIRCUITS, ONE OF WHICH SHALL BE FROM STORAGE BATTERIES OR AN ON-SITE GENERATOR, FOR A DURATION OF 90 MINUTES PER THE APPLICABLE CODES.
17. EXIT DOORS SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT.
18. ACCESS GATE(S) SHALL BE OPENABLE W/ FIRE DEPT MASTER KEY FROM THE EXTERIOR.
19. CURBS ALONG FIRE LANES SHALL BE PAINTED SAFETY RED & MARKED "FIRE LANE NO PARKING" W/ 3" WHITE LETTERS ON THE TOP OF CURBING EVERY 30' AS INDICATED ON THE APPROVED DRAWINGS.
20. APPROVED NUMBERS OR ADDRESSES SHALL BE PROVIDED FOR ALL NEW & EXG BLDGS IN SUCH A POSITION AS TO BE PLAINLY VISIBLE & LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER THE APPLICABLE CODES.
21. PROVIDE PERMANENT OR TEMPORARY STANDPIPES WHILE BUILDING IS UNDER CONSTRUCTION PER THE APPLICABLE CODES.
22. PROVIDE FIRE EXTINGUISHERS PER THE REQ THE APPLICABLE STANDARDS AND CODES.

CAL GREEN NOTES

CONSTRUCTION WASTE MANAGEMENT

1. CONTRACTOR TO PROVIDE A WASTE MANAGEMENT PLAN THAT INCLUDES THE FOLLOWING:
   A. IDENTIFIES THE CONSTRUCTION AND DEMOLITION WASTE MATERIAL TO BE DIVERTED FROM DISPOSAL BY EFFICIENT USAGE, RECYCLING, REUSE ON THE PROJECT OR SALVAGE FOR FUTURE USE OR SALE.
   B. DETERMINES IF CONSTRUCTION AND DEMOLITION WASTE MATERIALS WILL BE SORTED ON-SITE OR BULK MIXED.
   C. IDENTIFIES DIVERSION FACILITIES WHERE CONSTRUCTION AND DEMOLITION WASTE MATERIAL COLLECTED WILL BE TAKEN.
   D. SPECIFIES THAT THE AMOUNT OF CONSTRUCTION AND DEMOLITION WASTE MATERIALS DIVERTED SHALL BE CALCULATED BY WEIGHT OR VOLUME, BUT NOT BY BOTH.

WASTE MANAGEMENT COMPANY
IF A WASTE MANAGEMENT COMPANY IS USED - ENSURE THE SELECTED COMPANY CAN PROVIDE VERIFIABLE DOCUMENTATION THAT THE PERCENTAGE OF CONSTRUCTION AND DEMOLITION WASTE MATERIAL DIVERTED FROM THE LANDFILL COMPLIES WITH CALGREEN.

WASTE STREAM REDUCTION ALTERNATIVE
THE COMBINED WEIGHT OF NEW CONSTRUCTION DISPOSAL THAT DOES NOT EXCEED TWO POUNDS PER SQUARE FOOT OF BUILDING AREA MAY BE DEEMED TO MEET THE 65% MIN REQUIREMENT AS APPROVED BY THE ENFORCING AGENCY.

ADHESIVES, SEALANTS AND CAULKS

1. ADHESIVES, SEALANTS AND CAULKS USED ON THE PROJECT SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARD:
   A. ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMES, SEALANTS, SEALANT PRIMES AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN CAL GREEN TABLES 5.504.4.1 AND 5.504.4.2. SUCH PRODUCTS ALSO SHALL COMPLY WITH THE RULE 1168 PROHIBITION ON THE USE OF CERTAIN TOXIC COMPOUNDS (CHLOROFORM, ETHYLENE DICHLORIDE, METHYLENE CHLORIDE, PERCHLOROETHYLENE AND TRICHLOROETHYLENE), EXPECT FOR AEROSOL PRODUCTS AS SPECIFIED IN SUBSECTION B.
   B. AEROSOL ADHESIVES, AND SMALLER UNITY SIZES OF ADHESIVES, AND SEALANT OR CAULKING COMPOUNDS (IN UNITS OF PRODUCT, LESS PACKAGING, WHICH DO NOT WEIGH MORE THAN ONE POUND AND DO NOT CONSIST OF MORE THAN 16 FLUID OUNCES) SHALL COMPLY WITH STATEWIDE VOC STANDARDS AND OTHER REQUIREMENTS, INCLUDING PROHIBITIONS ON USE OF CERTAIN TOXIC COMPOUNDS, OF CALIFORNIA CODE OF REGULATIONS, TITLE 17, COMMENCING WIHT SECTION 94507.

PAINTS AND COATINGS
ARCHITECUTRAL PAINTS AND COATING SHALL COMPLY WITH VOC LIMITS IN TABLE 1 OF THE ARCHITECTURAL COATING SUGGESTED CONTROL MEASURE, AS SHOWN IN CALGREEN TABLE 5.504.4.3, UNLESS MORE STRINGENT LOCAK LIMITS APPLY. THE VOC CONTENT LIMIT FOR COATING THAT DO NOT MEET THE DEFINITIONS FOR THE SPECIALTY COATINGS CATEGORIES LISTED IN CALGREEN TABLE 5.504.4.3 SHALL BE DETERMINED BY CLASSIFYING THE COATING AS A FLAT, NONFLAT OR NONFLAT-HIGH GLOSS COATING, BASED ON ITS GLOSS, AS DEFINED IN SUBSECTIONS 4.21, 4.36 AND 4.37 OF THE 2007 CALIFORNIA AIR RESOURCES BOARD SUGGESTED CONTROL MEASURE, AND THE CORRESPONDING FLAT, NONFLAT OR NONFLAT-HIGH GLOSS VOC LIMIT IN CALGREEN TABLE 5.504.4.3 SHALL APPLY.

CARPET SYSTEMS
ALL CARPET INSTALLED IN THE BUILDING INTERIOR SHALL MEET THE REQUIREMENTS OF THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH, "STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS," VERSION 1.2 JANUARY 2017 (EMISSION TESTING METHOD FOR CALIFORNIA SPECIFICATION 01350).

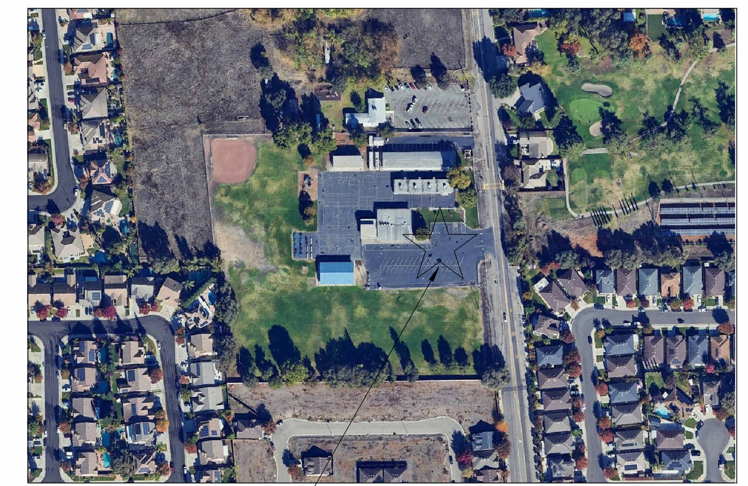
RESILIENT FLOORING SYSTEMS
WHERE RESILIENT FLOORING IS INSTALLED, AT LEAST 80 PERCENT OF FLOOR AREA RECEIVING RESILIENT FLOORING SHALL MEET THE REQUIREMENTS OF THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH, "STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS" VERSION 1.2 JANUARY 2017 (EMISSION TESTING METHOD FOR CALIFORNIA SPECIFICATION 01350).

THERMAL INSULATION
COMPLY WITH THE REQUIREMENTS OF THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH "STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS," VERSION 1.2 JANUARY 2017 (EMISSION TESTING METHOD FOR CALIFORNIA SPECIFICATION 01350.

ACOUSTICAL CEILING AND WALL PANELS
COMPLY WITH THE REQUIREMENTS OF THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH "STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS," VERSION 1.2 JANUARY 2017 (EMISSION TESTING METHOD FOR CALIFORNIA SPECIFICATION 01350.

INTERIOR SOUND TRANSMISSION
WALL ASSEMBLIES SEPARATING TENANT SPACES AND TENANT SPACES AND PUBLIC PLACES SHALL HAVE AN STC OF AT LEAST 40.

VICINITY MAP



PROPOSED SITE:
ELKHORN ELEMENTARY SCHOOL

ADDRESS:
10505 DAVIS RD,
STOCKTON, CA, 95209

TRUE NORTH PROJECT NORTH

PROJECT SCOPE

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION PROJECT IS LOCATED IN STOCKTON, CA AS A PART OF LODI UNIFIED SCHOOL DISTRICT. THIS PROJECT'S SCOPE OF WORK INCLUDES:

INC 1: SITE MAKE READY INCLUDING UPGRADES TO UTILITIES, NEW DROP OFF, NEW GRADING, NEW PAVING, & MISC. SITE IMPROVEMENTS, INCLUDING A NEW SHADE STRUCTURE.

INC 2: MODERNIZATION TO BUILDING A, D, & F. SITE IMPROVEMENTS INCLUDING NEW PLAY STRUCTURE, PAVING, AND LANDSCAPING.

INC 3: NEW MODULAR CLASSROOM BUILDING.

DEFERRED APPROVALS

INC 2: SHADE STRUCTURE ATTACHED TO PLAY STRUCTURE PER DSA IRA-22 ITEM 2.4.2

BID ALTERNATES

INC 1: ADD ALT 5 - REMOVE SOFTBALL FIELD & HYDRO SEED

INC 2:
ADD ALT 1 - BUILDING A RENOVATION
ADD ALT 2 - BUILDING D RENOVATION
ADD ALT 3 - PLAY STRUCTURE
ADD ALT 4 - OUTDOOR LEARNING IN FRONT OF BLDG A

INC 3: NONE

LIMIT OF WORK

THE INTENT OF THE LIMIT OF WORK LINE IS TO DESCRIBE IN GENERAL THE AREAS AFFECTED BY PROJECT CONSTRUCTION. IT IS NOT INTENDED TO BE AN EXACT INDICATION OR EDGE OF THE CONSTRUCTION AREA. THE CONTRACTOR SHOULD VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS AND THEIR RELATIONSHIP TO THE WORK PROPOSED IN THE CONTRACT DOCUMENTS. ALL ITEMS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK SHALL BE INCLUDED. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS REQUIRED BY ONE SHALL BE BINDING AS IF REQUIRED BY ALL TO THE EXTENT THAT IT IS REASONABLY INFERABLE FROM THEM AS BEING NECESSARY TO PRODUCE THE INTENDED RESULTS.

CALIFORNIA CLIMATE ZONE

CALIFORNIA CLIMATE ZONE: 12

APPLICABLE CODES

LIST OF APPLICABLE CODES

2025	CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR
2022	CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2022	CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2022	CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2022	CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2022	CALIFORNIA ENERGY CODE, PART 6, TITLE 24 CCR
2022	CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2022	CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2022	CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2022	CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR

TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

APPLICABLE STANDARDS

FOR A LIST OF APPLICABLE STANDARDS, INCLUDING CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS, REFER TO CBC CHAPTER 35 AND CFC CHAPTER 80.

Statement of General Conformance
FOR ARCHITECTS/ENGINEERS WHO UTILIZE PLANS,
INCLUDING BUT NOT LIMITED TO SHOP DRAWINGS, PREPARED BY OTHER LICENSED DESIGN PROFESSIONALS AND/OR CONSULTANTS
(Application No. # 02-123848 File No. 39-50)

☒ The drawings or sheets listed on the cover or index sheet G1.01
☐ This drawing, page of specifications/calculations

have been prepared by other design professionals or consultants who are licensed and/or authorized to prepare such drawings in this state. It has been examined by me for:

1. design intent and appears to meet the appropriate requirements of Title 24, California Code of Regulations and the project specifications prepared by me, and
2. coordination with my plans and specifications and is acceptable for incorporation into the construction of this project.

The Statement of General Conformance "shall not be construed as relieving me of my rights, duties, and responsibilities under Sections 17302 and 81138 of the Education Code and Sections 4-336, 4-341 and 4-344" of Title 24, Part 1. (Title 24, Part 1, Section 4-317 (b))

I certify that: ☒ All drawings of sheets listed on the cover or index sheet marked with an asterisk (*)
☐ This drawing or page

☒ is/are in general conformance and
☒ have been coordinated

Signature: [signature] Date: 04/22/2026

Architect or Engineer designated to be in general responsible charge

Print Name	License Number	Expiration Date
JULIAN WATT	C-40596	12/2027

PROJECT DIRECTORY

CLIENT INFORMATION

NAME: LODI UNIFIED SCHOOL DISTRICT
ADDRESS: 130 E VINE STREET
CITY,STATE, ZIP: LODI, CA 95240
DISTRICT REPRESENTATIVE
TEL: 209-331-7000
CONTACT: AMBERLY KIDDER E-MAIL: akidder@lodiusd.net

ARCHITECT

NAME: LPA, INC.
ADDRESS: 431 I ST #107
CITY,STATE, ZIP: SACRAMENTO, CA 95814
TEL: (916) 287-2348
CONTACT: AMY FISHER E-MAIL: afisher@lpadesignstudios.com

LANDSCAPE ARCHITECT

NAME: LPA, INC.
ADDRESS: 431 I ST #107
CITY,STATE, ZIP: SACRAMENTO, CA 95814
TEL: (916) 287-2326
CONTACT: ANDREW WICKHAM E-MAIL: awickham@lpadesignstudios.com

CIVIL ENGINEER

NAME: LPA, INC.
ADDRESS: 431 I ST #107
CITY,STATE, ZIP: SACRAMENTO, CA 95814
TEL: (916) 287-2350
CONTACT: CYNTHIA DUNNELLS E-MAIL: cdunnells@lpadesignstudios.com

STRUCTURAL ENGINEER

NAME: LPA, INC.
ADDRESS: 2765 TRUXTUN ROAD
CITY,STATE, ZIP: SAN DIEGO, CA 92106
TEL: (619) 929-3942
CONTACT: HARSHDA PRASAD E-MAIL: hprasad@lpadesignstudios.com

MECHANICAL ENGINEER

NAME: LPA, INC.
ADDRESS: 5301 CALIFORNIA AVE, SUITE 100
CITY,STATE, ZIP: IRVINE, CA 92617
TEL: (949) 701-4198
CONTACT: ERIC RING E-MAIL: ering@lpadesignstudios.com

ELECTRICAL ENGINEER

NAME: LPA, INC.
ADDRESS: 5301 CALIFORNIA AVE, SUITE 100
CITY,STATE, ZIP: IRVINE, CA 92617
TEL: (949) 701-4019
CONTACT: ALDO BACUZZI E-MAIL: abacuzzi@lpadesignstudios.com

PLUMBING ENGINEER

NAME: LPA, INC.
ADDRESS: 5301 CALIFORNIA AVE, SUITE 100
CITY,STATE, ZIP: IRVINE, CA 92617
TEL: (949) 701-4089
CONTACT: GREG WEBB E-MAIL: gwebb@lpadesignstudios.com

FIRE ALARM

NAME: LPA, INC.
ADDRESS: 5301 CALIFORNIA AVE, SUITE 100
CITY,STATE, ZIP: IRVINE, CA 92617
TEL: (949) 701-4312
CONTACT: MIKE NOROUZI E-MAIL: mnorouzi@lpadesignstudios.com

GEOTECHNICAL ENGINEER

NAME: MID PACIFIC ENGINEERING, INC.
ADDRESS: 8910 EAST VICTOR ROAD
CITY,STATE, ZIP: LODI, CA 95240
TEL: (209) 625-4400
CONTACT: DANIEL SMITH E-MAIL: smithdansmith@midpacificeng.com

TECHNOLOGY

NAME: LP ENGINEERS
ADDRESS: 1209 PLEASANT GROVE BLVD
CITY,STATE, ZIP: ROSEVILLE, CA 95678
TEL: (916) 721-2913
CONTACT: JOSIAH ZAMORA E-MAIL: jzamora@lpengineers.com

RESPONSIBILITY FOR JOB SITE SAFETY

NOTICE TO PERSONS PERFORMING WORK ON JOB SITE, INCLUDING CONTRACTORS, SUBCONTRACTORS, MATERIAL SUPPLIERS AND ANY AGENTS OR EMPLOYEES THEREOF

THESE PLANS AND SPECIFICATIONS DO NOT PROVIDE ANY DIRECTION OR INSTRUCTIONS TO CONTRACTORS, SUBCONTRACTORS, MATERIAL SUPPLIERS OR THEIR EMPLOYEES OR AGENTS RELATED TO CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, SAFETY PRECAUTIONS, MANNERS OR METHODS OF EGRESS OR INGRESS, INCLUDING BUT NOT LIMITED TO JOB SITE SAFETY, THE PHYSICAL CONDITION OF THE JOB SITE, THE MANNER OR METHOD IN WHICH THE AREA WHERE WORK IS PERFORMED IS ACCESSED BY WORKERS, AND SAFETY PROGRAMS OR SAFETY PROTOCOLS OF ANY KIND IN CONNECTION WITH THE WORK. ALL OF THE FOREGOING ARE SOLELY AND EXCLUSIVELY THE RESPONSIBILITY OF THE CONTRACTOR, SUBCONTRACTOR, MATERIAL SUPPLIERS, OR ANY AGENTS OR EMPLOYEES THEREOF.

THE ARCHITECT EXPRESSLY DISCLAIMS ANY CONTROL OVER AND RESPONSIBILITY FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, SAFETY PRECAUTIONS, MANNERS OR METHODS OF EGRESS OR INGRESS, INCLUDING BUT NOT LIMITED TO JOB SITE SAFETY, THE PHYSICAL CONDITION OF THE JOB SITE, THE MANNER OR METHOD IN WHICH THE AREA WHERE WORK IS PERFORMED IS ACCESSED BY WORKERS, AND SAFETY PROGRAMS OR SAFETY PROTOCOLS OF ANY KIND IN CONNECTION WITH THE WORK.

THE ARCHITECT HAS NOT CONDUCTED AN EVALUATION OR ANALYSIS OF SAFETY PROCEDURES OR APPLICABLE LAW REGARDING OR RELATING TO ACCESSING THE JOB SITE OR AREAS OF THE WORK DURING THE COURSE OF CONSTRUCTION.

THE ARCHITECT, THE ARCHITECT'S DESIGNS, AND ANY OTHER WORK PERFORMED BY THE ARCHITECT DO NOT ADDRESS, ANALYZE OR PROVIDE ANY DIRECTION OR ADVICE TO ANY PERSON OR ENTITY ON WHETHER OR NOT THE USE OF EXISTING LADDERS, DOORS, RAILINGS, INGRESS AND INGRESS ROUTES OR THE LIKE ARE IN COMPLIANCE OR NON-COMPLIANCE WITH OSHA, CAL-OSHA(CALIFORNIA ONLY), OR ANY OTHER APPLICABLE STATUTE, REGULATION, OR STANDARD RELATED TO JOB SITE SAFETY DURING THE COURSE OF CONSTRUCTION OF THE IMPROVEMENTS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT JULIAN WATT C-40596 17 DEC 2027 RENEWAL DATE STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

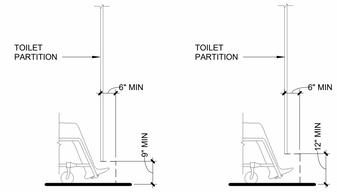
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

GENERAL PROJECT INFORMATION

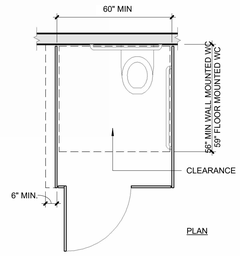
2G0.02



CBC 11B-604.8.1.4 & CBC 11B-604.8.1.1.3

ELEVATION ADULT

ELEVATION CHILDREN (K-12)

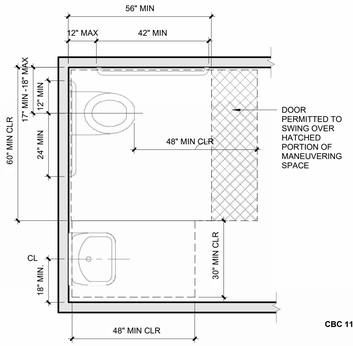


PLAN

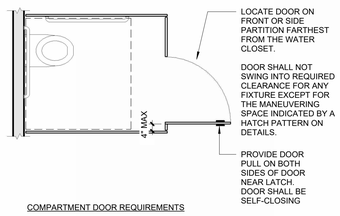
NOTE:
TOE CLEARANCE AT THE SIDE PARTITION IS NOT REQUIRED IN A COMPARTMENT GREATER THAN 66" WIDE

WHEELCHAIR ACCESSIBLE TOILET COMPARTMENT TOE CLEARANCE

3/8" = 1'-0" | 2G0.31 | 08



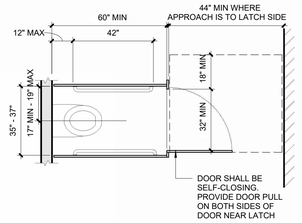
CBC 11B-604.3.1, CBC 11B-604.5.1, & CBC 11B-606.2



COMPARTMENT DOOR REQUIREMENTS

NOTE: TOILET COMPARTMENT DOORS INCLUDING HARDWARE, SHALL BE MIN. 32" CLR. AND COMPLY WITH CBC. TOILET COMPARTMENT DOORS IN THE SIDE OF THE PARITION SHALL BE MIN. 34" CLR.

CBC 11B-604.8.1.2

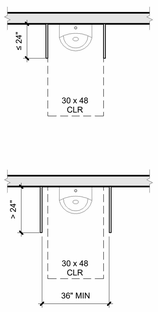


AT AMBULATORY STALL

CBC 11B-604.2,CBC 11B-604.5.1, & CBC 11B-604.8.2

ACCESSIBLE FIXTURES AT SINGLE ACCOMMODATION RESTROOM

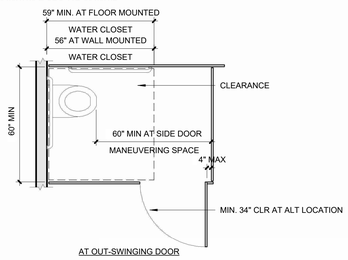
1/2" = 1'-0" | 15



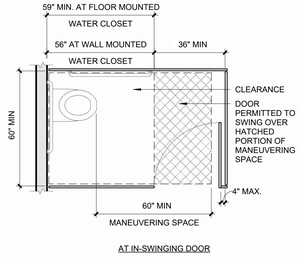
CBC 11B-305.7.1

ACCESSIBLE URINAL PARTITIONS

3/8" = 1'-0" | 2G0.31 | 14

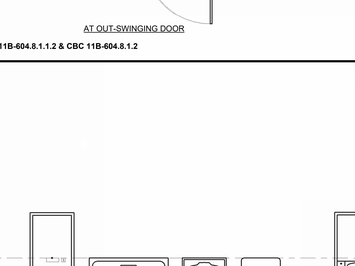


AT OUT-SWINGING DOOR



AT IN-SWINGING DOOR

CBC 11B-604.8.1.1.3 & CBC 11B-604.8.1.2



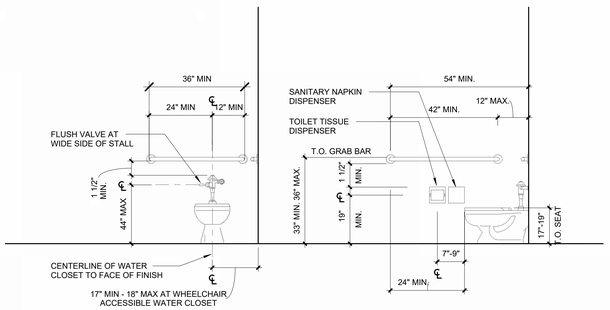
AT OUT-SWINGING DOOR

AT IN-SWINGING DOOR

CBC 11B-604.8.1.1.2 & CBC 11B-604.8.1.2

ACCESSIBLE TOILET CLEARANCES

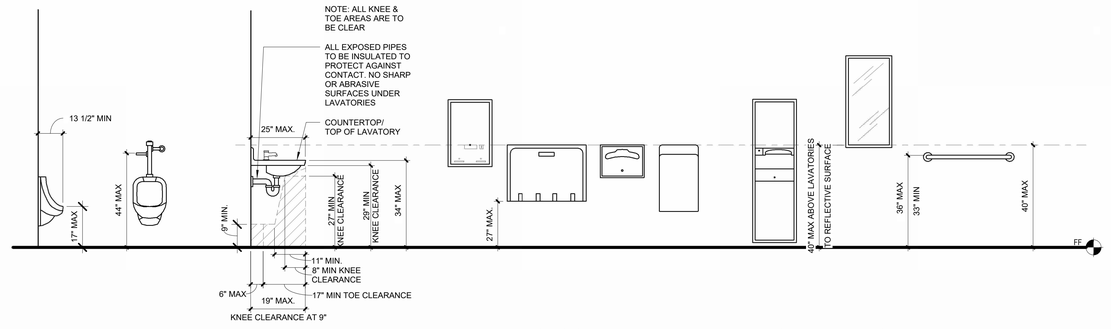
3/8" = 1'-0" | 2G0.31 | 06



CBC 11B-604.1, CBC 11B-604.2, CBC 11B-604.4, CBC 11B-604.7, CBC 11B-604.5.1, CBC 11B-609.3, & CBC 11B-609.4

RESTROOM MOUNTING HEIGHTS

1/2" = 1'-0" | 2G0.31 | 17



CBC 11B306.2, CBC 11B306.2.2, CBC 11B306.3, CBC 11B-603.3, CBC 11B603.5, CBC 11B-605.2, CBC 11B-606, & CBC 11B609.4

ACCESSIBLE MOUNTING HEIGHTS

1/2" = 1'-0" | 2G0.31 | 05

ACCESSIBILTY DETAIL NOTES

1. ALL DIMENSIONS SHOWN ON THIS SHEET ARE TO FACE OF FINISH, U.N.O.
2. ALL DIMENSIONS AND CLEARANCES SHOWN ON THIS SHEET ARE APPLICABLE THROUGHOUT THE DOCUMENTS WHEREVER THE DESCRIBED CONDITIONS OCCUR AND MAY OR MAY NOT BE SPECIFICALLY REFERENCED.
3. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL REQUIRED CLEARANCES.
4. CONSTRACTOR SHALL BRING DISCREPANCIES TO THE IMMEDIATE ATTENTION OF THE ARCHITECT.
5. FLOOR SLOPE AT ALL WHEELCHAIR SPACES TO BE 1:48 MAX. IN ANY DIRECTION.
6. ACCESSIBLE SIGNAGE REQUIREMENTS SEE SHEET 2A10.31

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

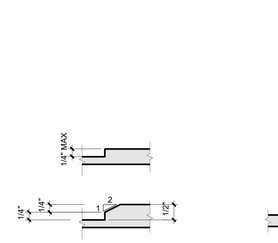
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENTS	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

TYPICAL ACCESSIBILITY NOTES AND DETAILS

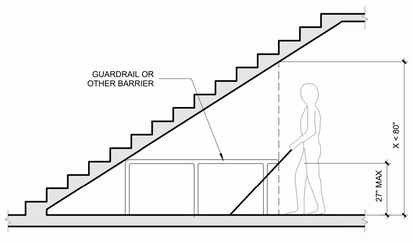
2G0.31



11B-303.2

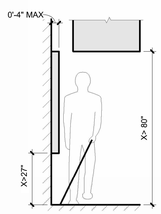
11B-303.3

CHANGES IN LEVEL | 6" = 1'-0" | 2G0.32 | 24



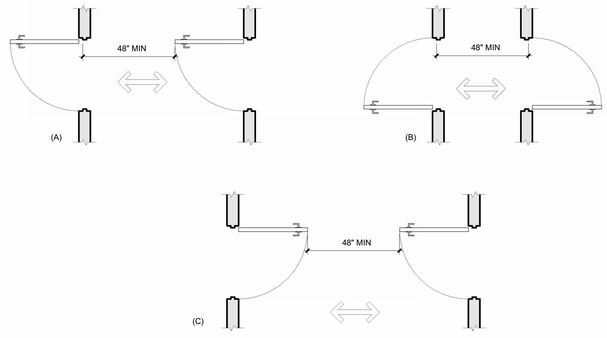
CBC 11B-307.4

VERTICAL CLEARANCE | 3/8" = 1'-0" | 2G0.32 | 20



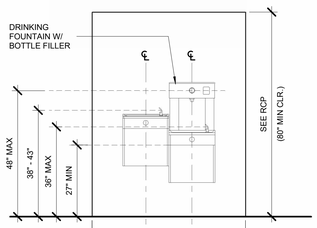
11B-307.2

ACCESSIBLE PATH OF TRAVEL PROTRUDING OBJECT LIMITS | 3/8" = 1'-0" | 2G0.32 | 16

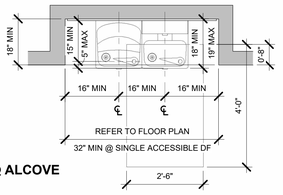


CBC 11B-404.2.6

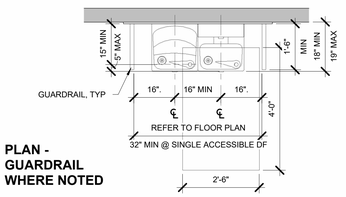
DOOR CLEARANCES - DOORS IN SERIES | 3/8" = 1'-0" | 2G0.32 | 08



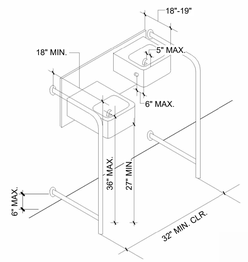
ELEVATION



PLAN @ ALCOVE



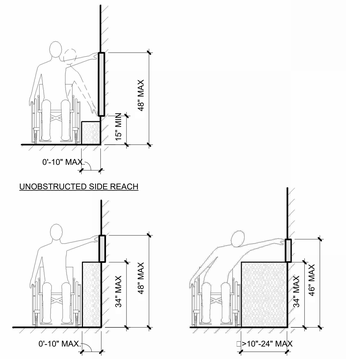
PLAN -
GUARDRAIL
WHERE NOTED



1. DRINKING FOUNTAIN SHALL BE ACCESSIBLE.
2. DRINKING FOUNTAINS SHALL BE LOCATED COMPLETELY WITHIN ALCOVES OR OTHERWISE POSITIONED SO AS NOT TO ENCROACH INTO PEDESTRIAN WAYS. THE ALCOVE IN WHICH THE WATER FOUNTAIN IS LOCATED SHALL NOT BE LESS THAN 32" IN WIDTH AND 18" IN DEPTH.
3. DRINKING FOUNTAIN SHALL BE A MINIMUM OF 18" AND A MAXIMUM OF 19" IN DEPTH AND THERE SHALL BE A CLEAR AND UNOBSTRUCTED KNEE SPACE UNDER THE DRINKING FOUNTAIN NOT LESS THAN 27" IN HEIGHT, 30" IN WIDTH AND 8" IN DEPTH, THE DEPTH MEASUREMENT BEING TAKEN FROM THE FRONT EDGE OF THE FOUNTAIN.
4. THERE SHALL BE TOE CLEARANCE OF 9" IN HEIGHT ABOVE THE FLOOR, AND 17" IN DEPTH FROM THE FRONT EDGE OF THE FOUNTAIN.
5. A CLEAR FLOOR SPACE AT LEAST 30" X 48" SHALL BE PROVIDED IN FRONT OF THE DRINKING FOUNTAIN TO ALLOW FORWARD APPROACH.
6. THE DRINKING FOUNTAIN BUBBLER SHALL BE ACTIVATED BY A MANUALLY OPERATED SYSTEM THAT IS FRONT MOUNTED OR SIDE MOUNTED AND LOCATED WITHIN 6" OF THE FRONT EDGE OF THE FOUNTAIN OR AN ELECTRONICALLY CONTROLLED DEVICE.
7. THE BUBBLER OUTLET ORIFICE SHALL BE LOCATED WITHIN 5" OF THE FRONT OF THE DRINKING FOUNTAIN AND SHALL BE WITHIN 36" OF THE FLOOR. THE WATER STREAM FROM THE BUBBLER SHALL BE SUBSTANTIALLY PARALLEL TO THE FRONT EDGE OF THE DRINKING FOUNTAIN.

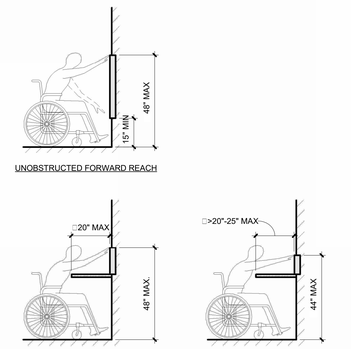
CBC 11B-306.3, CBC 11B-602, & CBC 11B-602.9

DRINKING FOUNTAIN ALCOVE W/ BOTTLE FILLER | 1/2" = 1'-0" | 2G0.32 | 21



CBC 11B-306.3.1 & CBC 11B-308.3.2

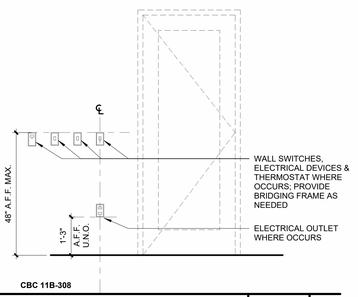
ACCESSIBLE SIDE REACH REQUIREMENTS | 3/8" = 1'-0" | 2G0.32 | 19



CBC 11B-308.2.1 & CBC 11B-308.2.2

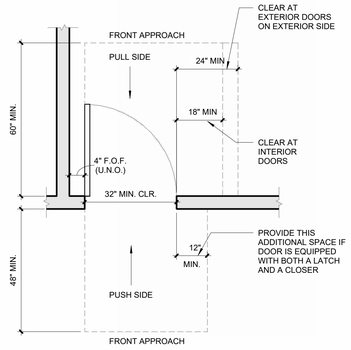
ACCESSIBLE FORWARD REACH REQUIREMENTS | 3/8" = 1'-0" | 2G0.32 | 15

NOTE: ALIGN CENTER OF ALL WALL SWITCHES & WALL DEVICES @ CENTERLINES U.N.O.



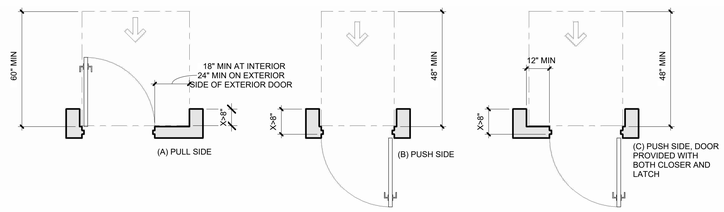
CBC 11B-308

TYPICAL DEVICE INSTALLATION | 1/2" = 1'-0" | 2G0.32 | 18



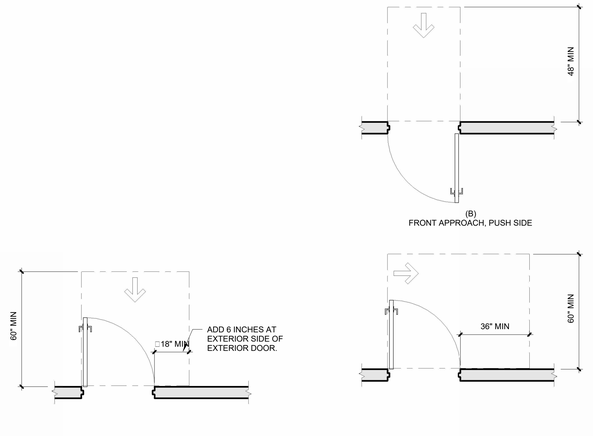
CBC 11B-404.2.3 & CBC 11B-404.2.4.1

TYPICAL CLEARANCES AT DOOR | 1/2" = 1'-0" | 2G0.32 | 14



CBC 11B-404.2.4.3

RECESSED DOOR CLEARANCES | 3/8" = 1'-0" | 2G0.32 | 13



CBC 11B-404.2.4.1

DOOR CLEARANCES | 3/8" = 1'-0" | 2G0.32 | 05

ACCESSIBILTY DETAIL NOTES

1. ALL DIMENSIONS SHOWN ON THIS SHEET ARE TO FACE OF FINISH, U.N.O.
2. ALL DIMENSIONS AND CLEARANCES SHOWN ON THIS SHEET ARE APPLICABLE THROUGHOUT THE DOCUMENTS WHEREVER THE DESCRIBED CONDITIONS OCCUR AND MAY OR MAY NOT BE SPECIFICALLY REFERENCED.
3. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL REQUIRED CLEARANCES.
4. CONSTRACTOR SHALL BRING DISCREPANCIES TO THE IMMEDIATE ATTENTION OF THE ARCHITECT.
5. FLOOR SLOPE AT ALL WHEELCHAIR SPACES TO BE 1:48 MAX. IN ANY DIRECTION.
6. ACCESSIBLE SIGNAGE REQUIREMENTS SEE SHEET 2A10.31

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

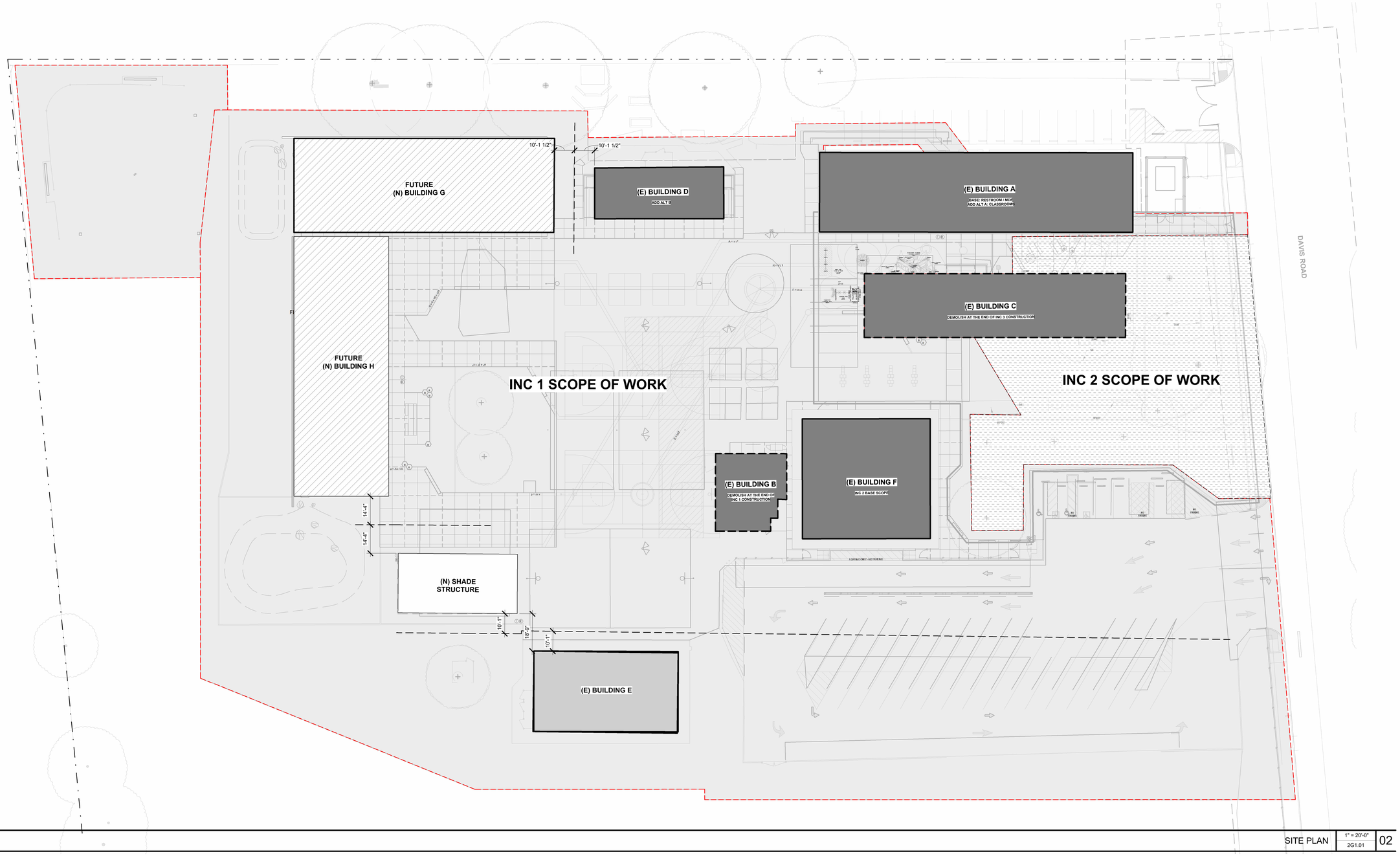
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

TYPICAL ACCESSIBILITY NOTES AND DETAILS

2G0.32



SITE PLAN | 1" = 20'-0" | 2G1.01 | 02

ELKHORN ELEMENTARY SCHOOL - CAMPUS BUILDING CODE ANALYSIS

BUILDING DESIGNATION	DSA PROJECT #	OCCUPANCY TYPE	CONSTRUCTION TYPE	SPRINKLERED	BASIC ALLOWED AREA SF	AREA INCREASE	CBC SECTION FOR INCREASE	TOTAL ALLOWED AREA SF	ACTUAL AREA SF	ALLOW STORY	ACTUAL STORY	NOTES
BUILDING A	46411	E	V-B	NO	9,500	NOT TAKEN	-	9,500	6,258	1	1	
BUILDING B/F	24262	E/B	V-B	NO	9,000	NOT TAKEN	-	9,000	6,472	1	1	NON-SEPARATED OCCUPANCY - USED MOST RESTRICTIVE OCCUPANCY
BUILDING C	37389, 42323	E/B	V-B	NO	9,000	NOT TAKEN	-	9,000	4,244	1	1	NON-SEPARATED OCCUPANCY - USED MOST RESTRICTIVE OCCUPANCY
BUILDING D	42976	E	V-B	NO	9,500	NOT TAKEN	-	9,500	1,540	1	1	
BUILDING E	A02-102324	A-2	V-B	NO	6,000	NOT TAKEN	-	6,000	2,991	1	1	
FUTURE BUILDING G (SEE INC 3)	A02-123848	E	V-B	YES	38,000	NOT TAKEN	-	38,000	12,281	2	1	
PC SHADE STRUCTURE	04-122188 PC	A-2	II-B	NO	9,500	NOT TAKEN	-	9,500	1,800	1	1	

CAMPUS PLUMBING CODE ANALYSIS

MINIMUM NUMBER OF REQ PLUMBING FIXTURES (CPC TABLE 422.1):

CAMPUS POPULATION:
STUDENTS: 400 --> 200 MALE / 200 FEMALE
STAFF: 20 --> 10 MALE / 10 FEMALE

REQUIRED (STUDENTS):

	WATER CLOSET	URINALS	LAVATORIES
MEN	4	2	5
WOMEN	7	-	5

PROVIDED (STUDENTS):

	WATER CLOSET	URINALS	LAVATORIES
MEN (MOD)	3	2	3
MEN (BLDG A)	1	3	2
TOTAL	**4**	**5**	**5**
WOMEN (MOD)	5	-	3
WOMEN (BLDG A)	4	-	2
TOTAL	**9**	**-**	**5**

REQUIRED (STAFF):

	WATER CLOSET	URINALS	LAVATORIES
MEN	1	1	1
WOMEN	1	-	1

PROVIDED (STAFF):

	WATER CLOSET	URINALS	LAVATORIES
MEN	1	1*	1
WOMEN	1	-	1

*URINAL COUNTS INCLUDE TOILETS AT GENER NEUTRAL RESTROOMS.

REQUIRED DRINKING FOUNTAINS: 4
PROVIDED DRINKING FOUNTAINS: 4

LEGEND

- FOR REFERENCE: (N) SHADE STRUCTURE UNDER INC 1
- INC 1 SITE SCOPE OF WORK
- FOR REFERENCE: RENOVATE (E) BUILDING UNDER INC 2
- FOR REFERENCE: INC 2 SITE SCOPE OF WORK
- FOR REFERENCE: DEMOLISH (E) BUILDING
- PROPERTY LINE
- FOR REFERENCE: (N) BUILDING - SEE INC 3
- FOR REFERENCE: (E) BUILDING NOT UNDER SCOPE OF WORK

GENERAL NOTES

1. FOR ADDITIONAL INFORMATION ON SITE SCOPE, REFER TO CIVIL AND LANDSCAPE DRAWINGS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

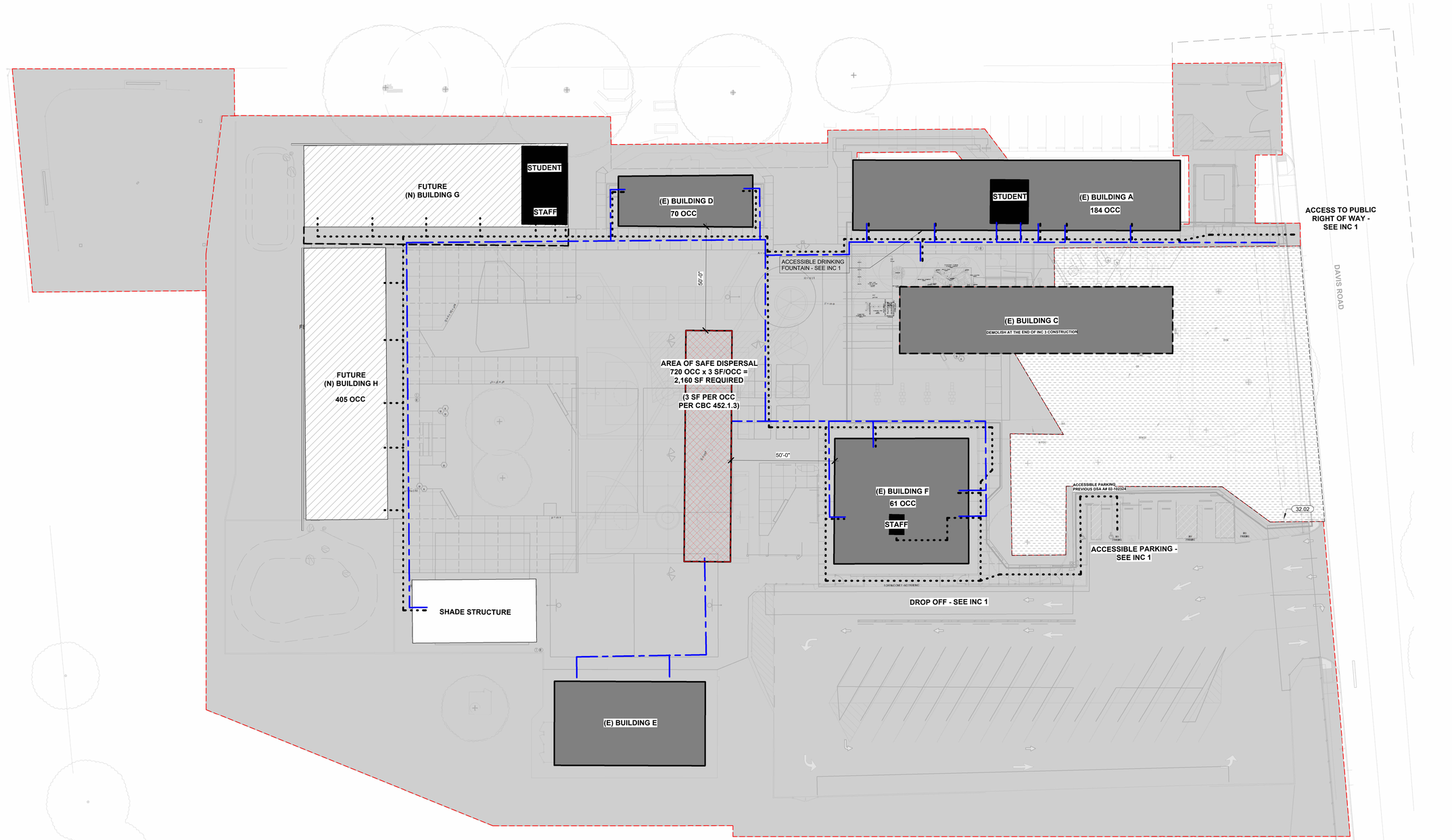
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	02/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

SITE PLAN

2G1.01



SITE ACCESSIBILITY PLAN | 1" = 20'-0" | 2G1.03 | 02

ACCESSIBLE PARKING CALCULATION

(PER CBC TABLE 11B - 208.2)

TOTAL STALLS:	36
REQUIRED ACCESSIBLE STALLS:	2
REQUIRED VAN ACCESSIBLE STALLS:	1
PROVIDED ACCESSIBLE STALLS:	2
PROVIDED ACCESIBLE VAN STALLS:	1

KEYNOTES

32.02	(E) TOW AWAY SIGN, REPLACE SIGNAGE, REFER TO CIVIL DRAWINGS.

GENERAL NOTES

1. FOR ADDITIONAL INFORMATION ON SITE SCOPE, REFER TO CIVIL AND LANDSCAPE DRAWINGS.
2. THE PATH OF TRAVEL IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS IS COMPLIANT WITH CURRENT APPLICABLE CALIFORNIA BUILDING CODE ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERATIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE PATH OF TRAVEL WAS EXAMINED AND ANY ELEMENTS, COMPONENTS, OR PORTIONS OF THE PATH OF TRAVEL THAT WERE DETERMINED TO BE NONCOMPLIANT 1) HAVE BEEN IDENTIFIED AND 2) THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WITHIN THE SCOPE OF THIS PROJECT'S WORK THROUGH DETAILS, DRAWINGS, AND SPECIFICATIONS INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS. ANY NONCOMPLIANT ELEMENTS, COMPONENTS, OR PORTION OF THE PATH OF TRAVEL THAT WILL NOT BE CORRECTED BY THIS PROJECT BASED ON VALUATION THRESHOLD LIMITATIONS OR A FINDING OF UNREASONABLE HARDSHIP ARE SO INDICATED IN THESE CONSTRUCTION DOCUMENTS. DURING CONSTRUCTION, IF PATH OF TRAVEL ITEMS WITHIN THE SCOPE OF THE PROJECT REPRESENTED AS CBC COMPLIANT ARE FOUND TO BE NONCONFORMING BEYOND REASONABLE CONSTRUCTION TOLERANCES, THEY SHALL BE BROUGHT INTO COMPLIANCE WITH THE CBC AS A PART OF THIS PROJECT BY MEANS OF A "CONSTRUCTION CHANGE DOCUMENT" - FORM DSA 140.
3. ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLANS IS A BARRIER FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING 1/2" IF BEVELED AT 1:2 MAXIMUM SLOPE OR VERTICAL LEVEL CHANGES NOT EXCEEDING 1/4" MAXIMUM AND AT LEAST 48" IN WIDTH. SURFACE IS STABLE, FIRM, AND SLIP RESISTANT. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE INDICATED. ACCESSIBLE PATH OF TRAVEL SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL ABOVE 27" AND LESS THAN 80". ARCHITECT SHALL VERIFY THAT THERE ARE NO BARRIER IN THE PATH OF TRAVEL.

LEGEND

- FOR REFERENCE: (N) SHADE STRUCTURE UNDER INC 1
- FOR REFERENCE: RENOVATE (E) BUILDING SEE INC 2
- FOR REFERENCE: (N) BUILDING - SEE INC 3
- PROPERTY LINE
- INC 1 SITE SCOPE OF WORK
- FOR REFERENCE: INC 2 SITE SCOPE OF WORK
- SAFE DISPERSAL AREA
- ACCESSIBLE RESTROOMS UNDER SCOPE OF WORK
- SAFE DISPERSAL PATH OF TRAVEL
- ACCESSIBLE PATH OF TRAVEL

BARRIER-FREE ACCESSIBLE ROUTE WITHOUT ANY ABRUPT VERTICAL CHANGES EXCEEDING 1/2" BEVELED AT 1:2 MAXIMUM SLOPE, EXCEPT THAT LEVEL CHANGES DO NOT EXCEED 1/4" VERTICAL AND IS AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS-SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE INDICATED. P.O.T. SHALL MAINTAIN FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM (11B-204 AND 11B-307).

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

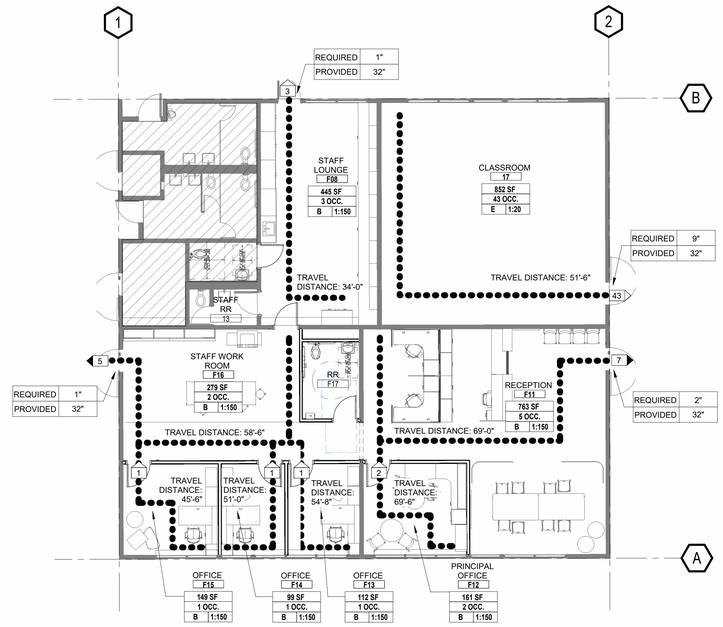
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/28/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

SITE ACCESSIBILITY PLAN

2G1.03



LEGEND

Room Name
— ROOM NUMBER
SF — SQUARE FOOTAGE
Occ-Load OCC — OCCUPANT LOAD
1:OLF — OCCUPANCY LOAD FACTOR
OCCUPANCY GROUP

REQUIRED	0" — EGRESS WIDTH REQUIRED
PROVIDED	0" — EGRESS WIDTH PROVIDED

FEC-S — FIRE EXTINGUISHER CABINET

1-HOUR RATED WALL ASSEMBLY

0 — INDIVIDUAL ROOM OCCUPANCY LOAD

0 — COMBINED ROOM OCCUPANCY LOAD

PATH OF TRAVEL/TRAVEL DISTANCE

CODE ANALYSIS

BUILDING USE:	LIBRARY, OFFICES
CONSTRUCTION CLASSIFICATION (CBC 602):	TYPE V-B
OCCUPANCY CLASSIFICATION (CBC 302 & 508.3):	B - BUSINESS & E - EDUCATIONAL (NON-SEPARATED OCCUPANCIES - MOST RESTRICTIVE OCCUPANCY USED)
ACCESSORY OCCUPANCY (CBC 508.2):	NONE
INCIDENTAL USES (CBC 509):	NONE
FIRE PROTECTION:	NON-SPRINKLERED
ALLOWABLE BUILDING HEIGHT (CBC 504 & TABLE 504.3):	40' - 0"
ALLOWABLE NUMBER OF STORIES (CBC 504 & TABLE 504.4):	1 STORY
ALLOWABLE BUILDING AREA (CBC 506.2.3 & TABLE 506.2):	9,000 SF
ACTUAL BUILDING HEIGHT:	18'-0" - OK
ACTUAL NUMBER OF STORIES:	1 STORY - OK
ACTUAL BUILDING AREA:	5,180 SF - OK

** BUILDING AREAS INCLUDE HORIZONTAL PROJECTIONS OF THE ROOF OR FLOOR ABOVE BUT EXCLUDE VENT SHAFTS & COURTS. (CBC 202)*

FIRE-RESISTANCE RATING REQ FOR BLDG ELEMENTS (CBC TABLE 601):

STRUCTURAL FRAME:	0 HOUR
EXTERIOR BEARING WALLS:	0 HOUR
INTERIOR BEARING WALLS:	0 HOUR
EXTERIOR NONBEARING WALLS:	REFER TO RATING REQ. BELOW
INTERIOR NONBEARING WALLS:	0 HOUR
FLOOR CONSTRUCTION:	0 HOUR
ROOF CONSTRUCTION:	0 HOUR **

***FIRE PROTECTION OF MEMBERS OTHER THAN THE PRIMARY STRUCTURAL FRAME SHALL NOT BE REQ. INCLUDING PROTECTION OF THE ROOF FRAMING & DECKING WHERE EVERY PART OF CONSTRUCTION IS 20 FT OR MORE ABOVE ANY FLOOR IMMEDIATELY BELOW (CBC 601 EXCEPTION 8)*

FIRE-RESISTANCE RATING REQ FOR EXTERIOR WALLS (CBC TABLE 705.5):

NO PROTECTION REQ:	10 < X ≤ 30'-0"
NO PROTECTION REQ:	X ≥ 30'-0"

NOTE: ALL EXTERIOR WALL ARE 10'-1" MIN. FROM THE IMAGINARY PROPERTY LINE.

MAX FLOOR AREA ALLOWANCES PER OCCUPANT (CBC TABLE 1004.5):

1:20 NET	=	EDUCATIONAL: CLASSROOM AREA
1:150 GROSS	=	BUSINESS AREA
1:300 GROSS	=	STORAGE AREAS, MECHANICAL EQUIPMENT ROOM

MEANS OF EGRESS SIZING (CBC 1005):
DOOR EXITS: # OCCUPANTS X 0.2 = EGRESS WIDTH

PROVIDE 2 EXITS IN ALL ROOMS WITH OCCUPANT LOADS ABOVE 49

MAXIMUM COMMON PATH OF TRAVEL (CBC TABLE 1006.2.1):

B OCCUPANCY:	100'-0"
E OCCUPANCY:	75'-0"
S-2 OCCUPANCY:	100'-0"

MAXIMUM EXIT ACCESS TRAVEL DISTANCE (CBC TABLE1017.2):

B OCCUPANCY:	200'-0"
E OCCUPANCY:	200'-0"
S-2 OCCUPANCY:	300'-0"

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
12/DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

CODE ANALYSIS PLAN - BLDG F

2G2.03

ABBREVIATIONS

GENERAL LIST: NOT ALL MAY APPLY.

AB	AGGREGATE BASE	MIN	MINIMUM
AC	ASPHALT CONCRETE PAVEMENT	MOC	MIDDLE OF CURVATURE
AE	ACCESS EASEMENT	N	NORTH
ASPH	ASPHALT PAVING	NG	NATURAL GRADE
BC	BEGIN CURVATURE	NTS	NOT TO SCALE
BCR	BEGIN CURB RETURN	OC	ON CENTER
BFP	BACK FLOW PREVENTER	(P)	PROPOSED, NEW
BI	BOX INLET	PA	PLANTING AREA
BM	BENCHMARK	PBC	PULL BOX CABLE
BOP	BOTTOM OF PIPE	PBE	PULL BOX ELECTRIC
BOR	BOTTOM OF RAMP	PBT	PULL BOX TELEPHONE
BS	BOTTOM OF STAIRS	PBW	PULL BOX WATER
BVC	BEGIN VERTICAL CURVATURE	PCC	POINT OF COMPOUND CURVATURE
BW	BOTTOM OF WALL	PE	PEDESTRIAN EASEMENT
C&G	CURB AND GUTTER	PI	POINT OF INTERSECTION
C/L,CL	CENTER LINE	PIVC	POINT OF INTERSECTION VERTICAL CURVATURE
CB	CATCH BASIN		
CONST	CONSTRUCT	PL	PROPERTY LINE
CR	CURB RETURN	POC	POINT OF CONNECTION
CT	COURT	PP	POWER POLE
CUL	CULVERT	PRC	POINT OF REVERSE CURVATURE
DI	DROP INLET	PVC	POLYVINYL CHLORIDE
DIP	DUCTILE IRON PIPE	PVMT	PAVEMENT
DW	DOMESTIC WATER	R	RADIUS
D/W	DRIVEWAY	RCP	REINFORCED CONCRETE PIPE
DE	DRAINAGE EASEMENT	RIM	TOP RIM OF STRUCTURE
DR	DRIVE	ROW	HIGHWAY EASEMENT
(E)	EXISTING	RT	RIGHT
E	EAST	RW	RECLAIMED WATER
EC	END CURVATURE	R/W	RIGHT OF WAY
ECR	END CURB RETURN	S	SOUTH OR SLOPE
EG	EXISTING GRADE	SBE	SUBBASE ELEVATION
ELEV	ELEVATION	SCO	SANITARY SEWER CLEANOUT
EOC	EDGE OF CONCRETE	SD	STORM DRAIN
EP	EDGE OF PAVEMENT	SDMH	STORM DRAIN MANHOLE
EQ	EQUAL	SF	SQUARE FEET
ESMT	EASEMENT	SHT	SHEET
EVC	END OF VERTICAL CURVATURE	STA	STATION
FF	FINISHED FLOOR	SMH	SANITARY SEWER MANHOLE
FFE	FINISHED FLOOR ELEVATION	SS	SANITARY SEWER
FG	FINISHED GRADE	SWPPP	STORM WATER POLLUTION PREVENTION PLAN
FH	FIRE HYDRANT		
FL	FLOWLINE	S/W	SIDEWALK
FS	FINISHED SURFACE	T	TANGENT
FW	FIRE PROTECTION SERVICE WATER	TB	TOP OF BERM
GB	GRADE BREAK	TBC	TOP BACK OF CURB
GFL	GUTTER FLOWLINE	TBW	TOP BACK OF WALK
GSL	LIMITS OF GRAVITY SEWER	TC	TOP OF CURB
GR	GRATE	TF	TOP OF FOOTING
GV	GAS VALVE	TG	TOP OF GRATE
HB	HOSE BIB	TOE	TOE OF SLOPE
HP	HIGH POINT	TOP	TOP OF PIPE
ICV	IRRIGATION CONTROL VALVE	TOR	TOP OF RAMP
INTX	POINT OF INTERSECTION	TOS	TOP OF SLOPE
INV	INVERT	TP	TOP OF PLANTER
JP	JOINT POLE	TS	TOP OF STAIRS
LE	LANDSCAPE EASEMENT	TW	TOP OF WALL
LF	LINEAR FEET	TYP	TYPICAL
LIP	LIP OF GUTTER	TP	TELEPHONE POLE
LP	LOW POINT	VC	VERTICAL CURVATURE
LT	LEFT	W	WEST
MAX	MAXIMUM	WM	WATER MAIN
MH	MANHOLE	WV	WATER VALVE

LEGEND

GENERAL LIST: NOT ALL MAY APPLY.

SYMBOL	DESCRIPTION
(RD)	ROOF DRAIN POC 5' FROM BUILDING
(G)	GAS POC 5' FROM BUILDING
(F)	FIRE WATER POC 5' FROM BUILDING
(W)	DOMESTIC WATER POC 5' FROM BUILDING
(SS)	SANITARY SEWER POC 5' FROM BUILDING
(D)	STORM DRAIN MANHOLE
(S)	SANITARY SEWER MANHOLE
	DRAIN INLET
AD	AREA DRAIN
	TRENCH DRAIN
	CLEANOUT
	BLOW OFF
	FIRE HYDRANT
	VALVE
	POST INDICATOR VALVE (PIV)/CHECK VALVE (CHK VLV)/FIRE DEPARTMENT CONNECTION (FDC)
	CHECK VALVE (CHK VLV)
	FIRE DEPARTMENT CONNECTION (FDC)
	DOUBLE DETECTOR CHECK (DBL CHK)
	REDUCED PRESSURE (BFP)
	POST INDICATOR VALVE (PIV)
	THRUST BLOCK
	BENDS, TEE AND CROSS
	WATER METER

LINE TYPE	DESCRIPTION
	APPROXIMATE PROJECT LIMITS
	RIGHT OF WAY/ PROPERTY LINE
	FENCE
	REMOVE EXISTING UTILITY
SS SS	EXISTING SEWER LINE
W W	EXISTING WATER LINE
SD SD	EXISTING STORM DRAIN LINE
FW FW	EXISTING DEDICATED PRIVATE FIRE SERVICE
G G	EXISTING NATURAL GAS SERVICE
E E	EXISTING ELECTRICAL LINE / CONDUIT
T T	EXISTING TELECOMMUNICATIONS LINE / CONDUIT
XXLF 6"SS S=X.XXX	SANITARY SEWER LINE
XXLF 6"DW PVC	DOMESTIC WATER LINE
XXLF 6"SD S=X.XXX	STORM DRAIN LINE (≤8" DIAMETER)
XXLF 12"SD S=X.XXX	STORM DRAIN LINE (>8" DIAMETER)
	PERFORATED STORM DRAIN LINE
XXLF 8"FW PVC	DEDICATED PRIVATE FIRE SERVICE
XXLF GAS PVC	NATURAL GAS LINE
GB	GRADE BREAK LINE
	FLOW LINE
	DAYLIGHT LINE

GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. CONTRACTOR SHALL ENSURE THAT THE CONSTRUCTION SITE IS PREPARED PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL HAVE ALL EROSION AND SEDIMENT CONTROL MEASURES IN PLACE AT ALL TIMES DURING CONSTRUCTION.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED.
3. THIS PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO UNANTICIPATED FIELD CONDITIONS.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED BEFORE AND AFTER ALL STORMS TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
5. CONTRACTOR SHALL MAINTAIN A LOG AT THE SITE OF ALL INSPECTIONS OR MAINTENANCE OF BMPS, AS WELL AS, ANY CORRECTIVE CHANGES TO THE BMPS OR EROSION AND SEDIMENT CONTROL PLAN.
6. IN AREAS WHERE SOIL IS EXPOSED, PROMPT REPLANTING WITH NATIVE COMPATIBLE, DROUGHT-RESISTANT VEGETATION SHALL BE PERFORMED. NO AREAS WILL BE LEFT EXPOSED OVER THE WINTER SEASON.
7. THE CONTRACTOR SHALL INSTALL THE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO COMMENCEMENT OF GRADING. LOCATION OF THE ENTRANCE MAY BE ADJUSTED BY THE CONTRACTOR TO FACILITATE GRADING OPERATIONS. ALL CONSTRUCTION TRAFFIC ENTERING THE PAVED ROAD MUST CROSS THE STABILIZED CONSTRUCTION ENTRANCE.
8. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE SWEPT AT THE END OF EACH WORKING DAY OR MORE OFTEN AS NECESSARY.
9. CONTRACTOR SHALL PLACE GRAVEL/SAND BAGS AROUND ALL NEW DRAINAGE STRUCTURE OPENINGS IMMEDIATELY AFTER THE STRUCTURE OPENING IS CONSTRUCTED. THESE GRAVEL/SAND BAGS SHALL BE MAINTAINED AND REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED.
10. CONTRACTOR SHALL IMPLEMENT HOUSEKEEPING PRACTICES AS FOLLOWS:
    A. SOLID WASTE MANAGEMENT:
    PROVIDE DESIGNATED WASTE COLLECTION AREAS AND CONTAINERS. ARRANGE FOR REGULAR REMOVAL AND DISPOSAL. CLEAR SITE OF TRASH INCLUDING ORGANIC DEBRIS, PACKAGING MATERIALS, SCRAP OR SURPLUS BUILDING MATERIALS AND DOMESTIC WASTE DAILY.
    B. MATERIAL DELIVERY AND STORAGE:
    PROVIDE A DESIGNATED MATERIAL STORAGE AREA WITH SECONDARY CONTAINMENT SUCH AS BERMING. STORE MATERIAL ON PALLETS AND PROVIDE COVERING FOR SOLUBLE MATERIALS. RELOCATE STORAGE AREA INTO BUILDING SHELL WHEN POSSIBLE. INSPECT AREA WEEKLY.
    C. CONCRETE WASTE:
    PROVIDE A DESIGNATED AREA FOR A TEMPORARY PIT TO BE USED FOR CONCRETE TRUCK WASH-OUT. CONCRETE WASHOUT CANNOT BE WITHIN 50' MINIMUM OF DRAIN INLETS. DISPOSE OF HARDENED CONCRETE OFFSITE. AT NO TIME SHALL A CONCRETE TRUCK DUMP ITS WASTE AND CLEAN ITS TRUCK INTO THE STORM DRAINS VIA CURB AND GUTTER. INSPECT DAILY TO CONTROL RUNOFF, AND WEEKLY FOR REMOVAL OF HARDENED CONCRETE.
    D. PAINT AND PAINTING SUPPLIES:
    PROVIDE INSTRUCTION TO EMPLOYEES AND SUBCONTRACTORS REGARDING REDUCTION OF POLLUTANTS INCLUDING MATERIAL STORAGE, USE, AND CLEAN UP. INSPECT SITE WEEKLY FOR EVIDENCE OF IMPROPER DISPOSAL.
    E. VEHICLE FUELING, MAINTENANCE AND CLEANING:
    PROVIDE A DESIGNATED FUELING AREA WITH SECONDARY CONTAINMENT SUCH AS BERMING. DO NOT ALLOW MOBILE FUELING OF EQUIPMENT. PROVIDE EQUIPMENT WITH DRIP PANS. RESTRICT ONSITE MAINTENANCE AND CLEANING OF EQUIPMENT TO A MINIMUM. INSPECT AREA WEEKLY.
    F. HAZARDOUS WASTE MANAGEMENT:
    PREVENT THE DISCHARGE OF POLLUTANTS FROM HAZARDOUS WASTES TO THE DRAINAGE SYSTEM THROUGH PROPER MATERIAL USE, WASTE DISPOSAL AND TRAINING OF EMPLOYEES. HAZARDOUS WASTE PRODUCTS COMMONLY FOUND ON-SITE INCLUDE BUT ARE NOT LIMITED TO PAINTS & SOLVENTS, PETROLEUM PRODUCTS, FERTILIZERS, HERBICIDES & PESTICIDES, SOIL STABILIZERS, STABILIZATION PRODUCTS, ASPHALT PRODUCTS AND CONCRETE CURING PRODUCTS.
11. NO GRADING SHALL BE DONE UNTIL SITE- AND SEASON-SPECIFIC SOIL LOSS AND HOUSEKEEPING STORMWATER BMPs HAVE BEEN APPROVED BY THE INSPECTOR. THE CONTRACTOR SHOULD EMPLOY THE DESIGN BMPs AND ANY OTHERS NEEDED AS SITUATIONS ARISE. CONTRACTOR SHOULD CONDUCT SITE INSPECTIONS BEFORE, DURING AND AFTER EACH EXTENDED STORM EVENT TO IDENTIFY CONDITIONS THAT MAY CONTRIBUTE TO EROSION AND SEDIMENT PROBLEMS OR ANY OTHER POLLUTANT DISCHARGES. IF ADDITIONAL CONTROL MEASURES ARE NEEDED, CONTRACTOR SHOULD IMPLEMENT THEM IMMEDIATELY.

POLLUTION PREVENTION NOTES

IN ORDER TO MEET THE REQUIREMENTS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM FOR CONSTRUCTION, CONSTRUCTION CONTRACTORS SHALL INSTALL AND MAINTAIN APPROPRIATE BEST MANAGEMENT PRACTICES (BMPS), AS SHOWN IN THE EROSION CONTROL PLAN AND IN ACCORDANCE WITH THE SWPPP (STORM WATER POLLUTION PREVENTION PLAN), ON ALL CONSTRUCTION PROJECTS. BMPS SHALL BE INSTALLED IN ACCORDANCE WITH INDUSTRY RECOMMENDED STANDARDS, AND/OR IN ACCORDANCE WITH ANY GENERAL CONSTRUCTION PERMIT ISSUED BY THE STATE FOR THE PROJECT TO PREVENT ANY DISCHARGES FROM THE PROJECT SITE OR INTO ANY STORM DRAIN FACILITIES. ALL SEDIMENTS, CONSTRUCTION MATERIALS, DEBRIS AND WASTES, AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, WIND, OR VEHICLE TRACKING. UNDER DIRECTION OF THE ENGINEER OF RECORD, EROSION AND/OR SEDIMENT CONTROL DEVICES SHALL BE MODIFIED AS NEEDED AS THE PROJECT PROGRESSES TO ENSURE EFFECTIVENESS.

BMP MAINTENANCE NOTES

1. FOLLOWING OWNER ACCEPTANCE OF CONSTRUCTION WORK, POST CONSTRUCTION BEST MANAGEMENT PRACTICE (BMP) MEASURES SHALL BE MAINTAINED BY THE PROPERTY OWNER, INCLUDING BUT NOT LIMITED TO:
   1.1. ANNUAL INSPECTION, REPLACEMENT, AND/OR SEDIMENTATION REMOVAL OF VEGETATED SWALES, TREATMENT PONDS, AND OTHER SURFACE STORMWATER TREATMENT MEASURES AS REQUIRED WITH AN INCREASED FREQUENCY BASED ON SITE CONDITIONS.
   1.2. MAINTENANCE SERVICE AGREEMENT(S) OF STORMWATER TREATMENT VAULTS, INLETS, MANHOLES, AND OTHER DEVICES BASED ON MANUFACTURES' RECOMMENDATIONS AND FREQUENCY.
   1.3. ANNUAL INSPECTION OF PERMEABLE PAVEMENT AND REMOVAL OF SEDIMENT AS NEEDED.
   1.4. ANNUAL INSPECTION OF STORMWATER INLETS AND MAINTENANCE AS REQUIRED TO CLEAR GRATES AND INLETS OF DEBRIS.
   1.5. THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND WATER QUALITY MANAGEMENT PLAN (WQMP) MAY CONTAIN ADDITIONAL OR MORE STRINGENT MAINTENANCE REQUIREMENTS.
2. BMP DETAILS MAY BE FOUND IN APPENDIX H OF THE PROJECT SWPPP DOCUMENT. BMP DETAILS PER CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA) AND ARE AVAILABLE AT www.casqa.org.
3. FOR PROJECTS GREATER THAN 1 ACRE: THE CONTRACTOR SHALL VERIFY THE STATUS OF THE SWPPP/NOI/WDID PRIOR TO EARTHMOVING ACTIVITIES. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE PREPARED AND A NOTICE OF INTENT (NOI) SHALL BE FILED WITH THE STATE WATER RESOURCES CONTROL BOARD (SWRCB) IN ACCORDANCE WITH THE REQUIREMENTS OF CALIFORNIA GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (PERMIT NO. CAS000002) FOR ALL OPERATIONS ASSOCIATED WITH THESE PLANS. THE CONTRACTOR SHALL KEEP A COPY OF THE SWPPP ON SITE AND AVAILABLE FOR REVIEW.

AREA SUMMARY

TOTAL DISTURBED AREA = 24,620 SF (0.57± ACRES)

DEMOLITION NOTES

1. THE INTENT OF THE DEMOLITION PLAN IS TO DESCRIBE IN GENERAL THE DEMOLITION AREAS AFFECTED BY THE PROJECT CONSTRUCTION. IT IS NOT INTENDED AS A DETAILED DESCRIPTION OF EXISTING ITEMS OR ELEMENTS TO BE REMOVED. THE CONTRACTOR SHALL VISIT THE SITE AND REVIEW ANY AVAILABLE RECORD DOCUMENTS TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS AND SHOULD INCLUDE THE REMOVAL OF ALL ITEMS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ONE SHALL BE BINDING AS IF REQUIRED BY ALL TO THE EXTENT THAT IT IS REASONABLY INFERABLE FROM THEM AS BEING NECESSARY TO PRODUCE THE INTENDED RESULTS.
2. REMOVE EXISTING BUILDINGS, FOUNDATIONS AND SERVICE UTILITIES AS INDICATED ON PLANS. CAP ALL UTILITIES AT APPROPRIATE POINTS. ALL EXISTING ELECTRICAL / TELEPHONE / CATV UTILITIES SHALL BE REMOVED AS INDICATED OR BACK TO THE POINT WHERE THE SPECIFIC UTILITY SYSTEM ENTERS THE WORK AREA. COORDINATE DEMOLITION OF ALL UTILITIES WITH THE OWNER. ALL UTILITIES CONNECTED TO EXISTING BUILDINGS TO REMAIN SHALL CONTINUE TO BE OPERATIONAL DURING THE DEMOLITION PROCESS. DOMESTIC AND FIRE SERVICE WATER AND NATURAL GAS SHALL BE REMOVED TO A POINT OUTSIDE THE PERIMETER OF PROPOSED NEW CONSTRUCTION TO EXISTING VALVES OR SIMILAR SHUT-OFF DEVICES. IF A SHUT-OFF DEVICE IS NOT REASONABLY ADJACENT TO THE PERIMETER OF THE PROPOSED NEW CONSTRUCTION, PROVIDE A SHUT-OFF DEVICE IN BELOW-GRADE YARD BOX. CONFIRM LOCATION OF NEW DEVICES WITH OWNER PRIOR TO INSTALLATION. SANITARY SEWER AND STORM DRAINAGE SHALL BE CAPPED TO A POINT OUTSIDE THE PERIMETER OF THE PROPOSED NEW CONSTRUCTION. OTHER UTILITIES NOT SPECIFICALLY IDENTIFIED IN THESE DOCUMENTS AND NOT ANTICIPATED FOR REUSE SHALL BE REMOVED IN ENTIRETY.
3. FOR ALL EXISTING MATERIALS THAT CAN BE SALVAGED, OWNER HAS FIRST RIGHT OF REFUSAL FOR REMOVED ITEMS THAT MAY HAVE RESIDUAL COMMERCIAL OR HISTORIC VALUE INCLUDING HARDWARE, GLASS, CORNER STONES, TIME CAPSULES, LIGHT STANDARDS, SIGNS, FENCING, BENCHES, WATER FOUNTAINS, TRASH CONTAINERS, ETC. SHALL REMAIN AS PROPERTY OF THE OWNER. ALL ITEMS TO BE SALVAGED FOR REUSE/REINSTALLATION MUST MEET CURRENT CODE REQUIREMENTS. COORDINATE ITEMS TO BE RETAINED WITH OWNER AND REMOVE FROM CONSTRUCTION SITE TO A LOCATION APPROVED BY OWNER. REMOVED MATERIALS, NOT INDICATED OR DIRECTED TO BE SALVAGED FOR THE OWNER'S BENEFIT ARE DEBRIS AND BECOME THE CONTRACTOR'S PROPERTY UPON REMOVAL.
4. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY SEARCH OF THE AVAILABLE RECORDS AND FIELD SURVEYS. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT, UTILITY COMPANIES, AND/OR FIELD VERIFY AND LOCATE ALL UTILITIES BEFORE PROCEEDING WITH WORK. THE CONTRACTOR IS ALSO REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. NOTIFY THE ENGINEER IF ADDITIONAL UTILITIES ARE LOCATED OR IF CONFLICTS ARE FOUND WITH EXISTING CONDITIONS.
5. ALL TREES TO BE REMOVED SHALL BE MARKED BY CONTRACTOR AND APPROVED FOR REMOVAL BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO REMOVING OR CUTTING TREE(S). EXISTING ROOTS SHALL BE GRINDED TO A DEPTH OF APPROXIMATELY 3-FEET. USE CAUTION WHILE GRINDING WHEN EXISTING UTILITIES ARE IN CLOSE PROXIMITY TO TREES. ALL TREES TO REMAIN WITHIN THE LIMIT OF WORK SHALL BE PROTECTED AND MAINTAINED PER SPECIFICATIONS AND DETAILS.
6. SAWCUT EXISTING CONCRETE AND ASPHALT TO AN EXISTING CONTROL JOINT WHERE POSSIBLE, AT MINIMUM TO A NEAT-STRAIGHT LINE. ALL DEBRIS SHALL BE HAULED OFFSITE TO A LEGAL DUMPING SITE OR SALVAGED FOR REUSE ON PROJECT AS NOTED.
7. WORK WITHIN CITY, COUNTY, OR STATE RIGHT-OF-WAY REQUIRES A SEPARATE ENCROACHMENT PERMIT WHICH THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING PRIOR TO STARTING WORK WITHIN RIGHT-OF-WAY.
8. CONTRACTOR TO COORDINATE UTILITY DEMOLITION WITH DRAINAGE AND UTILITY WORK SHOWN IN THIS PLAN SET. ALL UTILITY SHUTDOWNS SHALL BE COORDINATED PER PROJECT SPECIFICATIONS.
9. EXISTING DRY UTILITIES SHOWN FOR DEMOLITION ARE SHOWN FOR COORDINATION ONLY. REFER TO OTHER DISCIPLINES FOR LIMITS AND DETAILS OF DEMOLITION.
10. THE CONTRACTOR SHALL RECYCLE CONSTRUCTION DEBRIS, ASPHALT, AND CONCRETE GENERATED FROM REMOVALS REQUIRED TO CONSTRUCT THE PROJECT. THE CONTRACTOR IS OBLIGATED, UNDER THIS CONTRACT, TO RECYCLE THE WASTE MATERIAL THROUGH AN APPROVED RECYCLING PLANT.
11. A LIST OF FACILITIES THAT ACCEPT CONSTRUCTION & DEMOLITION DEBRIS CAN BE FOUND ON THE CALRECYCLE WEBSITE AT: HTTPS://WWW.CALRECYCLE.CA.GOV/CONDEMO
12. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING BUILDING FINISHES DURING DEMOLITION. ANY FINISH THAT IS DAMAGED DURING DEMOLITION SHALL BE REPAIRED OR REPLACED IN-KIND OR BETTER.

GENERAL NOTES TO CONTRACTOR

1. THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY OWNERS FOR LOCATION, REMOVAL, AND/OR RELOCATION OF ANY UTILITY SERVICES AFFECTED BY CONSTRUCTION. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONARY MEASURES TO PROTECT UNDERGROUND OR OVERHEAD STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THESE DRAWINGS.
2. THE CONTRACTOR SHALL NOTIFY THE PROJECT INSPECTOR AND THE RESPECTIVE UTILITY OWNERS AND OTHER AGENCIES AT LEAST TWO WORKING DAYS PRIOR TO START OF CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING, VERIFYING LOCATIONS (BOTH HORIZONTAL AND VERTICAL), AND MAINTAINING ALL EXISTING UNDERGROUND UTILITIES, BOTH SHOWN ON THE PLANS AND/OR NOT SHOWN ON THE PLANS DURING CONSTRUCTION. REPAIR DAMAGED UTILITIES TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND UTILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS BECAUSE OF LOCATIONS OF EXISTING FACILITIES AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. APPROVAL OF THESE PLANS DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OR COMPLETENESS OF THE LOCATION OR THE EXISTENCE, OR NON-EXISTENCE OF ANY UTILITY AND/OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE CONTRACTOR IS REQUIRED TO TAKE ALL DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OF RECORD AND/OR NOT OF RECORD SHOWN OR NOT SHOWN AND ANY OTHER LINE(S) OR STRUCTURE(S) NOT SHOWN ON THESE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF, AND/OR DAMAGE TO THESE LINE(S) AND/OR STRUCTURE(S).
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY SHORING AT PROPOSED BUILDING FOUNDATIONS, FOOTINGS, AND WALLS TO PROTECT EXISTING UTILITIES IN PLACE.
6. UNAUTHORIZED CHANGES AND USES - CAUTION: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.
7. THE CONTRACTOR SHALL MAINTAIN THE EXISTING ACCESSIBLE ROUTE CLEAR OR PROVIDE AN ALTERNATE ACCESSIBLE ROUTE OF TRAVEL DURING DEMOLITION AND/OR CONSTRUCTION.
8. THE CONTRACTOR SHALL MAINTAIN THE EXISTING FIRE EXITS AND STAIRS CLEAR AND USABLE OR PROVIDE ALTERNATE FIRE EXITS DURING DEMOLITION AND/OR CONSTRUCTION.

EARTHWORK NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THE GRADING PLANS AND SOILS REPORT THOROUGHLY PRIOR TO SITE MOBILIZATION. IT IS ALSO THE GRADING CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CIVIL AND SOILS ENGINEERS IF ONSITE DISCREPANCIES ARE OBSERVED THAT WOULD AFFECT THE EARTHWORK QUANTITIES.
2. THE EXISTING TOPOGRAPHY AS DELINEATED ON THESE DRAWINGS SHALL BE UTILIZED AS THE BASIS FOR ALL EARTHWORK COMPUTATIONS. SAID TOPOGRAPHY SHALL BE PRESUMED TO BE ACCEPTABLE TO ALL INTERESTED PARTIES UNLESS A DEVIATION IS FOUND PRIOR TO THE START OF GRADING IN ANY SPECIFIC AREAS. ANY DEVIATION SO DETERMINED SHALL BE PROMPTLY TRANSMITTED TO ALL INTERESTED PARTIES.
3. THE CONTRACTOR IS REQUIRED TO ESTIMATE THE QUANTITIES OF GRADING WORK TO BE DONE AND INCLUDE ALL COSTS THEREFROM WITH HIS BID, AS NO ADDITIONAL ALLOWANCE WILL BE MADE WITHOUT PRIOR CONSENT FROM THE OWNER.
4. OVER-EXCAVATION AND/OR EXCESS BACKFILLING OR DUPLICATION OF GRADING ACTIVITIES IS NOT A BASIS FOR ADDITIONAL COMPENSATION. THIS ALSO APPLIES WHERE MATERIAL IS TO BE REMOVED AND REPLACED TO REDUCE MOISTURE CONTENT.
5. OFF-SITE DISPOSAL OF EXCAVATION MATERIAL IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE INCLUDED IN THE BID. THE CONTRACTOR SHALL HOLD THE OWNER AND ENGINEER HARMLESS AS A RESULT OF ANY CLAIMS ARISING FROM THE ACTIONS ENROUTE OR AWAY FROM THE SITE.
6. EARTH VOLUMES SHOWN HEREON ARE ESTIMATES BASED UPON THE GEOTECHNICAL ANALYSIS PERFORMED BY THE NAMED SOILS ENGINEER AND TOPOGRAPHIC SURVEY OF THE EXISTING GROUND SURFACE AT THE TIME OF PLAN PREPARATION. EARTHWORK VOLUMES ARE COMPUTED BY METHODS COMMONLY USED IN STANDARD ENGINEERING PRACTICE, AND ARE INTENDED FOR USE IN ESTABLISHING GOVERNING AGENCY FEES. ACTUAL FIELD CONDITIONS MAY VARY FROM OBSERVED OR MEASURED CONDITIONS AT THE TIME OF PLAN PREPARATION. EARTHWORK QUANTITIES MAY VARY AS A RESULT.
7. ANY EXPORT OR IMPORT REQUIRED TO BALANCE THE SITE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. PAVEMENT AND SUBGRADE RECOMMENDATIONS RELATED TO OVER-EXCAVATION, PAVEMENT SUBGRADE, ETC., PER GEOTECHNICAL REPORT:
   a. FILL PLACED BELOW BUILDINGS SHOULD CONSIST OF NON-EXPANSIVE, IMPORTED SOILS, AND SHOULD EXTEND AT LEAST 5 FEET BEYOND OUTER EDGE OF BUILDING FOUNDATIONS AND AT LEAST 2 FEET BEYOND ADJACENT EXTERIOR PAVEMENTS AS REQUIRED PER SUBSECTION "ENGINEERED FILL CONSTRUCTION" UNDER SECTION "RECOMMENDATIONS" OF THE "GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING REPORT" DATED JUNE 6, 2025, BY MID PACIFIC ENGINEERING, INC. (MPE).
   b. SUBGRADE BELOW BUILDING PADS AND EXTERIOR PAVEMENTS SHOULD BE PREPARED AS REQUIRED PER SUBSECTION "ENGINEERED FILL CONSTRUCTION" UNDER SECTION "RECOMMENDATIONS" OF THE "GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING REPORT" DATED JUNE 6, 2025, BY MID PACIFIC ENGINEERING, INC. (MPE).
   c. SOILS BELOW BUILDING PADS SHOULD BE OVER-EXCAVATED TO 5 FEET BEYOND THE PERIMETER OF THE BUILDING AND TO A DEPTH EQUAL TO THE BOTTOMS OF PROPOSED FOUNDATIONS OR 2 FEET BELOW EXISTING SITE GRADES WHICHEVER IS DEEPER, AND SUBGRADES BELOW EXCAVATIONS AND SUB-EXCAVATIONS SHOULD BE PREPARED AS REQUIRED PER SUBSECTION "SITE PREPARATION AND OVER-EXCAVATION" UNDER SECTION "RECOMMENDATIONS" OF THE "GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING REPORT" DATED JUNE 6, 2025, BY MID PACIFIC ENGINEERING, INC. (MPE).

GEOTECHNICAL INFORMATION

FOR SITE PREPARATION, OVEREXCAVATION, FOUNDATION RECOMMENDATIONS, PAVEMENT, SUBGRADE, AND GRADATION REQUIREMENTS SEE GEOTECHNICAL INVESTIGATION REPORT ENTITLED:

"GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING REPORT
ELKHORN ELEMENTARY SCHOOL
NEW CLASSROOM BUILDING AND REMODELING"

PREPARED BY: MID PACIFIC ENGINEERING, INC.
840 EMBARCADERO DRIVE
SUITE 20
WEST SACRAMENTO, CA 95605

PROJECT NO: 06317-03

DATED: JUN 06, 2025

"SUPPLEMENTAL RECOMMENDATIONS LETTER
ELKHORN ELEMENTARY SCHOOL
NEW CLASSROOM BUILDING AND REMODELING"

PREPARED BY: MID PACIFIC ENGINEERING, INC.
840 EMBARCADERO DRIVE
SUITE 20
WEST SACRAMENTO, CA 95605

PROJECT NO: 06317-03

DATED: APRIL 8, 2026

EARTHWORK QUANTITIES

APPROXIMATE CUT: 100 CY

APPROXIMATE FILL: 100 CY

NOTE:
EARTHWORK QUANTITIES INDICATED ARE FOR REFERENCE ONLY (NOT FOR BID OR PAYMENT). THE CONTRACTOR IS RESPONSIBLE FOR ACTUAL QUANTITIES.

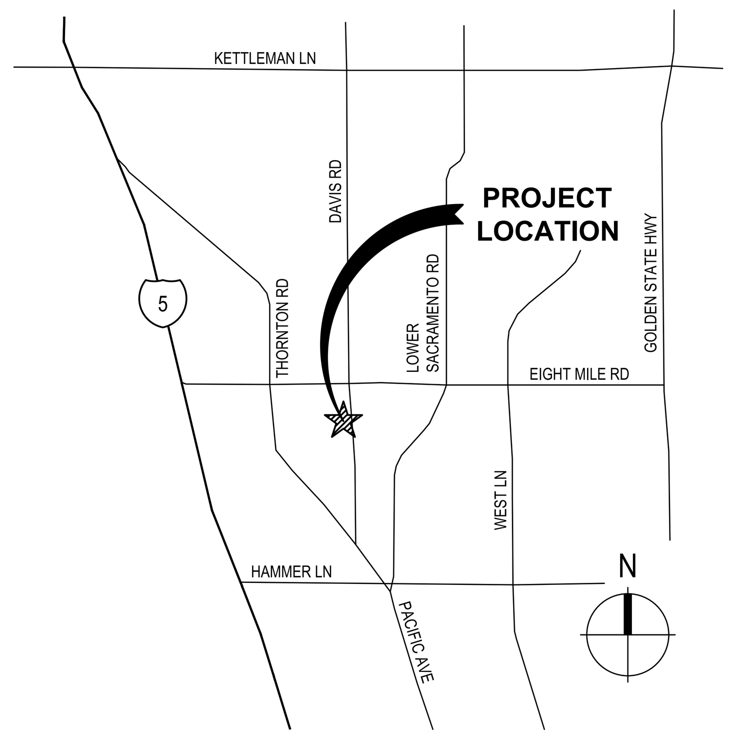
HAUL ROUTE TO BE DETERMINED AT PRE-GRADE MEETING AND ALL NECESSARY PERMITS SHALL BE OBTAINED BY THE GENERAL CONTRACTOR

BENCHMARK

SAN JOAQUIN COUNTY BRASS DISK IN MONUMENT WELL MARKING THE EAST ONE - QUARTER (1/4) CORNER OF SECTION 5, TOWNSHIP 2 NORTH, RANGE 6 EAST, DAVIS RD. BRASS DISK MARKS COS IN-9.

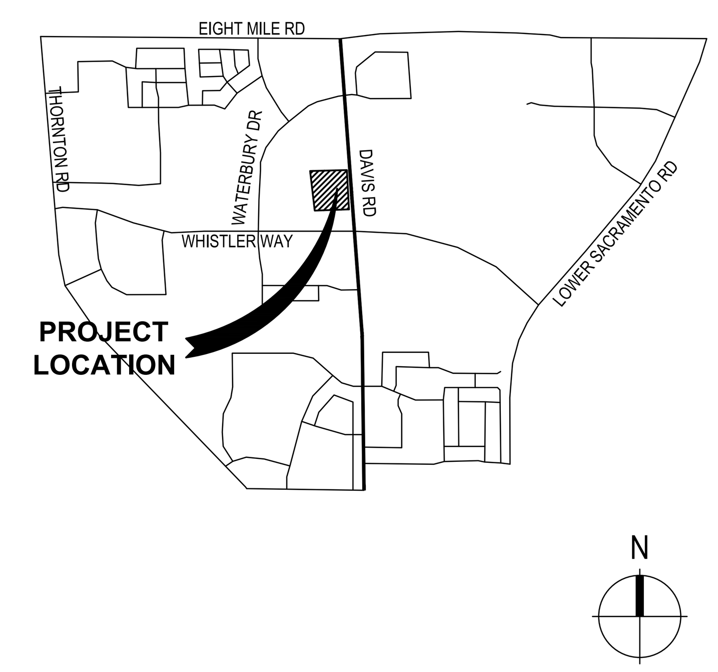
VICINITY MAP

NTS



LOCATION MAP

NTS



CIVIL SHEET INDEX

2C0.01	CIVIL NOTES
2C0.02	KEY MAP
2C0.03	EXISTING CONDITIONS
2C1.01	DEMOLITION PLAN
2C2.01	GRADING PLAN
2C2.02A	GRADING PLAN, ADD-ALTERNATIVE 2 AND 3
2C3.01	STORM DRAIN PLAN
2C3.02A	STORM DRAIN PLAN, ADD-ALTERNATIVE 2 AND 3
2C5.01	HORIZONTAL CONTROL AND PAVING PLAN
2C5.02A	HORIZONTAL CONTROL AND PAVING PLAN, ADD-ALTERATIVE 2 AND 3
2C6.01	EROSION CONTROL PLAN
2C6.02A	EROSION CONTROL PLAN, ADD-ALTERNATIVE 2 AND 3
2C7.01	DETAILS

DIG ALERT NOTICE

PURSUANT TO THE CALIFORNIA GOVERNMENT CODE SECTION 4216, NO EXCAVATION PERMIT IS VALID UNLESS DIG ALERT HAS BEEN CONTACTED AT LEAST TWO (2) WORKING DAYS PRIOR TO THE COMMENCEMENT OF EXCAVATION AND AN INQUIRY IDENTIFICATION NUMBER HAS BEEN ISSUED.

INQUIRY ID# ____________

DIGALERT
811. Know what's below. Call 811 before you dig.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHEREEN M. SHINKAI
R.C.E. 68369
EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

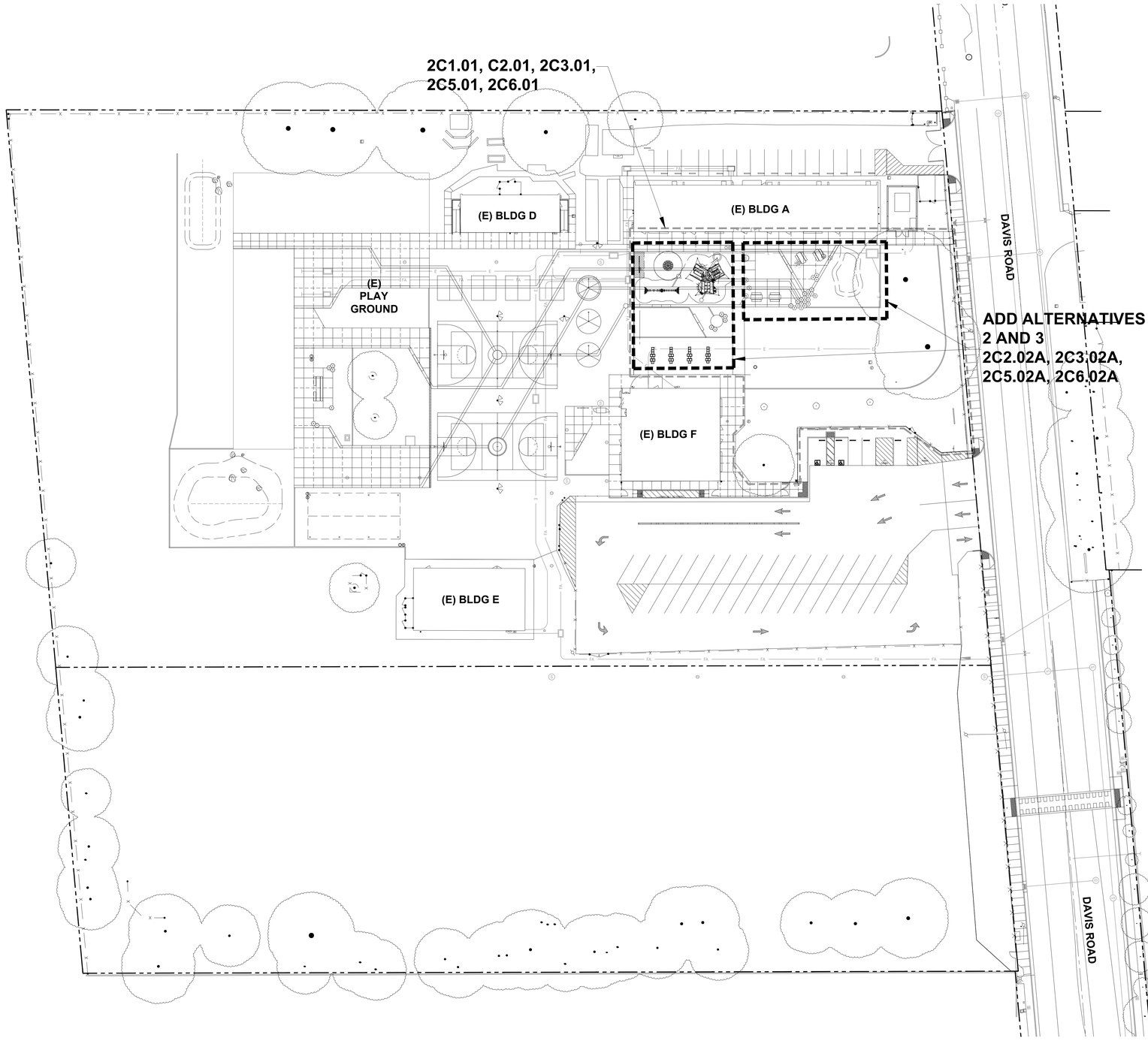
Revision	Date

Submittal	Date
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	CD
Scale	N/A

CIVIL NOTES

2C0.01



LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

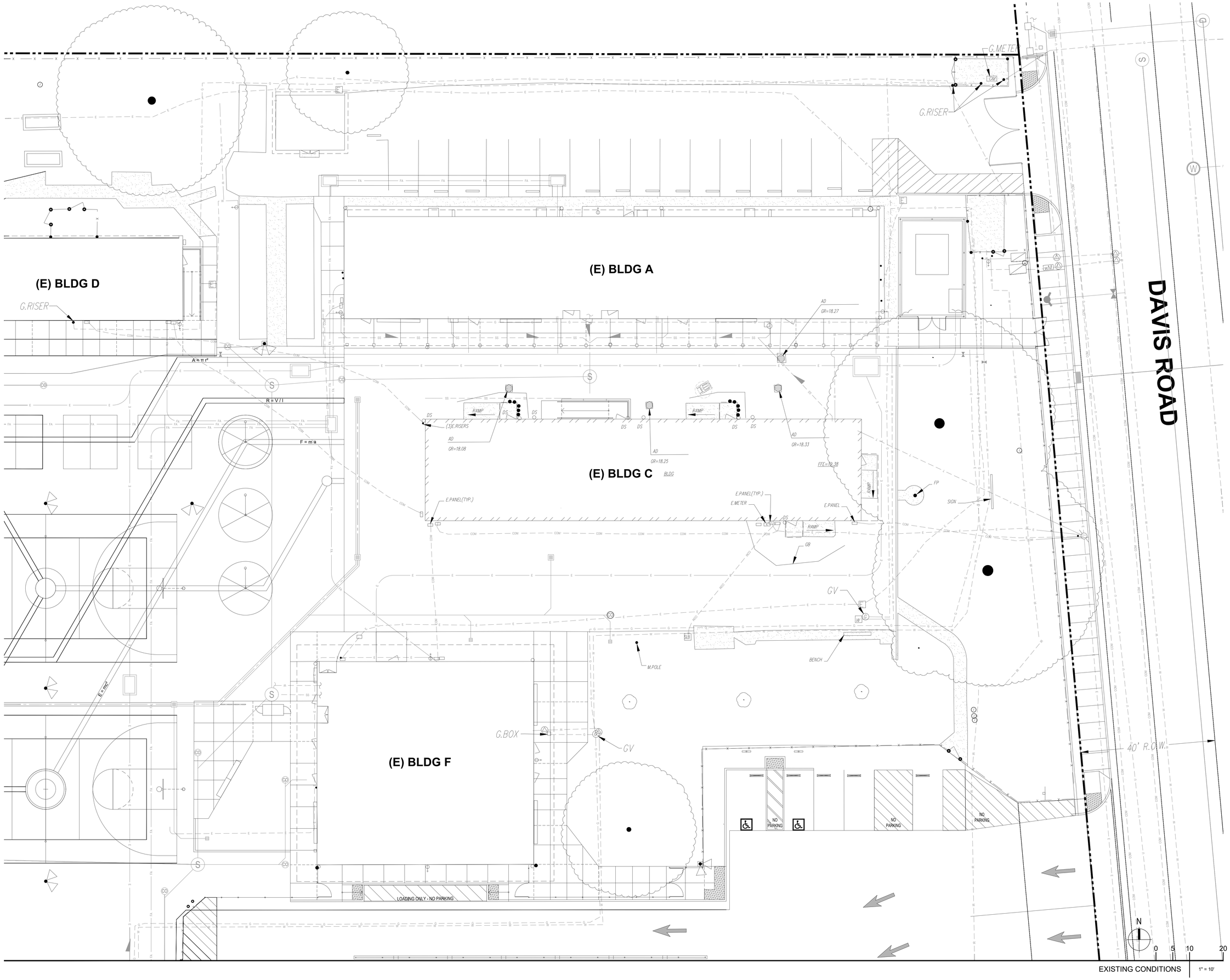
Revision	Date

Submittal	Date
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 20'

KEY MAP

2C0.02



EXISTING CONDITIONS 1" = 10'

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWINEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client). The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

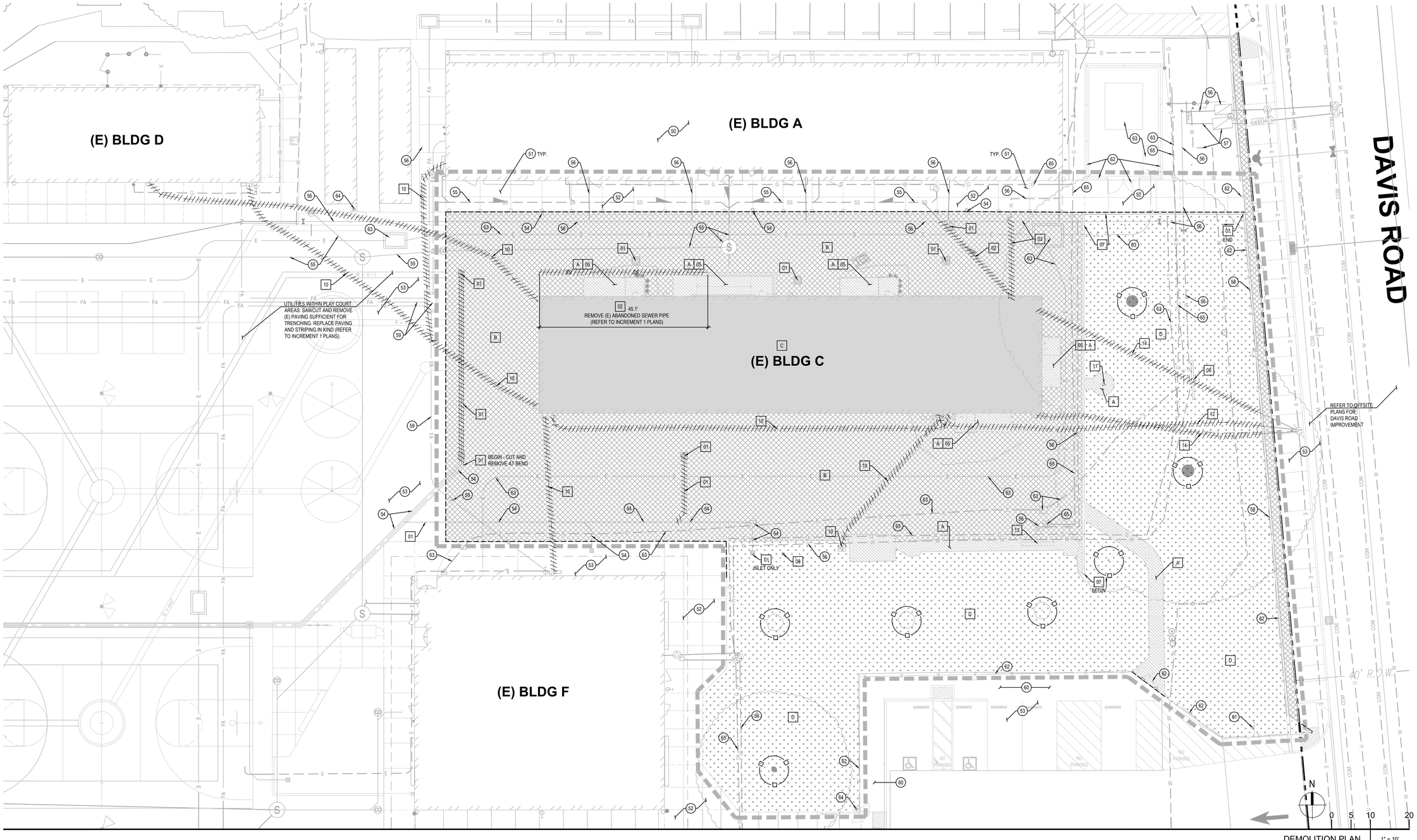
Revision	Date

Submittal	Date
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 10'

EXISTING CONDITIONS

2C0.03



DEMOLITION PLAN 1" = 10'

PROTECTION KEYNOTES

KEY NOTE	DESCRIPTION
61	PROTECT (E) MONUMENT AND/OR SIGN POST.
62	PROTECT (E) FENCE AND/OR GATE AND FOOTINGS.
63	PROTECT (E) ELECTRICAL FACILITIES.
64	PROTECT (E) LIGHT POLE AND FOOTING.
65	PROTECT (E) GAS FACILITIES.

PROTECTION KEYNOTES

KEY NOTE	DESCRIPTION
50	PROTECT (E) BUILDING, FOUNDATION AND OTHER STRUCTURAL FEATURES AND BUILDING UTILITIES.
51	PROTECT (E) CANOPY AND COLUMNS, AND OTHER STRUCTURAL FEATURES AND CANOPY UTILITIES.
52	PROTECT (E) CONCRETE PAVEMENT/SIDEWALK.
53	PROTECT (E) AC PAVEMENT.
54	PROTECT (E) STORM DRAIN FACILITIES.
55	PROTECT (E) SANITARY SEWER FACILITIES.
56	PROTECT (E) WATER SERVICE FACILITIES.
57	PROTECT (E) IRRIGATION FACILITIES.
58	PROTECT (E) CURB.
59	PROTECT (E) TELECOMMUNICATION FACILITIES.
60	PROTECT (E) STRIPING.

DEMOLITION KEYNOTES

KEY NOTE	DESCRIPTION
08	REMOVE (E) POST AND FOOTING.
09	NOT USED.
10	REMOVE (E) TELECOMMUNICATION FACILITIES.
11	REMOVE (E) FLAGPOLE AND FOOTING.
12	REMOVE (E) ELECTRICAL CONDUITS. SEE ELECTRICAL PLANS FOR IMPROVEMENTS.
13	REMOVE (E) BENCH.
14	REMOVE (E) COMMUNCATION LINE. SEE ELECTRICAL PLANS FOR IMPROVEMENTS.

DEMOLITION LEGEND

LABEL	DESCRIPTION
	SAWCUT (E) PAVEMENT AS NEEDED. SEE DEMOLITION NOTE 6 AND 10 SHEET C0.01.
	APPROXIMATE LIMIT OF WORK LINE.
	REMOVE (E) UTILITY. SEE DEMOLITION NOTES 2, 4, 8, AND 9 SHEET C0.01.

DEMOLITION KEYNOTES

KEY NOTE	DESCRIPTION
01	REMOVE (E) STORM DRAIN PIPE AND APPURTENANCES. SEE UTILITY PLAN FOR IMPROVEMENTS.
02	REMOVE (E) SANITARY SEWER PIPE AND APPURTENANCES. SEE UTILITY PLAN FOR IMPROVEMENTS.
03	REMOVE (E) WATER PIPE AND APPURTENANCES. SEE UTILITY PLAN FOR IMPROVEMENTS.
04	NOT USED.
05	REMOVE (E) RAMP AND HANDRAILS. WHERE SHOWN PER PLAN, REMOVE EXISTING BOLLARDS ADJACENT TO THE RAMP.
06	SALVAGE (E) SIGN/MONUMENT. SEE LANDSCAPE PLANS FOR NEW LOCATION.
07	REMOVE (E) CURB.

DEMOLITION NOTES

-SEE DEMOLITION NOTES, SHEET C0.01.

DEMOLITION LEGEND

LABEL	DESCRIPTION
A	REMOVE (E) CONCRETE PAVEMENT/SIDEWALK, SEE DEMOLITION NOTE 10 SHEET C0.01.
B	REMOVE (E) AC PAVEMENT, SEE DEMOLITION NOTE 10 SHEET C0.01.
C	REMOVE (E) BUILDING STRUCTURE, SEE DEMOLITION NOTE 2 SHEET C0.01.
D	REMOVE (E) LANDSCAPING. SEE LANDSCAPE AND IRRIGATION PLANS FOR IMPROVEMENTS.
	REMOVE (E) TREE, SEE DEMOLITION NOTE 5 SHEET C0.01.
	(E) TREE TO REMAIN AND BE PROTECTED, SEE DEMOLITION NOTE 5 SHEET C0.01.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER KATHLEEN M. SWINNEY R.C.E. 68369 EXP. 9-30-27 STATE OF CALIFORNIA CIVIL

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

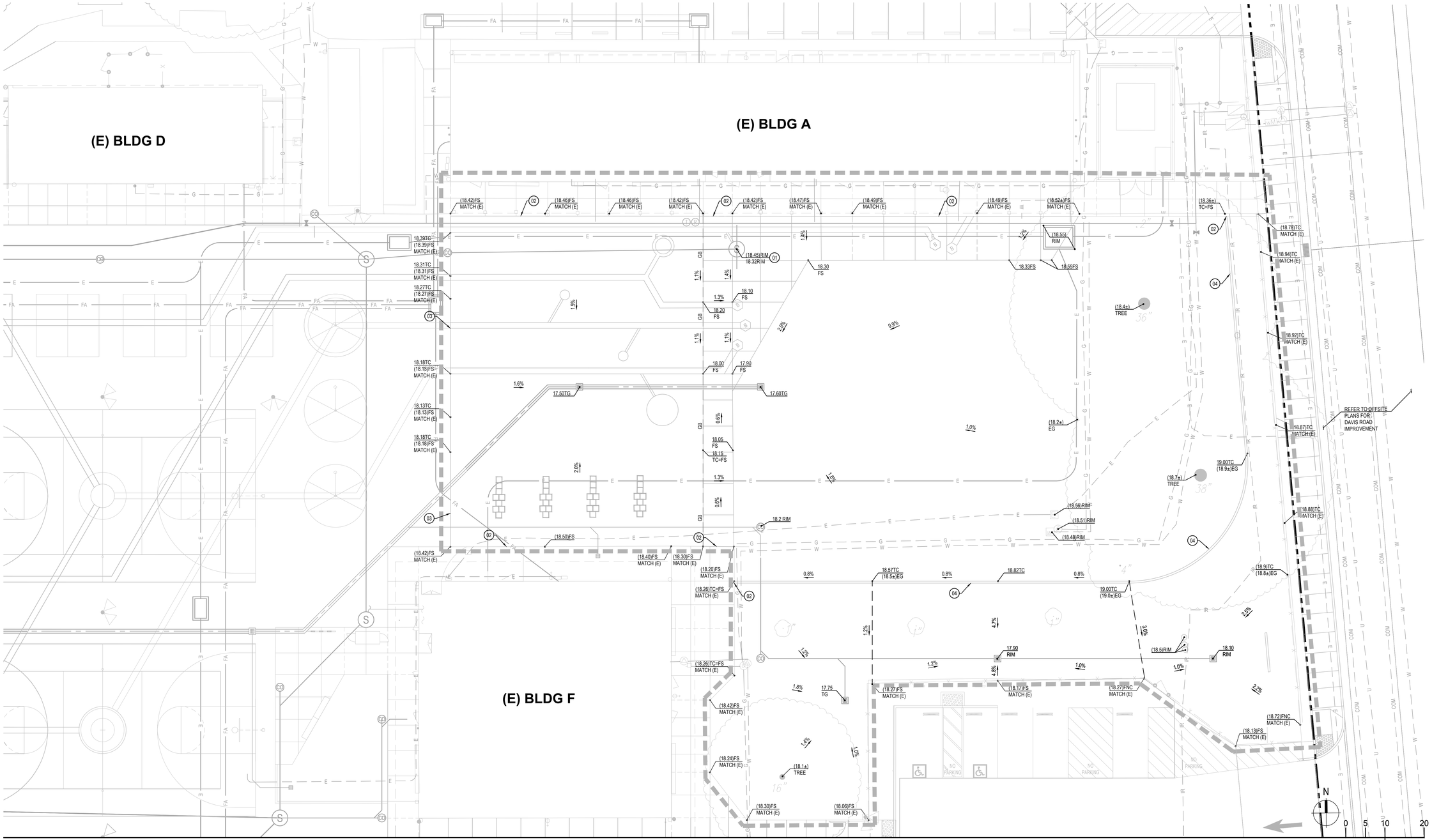
Date
Revision

Date 04/24/2026
Submittal DSA SUBMITTAL

Job Number	31942
Checked By	CD
Scale	1" = 10'

DEMOLITION PLAN

2C1.01



LEGEND

SYMBOL	DESCRIPTION
PA	PLANTING AREA SEE LANDSCAPE PLAN DETAILS FOR GRADES ADJACENT TO HARDSCAPE
	APPROXIMATE LIMIT OF WORK
GB	GRADE BREAK

GRADING CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
01	RAISE OR LOWER (E) UTILITY STRUCTURE TO FINISHED GRADE AS NEEDED.
02	JOIN EXISTING CONCRETE PAVEMENT AND MATCH EXISTING GRADE.
03	JOIN EXISTING AC PAVEMENT AND MATCH EXISTING GRADE.
04	CONSTRUCT CONCRETE FLUSH CURB PER LANDSCAPE DETAILS 10,11 SHEET 2L5.01.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

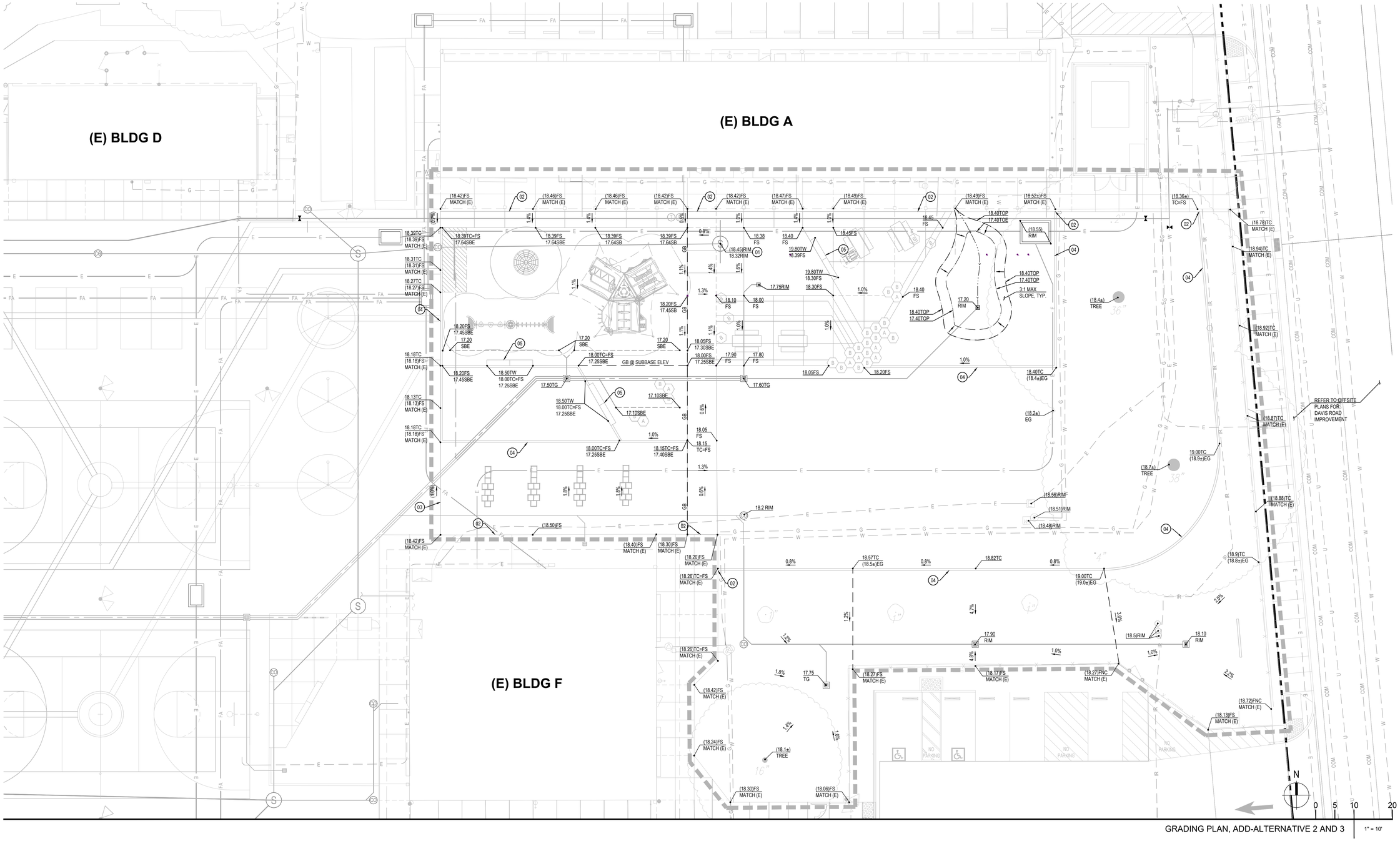
Revision
Date

Submittal
DSA SUBMITTAL
Date 04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 10'

GRADING PLAN

2C2.01



GRADING PLAN, ADD-ALTERNATIVE 2 AND 3 1" = 10'

LEGEND

SYMBOL	DESCRIPTION
PA	PLANTING AREA SEE LANDSCAPE PLAN DETAILS FOR GRADES ADJACENT TO HARDSCAPE
	APPROXIMATE LIMIT OF WORK
GB	GRADE BREAK

GRADING CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
01	RAISE OR LOWER (E) UTILITY STRUCTURE TO FINISHED GRADE AS NEEDED.
02	JOIN EXISTING CONCRETE PAVEMENT AND MATCH EXISTING GRADE.
03	JOIN EXISTING AC PAVEMENT AND MATCH EXISTING GRADE.
04	CONSTRUCT CONCRETE FLUSH CURB PER LANDSCAPE DETAILS 10,11 SHEET 2L5.01.
05	CONSTRUCT CONCRETE FREE-STANDING WALL PER LANDSCAPE DETAILS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER KATHLEEN M. SWENEY R.C.E. 68369 EXP. 9-30-27 STATE OF CALIFORNIA CIVIL

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

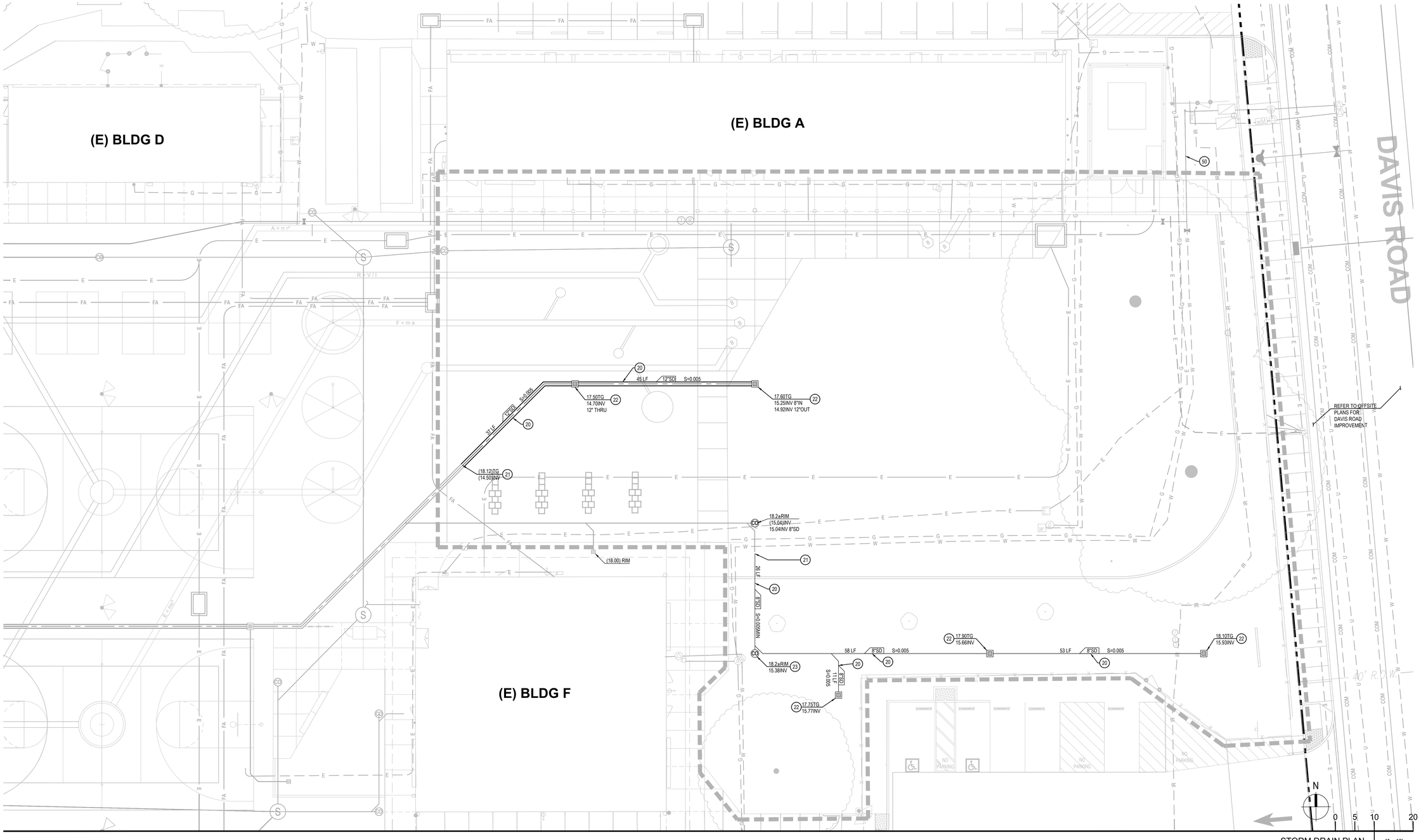
Revision Date

Submittal DSA SUBMITTAL Date 04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 10'

GRADING PLAN, ADD-ALTERNATIVE 2 AND 3

2C2.02A



STORM DRAIN PLAN 1" = 10'

CONSTRUCTION NOTES:

1. UTILITIES TO CROSS OVER OR UNDER OTHER UTILITIES TO MAINTAIN 12" MINIMUM CLEARANCE AT UTILITY CROSSINGS, UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL VERIFY SIZE AND LOCATION (HORIZONTAL AND VERTICAL) OF EXISTING CROSSING AND JOINING UTILITIES PRIOR TO CONSTRUCTION AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICT.
3. CONTRACTOR SHALL CONSTRUCT GRAVITY UTILITIES (SEWER AND STORM DRAIN) BEFORE OTHER UTILITIES. CONSTRUCTION OF THESE GRAVITY UTILITIES TO START FROM THE DOWNSTREAM ENDS.
4. EXISTING UTILITIES ARE COMPILED BASED ON PREVIOUS BASE FILES, FIELD SURVEY AND FIELD VERIFICATION. POTHOLING IS RECOMMENDED TO VERIFY ANY AND ALL UTILITIES KNOWN OR UNKNOWN WHICH MAY BE IN CONFLICT WITH PROPOSED CONSTRUCTION.
5. PRIOR TO THE REMOVAL OF ANY WET OR DRY UTILITY LINES, THE CONTRACTOR SHALL CONFIRM WITH OWNER REPRESENTATIVE WHETHER THESE UTILITY LINES ARE STILL ACTIVE OR NOT. IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICT.
6. CONTRACTOR TO ADJUST TO FINISHED GRADE ALL EXISTING UTILITY BOXES, STORM DRAIN CLEANOUT COVERS, PULL BOXES AND VALVE COVERS NOT SPECIFICALLY SHOWN WITHIN THE LIMITS OF WORK.
7. SEE DETAIL 01 SHEET 2C7.01 FOR STORM DRAIN UTILITY TRENCHING AND BACKFILL.
8. SAWCUT, REMOVE AND REPLACE EXISTING CURB AS REQUIRED FOR TRENCHING. MATCH EXISTING CURB.
9. ALL PRECAST DRAIN INLETS TO HAVE AN APPROVED "NO DUMPING DRAINS TO ____" 3" X 5½" ROUNDED CORNERED RECTANGLES STYLE #NDO OR 4" DIAMETER ROUND STYLE #SDO ABRASION AND UV RESISTANT DURACAST STYLE MARKER BY DAS MANUFACTURING OR EQUIVALENT APPLIED TO THE CONCRETE COLLAR AROUND DRAIN INLET USING RAPID SET URETHANE ADHESIVE OR QUICKSTIK EPOXY PUTTY ADHESIVE PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
http://www.dasmanufacturing.com/product_guide.html

STORM DRAIN CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
20	SUPPLY AND INSTALL PVC STORM DRAIN PIPE. SIZE AND SLOPE PER PLAN.
21	CONNECT TO (E) STORM DRAIN INSTALLED IN INCREMENT 1. CONTRACTOR TO VERIFY ELEVATION OF EXISTING PIPE AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
22	SUPPLY AND INSTALL 12"X12" PRECAST CONCRETE DRAIN INLET. SEE DETAIL 03 SHEET 2C7.01.
23	SUPPLY AND INSTALL CLEANOUT TO GRADE PER DETAIL 06 SHEET 2C7.01.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

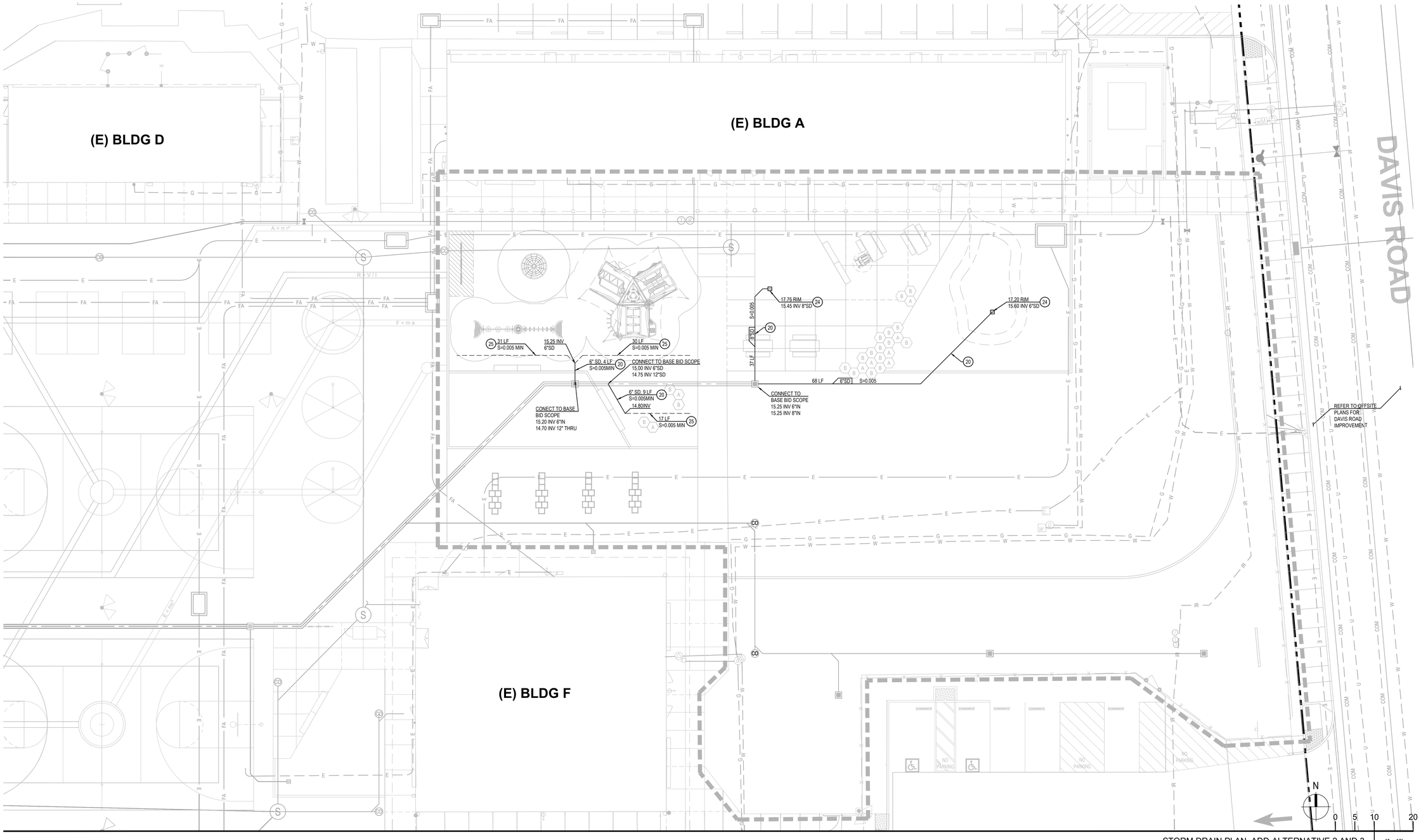
Revision	Date

Submittal	Date
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 10'

STORM DRAIN PLAN

2C3.01



STORM DRAIN PLAN, ADD-ALTERNATIVE 2 AND 3 1" = 10'

CONSTRUCTION NOTES:

1. UTILITIES TO CROSS OVER OR UNDER OTHER UTILITIES TO MAINTAIN 12" MINIMUM CLEARANCE AT UTILITY CROSSINGS, UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL VERIFY SIZE AND LOCATION (HORIZONTAL AND VERTICAL) OF EXISTING CROSSING AND JOINING UTILITIES PRIOR TO CONSTRUCTION AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICT.
3. CONTRACTOR SHALL CONSTRUCT GRAVITY UTILITIES (SEWER AND STORM DRAIN) BEFORE OTHER UTILITIES. CONSTRUCTION OF THESE GRAVITY UTILITIES TO START FROM THE DOWNSTREAM ENDS.
4. EXISTING UTILITIES ARE COMPILED BASED ON PREVIOUS BASE FILES, FIELD SURVEY AND FIELD VERIFICATION. POTHOLING IS RECOMMENDED TO VERIFY ANY AND ALL UTILITIES KNOWN OR UNKNOWN WHICH MAY BE IN CONFLICT WITH PROPOSED CONSTRUCTION.
5. PRIOR TO THE REMOVAL OF ANY WET OR DRY UTILITY LINES, THE CONTRACTOR SHALL CONFIRM WITH OWNER REPRESENTATIVE WHETHER THESE UTILITY LINES ARE STILL ACTIVE OR NOT. IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICT.
6. CONTRACTOR TO ADJUST TO FINISHED GRADE ALL EXISTING UTILITY BOXES, STORM DRAIN CLEANOUT COVERS, PULL BOXES AND VALVE COVERS NOT SPECIFICALLY SHOWN WITHIN THE LIMITS OF WORK.
7. SEE DETAIL 01 SHEET 2C7.01 FOR STORM DRAIN UTILITY TRENCHING AND BACKFILL.
8. SAWCUT, REMOVE AND REPLACE EXISTING CURB AS REQUIRED FOR TRENCHING. MATCH EXISTING CURB.
9. ALL PRECAST DRAIN INLETS TO HAVE AN APPROVED "NO DUMPING DRAINS TO ____" 3" X 5½" ROUNDED CORNERED RECTANGLES STYLE #NDO OR 4" DIAMETER ROUND STYLE #SDO ABRASION AND UV RESISTANT DURACAST STYLE MARKER BY DAS MANUFACTURING OR EQUIVALENT APPLIED TO THE CONCRETE COLLAR AROUND DRAIN INLET USING RAPID SET URETHANE ADHESIVE OR QUICKSTIK EPOXY PUTTY ADHESIVE PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS. http://www.dasmanufacturing.com/product_guide.html

STORM DRAIN CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
20	SUPPLY AND INSTALL PVC STORM DRAIN PIPE. SIZE AND SLOPE PER PLAN.
24	SUPPLY AND INSTALL 12" SQUARE ATRIUM GRATE PER DETAIL 08 SHEET 2C7.01.
25	SUPPLY AND INSTALL PLAY AREA SUBDRAIN PER DETAIL 04 SHEET 2C7.01. SIZE AND SLOPE PER PLAN.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

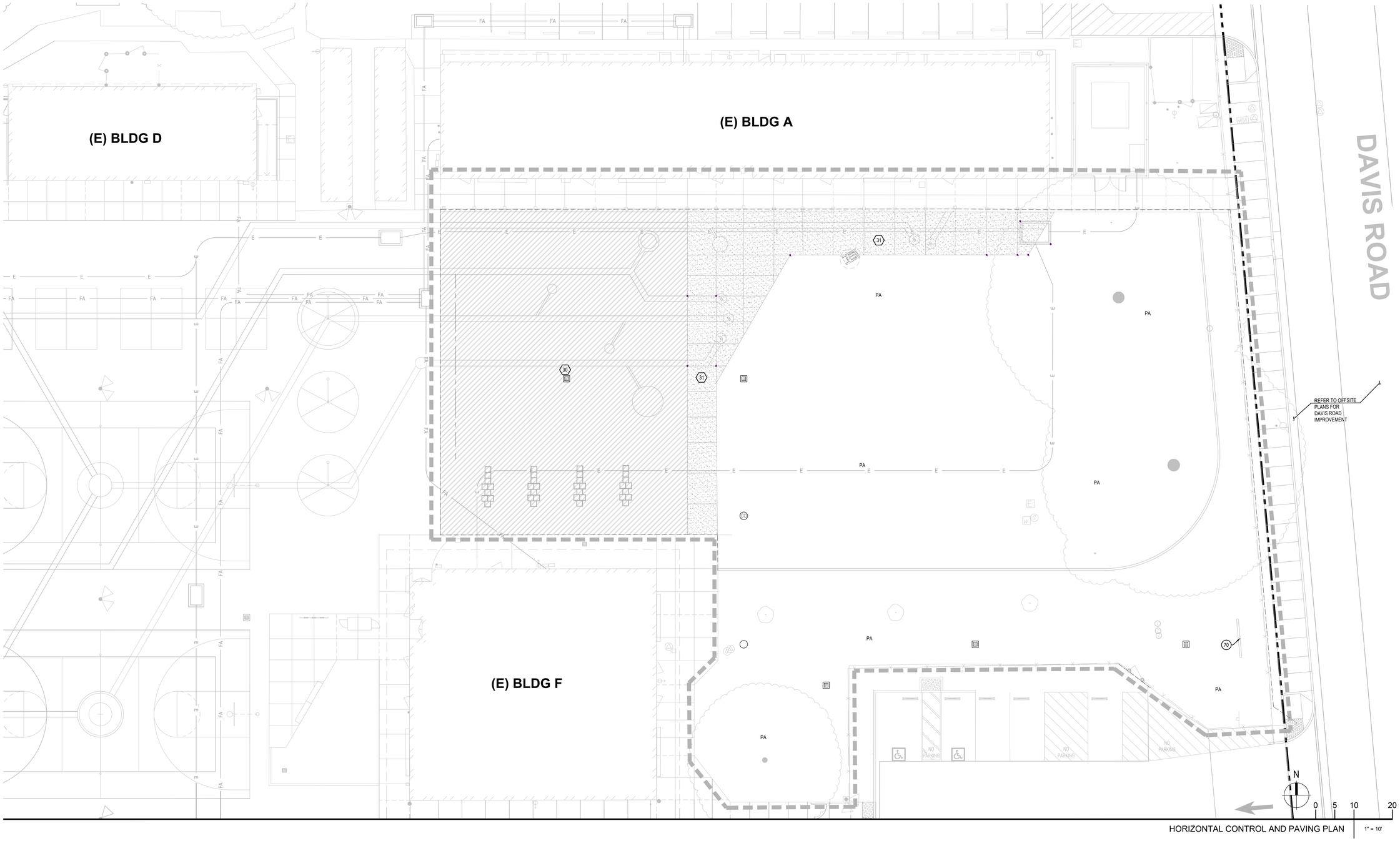
Revision Date

Submittal 04/24/2026
DSA SUBMITTAL

Job Number	31942
Checked By	CD
Scale	1" = 10'

STORM DRAIN PLAN, ADD-ALTERNATIVE 2 AND 3

2C3.02A



HORIZONTAL CONTROL AND PAVING PLAN 1" = 10'

HORIZONTAL CONTROL NOTES:

THIS HORIZONTAL CONTROL PLAN ESTABLISHES THE FOLLOWING TO BE USED AS BASE CONTROL FOR CONSTRUCTION STAKING.

1. PRIOR TO STAKING ANY BUILDING STRUCTURE, SURVEYOR SHALL VERIFY THAT THE GRIDS SHOWN ON THIS PLAN MATCHES THE ARCHITECTURAL & STRUCTURAL PLANS.
2. TWO COORDINATES ARE PROVIDED TO ESTABLISH THE BUILDING GRID. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR FINAL BUILDING DIMENSIONS.
3. IF ANY DISCREPANCIES ARE FOUND DURING CONSTRUCTION STAKING NOTIFY CIVIL ENGINEER IMMEDIATELY.
4. SEE LANDSCAPE PLANS FOR:
   - 4.1. DETAILED HARDSCAPE DIMENSIONS.
   - 4.2. LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
   - 4.3. LOCATION AND TYPE OF PAVING AND STRIPING IN PEDESTRIAN AREAS.

BENCHMARK

-SEE SHEET 2C0.01 FOR BENCHMARK.

PAVING NOTES:

1. SEE LANDSCAPE PLANS FOR PAVERS, LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
2. VERIFY ALL VEHICULAR AND NON-VEHICULAR LIMITS WITH LANDSCAPE PLANS.

CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
70	RELOCATED SIGN. SEE LANDSCAPE DETAIL 03 SHEET 2L5.02.

STRIPING NOTES

1. ALL EXISTING STRIPING AND MARKINGS TO REMAIN UNLESS OTHERWISE NOTED. CONFLICTS BETWEEN EXISTING AND PROPOSED SHALL BE RESOLVED BY THE ENGINEER.
2. REMOVAL OF EXISTING STRIPING AND PAVEMENT MARKINGS SHALL BE ACCOMPLISHED BY WET SANDBLASTING OR OTHER APPROVED GRINDING METHOD PRIOR TO INSTALLATION OF NEW STRIPING. ALL CONFLICTING STRIPING, PAVEMENT MARKINGS, AND RAISED PAVEMENT MARKERS SHALL BE REMOVED.
3. PAVEMENT THAT IS DAMAGED DUE TO THE REMOVAL OF MARKERS OR STRIPING SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER.

PAVING LEGEND

SYMBOL	DESCRIPTION
30	LIGHT DUTY AC PAVEMENT 3" AC OVER 10" CL II AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION.
31	PEDESTRIAN CONCRETE PAVEMENT 4" PCC OVER 4" CL II AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. SEE DETAIL 01 SHEET 2C7.01.
PA	PLANTING AREA SEE LANDSCAPE PLANS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWINNEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA
CIVIL

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

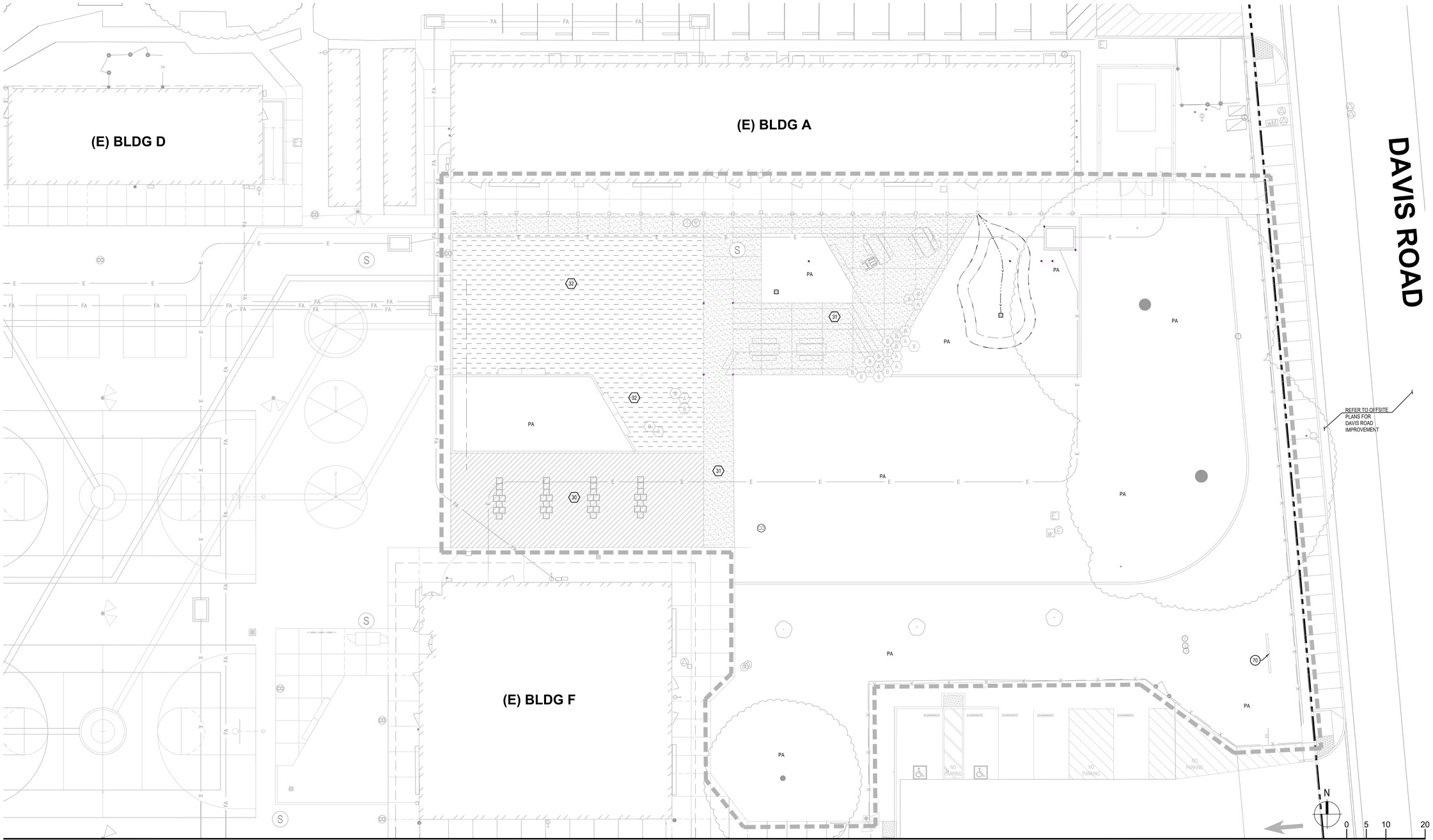
Revision Date

Submittal DSA SUBMITTAL
Date 04/24/2026

Job Number	31942
Checked By	CD
Scale	1" = 10'

HORIZONTAL CONTROL AND PAVING PLAN

2C5.01



HORIZONTAL CONTROL AND PAVING PLAN, ADD-ALTERNATIVE 2 AND 3 1" = 10'

HORIZONTAL CONTROL NOTES:

THIS HORIZONTAL CONTROL PLAN ESTABLISHES THE FOLLOWING TO BE USED AS BASE CONTROL FOR CONSTRUCTION STAKING.

1. PRIOR TO STAKING ANY BUILDING STRUCTURE, SURVEYOR SHALL VERIFY THAT THE GRIDS SHOWN ON THIS PLAN MATCHES THE ARCHITECTURAL & STRUCTURAL PLANS.
2. TWO COORDINATES ARE PROVIDED TO ESTABLISH THE BUILDING GRID. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR FINAL BUILDING DIMENSIONS.
3. IF ANY DISCREPANCIES ARE FOUND DURING CONSTRUCTION STAKING NOTIFY CIVIL ENGINEER IMMEDIATELY.
4. SEE LANDSCAPE PLANS FOR:
   - 4.1. DETAILED HARDSCAPE DIMENSIONS.
   - 4.2. LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
   - 4.3. LOCATION AND TYPE OF PAVING AND STRIPING IN PEDESTRIAN AREAS.

BENCHMARK

-SEE SHEET 2C0.01 FOR BENCHMARK.

PAVING NOTES:

1. SEE LANDSCAPE PLANS FOR PAVERS, LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
2. VERIFY ALL VEHICULAR AND NON-VEHICULAR LIMITS WITH LANDSCAPE PLANS.

CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
70	RELOCATED SIGN. SEE LANDSCAPE DETAIL 03 SHEET 2L5.02.

STRIPING NOTES

1. ALL EXISTING STRIPING AND MARKINGS TO REMAIN UNLESS OTHERWISE NOTED. CONFLICTS BETWEEN EXISTING AND PROPOSED SHALL BE RESOLVED BY THE ENGINEER.
2. REMOVAL OF EXISTING STRIPING AND PAVEMENT MARKINGS SHALL BE ACCOMPLISHED BY WET SANDBLASTING OR OTHER APPROVED GRINDING METHOD PRIOR TO INSTALLATION OF NEW STRIPING. ALL CONFLICTING STRIPING, PAVEMENT MARKINGS, AND RAISED PAVEMENT MARKERS SHALL BE REMOVED.
3. PAVEMENT THAT IS DAMAGED DUE TO THE REMOVAL OF MARKERS OR STRIPING SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER.

PAVING LEGEND

SYMBOL	DESCRIPTION
30	LIGHT DUTY AC PAVEMENT 3" AC OVER 10" CL II AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION.
31	PEDESTRIAN CONCRETE PAVEMENT 4" PCC OVER 4" CL II AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. SEE DETAIL 01 SHEET 2C7.01.
32	PLAY SURFACING WITH SYNTHETIC TURF SEE LANDSCAPE PLANS.
PA	PLANTING AREA SEE LANDSCAPE PLANS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWINEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA
CIVIL

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

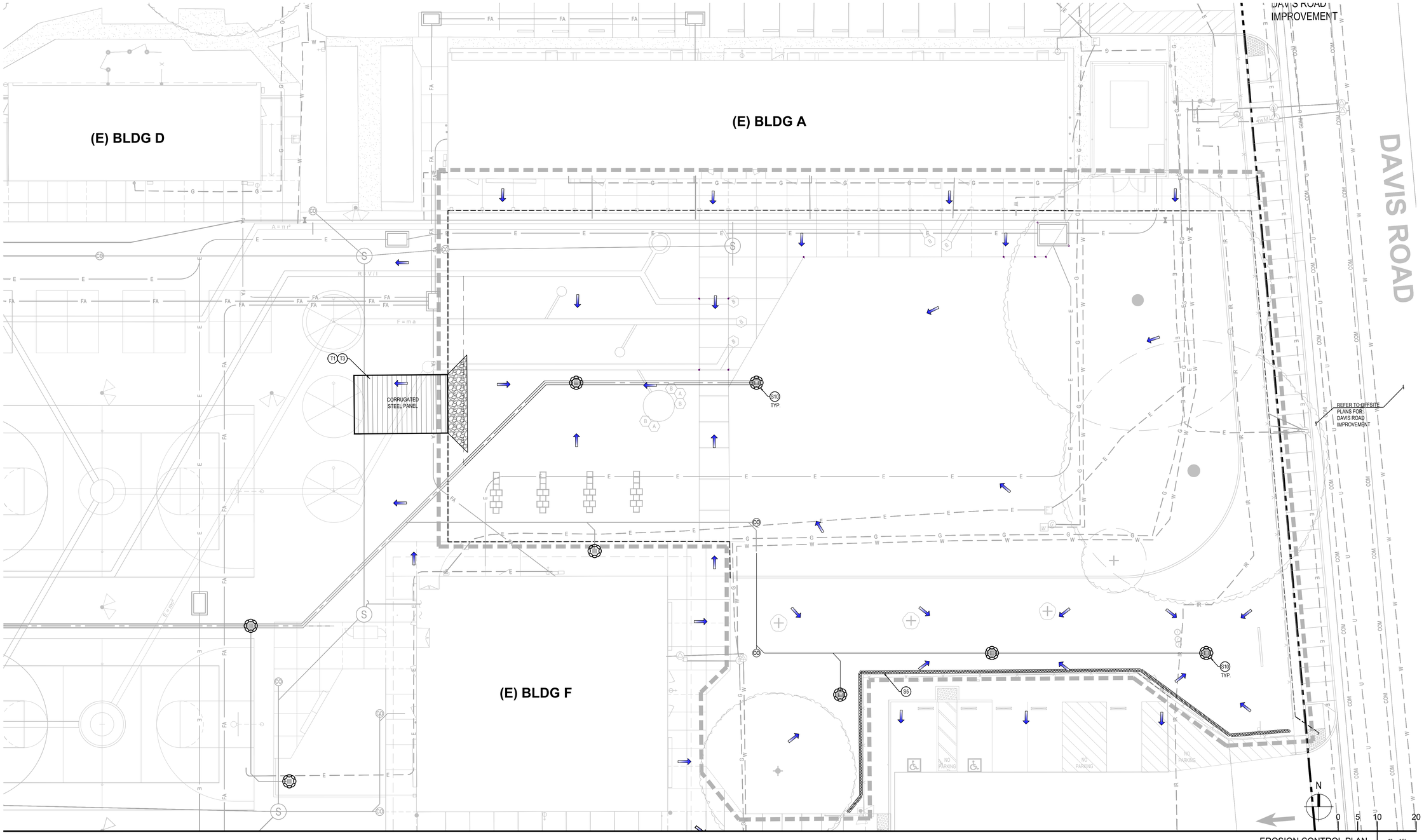
Date
Revision

Date 04/24/2026
Submittal DSA SUBMITTAL

Job Number	31942
Checked By	CD
Scale	1" = 10'

HORIZONTAL CONTROL AND PAVING PLAN, ADD-ALTERNATIVE 2 AND 3

2C5.02A



EROSION CONTROL PLAN

DISCHARGE LOCATIONS

W#	STORMWATER STORAGE (E.G. BIORETENTION) OR CONTAINMENT (E.G. CISTERN)

STORM WATER STORAGE OR CONTAINMENT

D#	DISCHARGE LOCATION

SAMPLING LOCATIONS

B#	POLLUTANT SAMPLE LOCATION - BACKGROUND SAMPLE
C#	POLLUTANT SAMPLE LOCATION - CONTRACTORS YARD
S#	POLLUTANT SAMPLE LOCATION - SITE
R#	POLLUTANT SAMPLE LOCATION - RUN-ON

THE SAMPLE LOCATIONS SHOWN ARE THE MINIMUM REQUIREMENT FOR THE PROJECT SITE AND RISK LEVEL 2. SAMPLE LOCATIONS MAY BE RELOCATED IF FIELD CONDITIONS WILL NOT ALLOW FOR SATISFACTORY SAMPLING. ANY ADJUSTMENTS TO SAMPLING LOCATIONS MUST MEET THE INTENDED PURPOSE ORIGINALLY DESIGNATED FOR THAT LOCATION AND MUST BE DOCUMENTED WITH A SWPPP AMENDMENT FORM.

EROSION CONTROL BMPs: ***

KEY NOTE	DESCRIPTION
E2	EC-2, PRESERVATION OF EXISTING VEGETATION
E3	EC-3, HYDRAULIC MULCH
E4	EC-4, HYDROSEEDING
E5	EC-5, SOIL BINDERS
E6	EC-6, STRAW MULCH
E7	EC-7, GEOTEXTILES AND MATS
E15	EC-15, SOIL PREPARATION/ROUGHENING

*** KEYNOTES NOT SHOWN ON PLAN ARE LISTED AS ALTERNATIVE SURFACE STABILIZATION; COORDINATE USE AND LOCATION WITH QSP.

SEDIMENT CONTROL BMPs:

S5	SE-5, FIBER ROLLS
S6	SE-6, GRAVEL BAG BERM (ACCEPTABLE FOR USE IN PLACE OF FIBER ROLLS)
S10	SE-10, STORM DRAIN INLET PROTECTION

TRACKING CONTROL BMPs:

T1	TC-1, STABILIZED CONSTRUCTION ENTRANCE/EXIT (MODIFIED AS SHOWN)
T3	TC-3, ENTRANCE/OUTLET TIRE WASH

OVERALL SITE BMPs: (PROJECT-WIDE APPLICATION)

- SC-10, NON-STORMWATER DISCHARGES
- WE-1, WIND EROSION CONTROL
- WM-1, MATERIAL DELIVERY AND STORAGE
- WM-2, MATERIAL USE
- WM-3, STOCKPILE MANAGEMENT
- WM-4, SPILL PREVENTION AND CONTROL
- WM-5, SOLID WASTE MANAGEMENT
- WM-6, HAZARDOUS WASTE MANAGEMENT
- WM-7, CONTAMINATED SOIL MANAGEMENT
- WM-8, CONCRETE WASTE MANAGEMENT
- WM-9, SANITARY/SEPTIC WASTE MANAGEMENT
- WM-10, LIQUID WASTE MANAGEMENT

OVERALL SITE BMPs: (PROJECT-WIDE APPLICATION)

- EC-1, SCHEDULING
- SE-7, STREET SWEEPING AND VACUUMING (FOR ALL PAVED AREAS)
- NS-1, WATER CONSERVATION PRACTICES
- NS-3, PAVING AND GRINDING OPERATIONS
- NS-6, ILLICIT CONNECTION/DISCHARGE
- NS-7, POTABLE WATER/IRRIGATION
- NS-8, VEHICLE AND EQUIPMENT CLEANING
- NS-9, VEHICLE AND EQUIPMENT FUELING
- NS-10, VEHICLE AND EQUIPMENT MAINTENANCE
- NS-12, CONCRETE CURING
- NS-13, CONCRETE FINISHING

EROSION CONTROL NOTES

-SEE SHEET C0.01 FOR EROSION AND SEDIMENT CONTROL NOTES.

-SEE SHEET C0.01 FOR BMP MAINTENANCE NOTES.

-ALL BMPS PER CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA)(UNLESS NOTED OTHERWISE) AND ARE AVAILABLE AT www.casqa.org.

-BMPS "NOT" CALLED OUT PER PLAN, ARE SHOWN FOR REFERENCE AS BMP OPTIONS PER QSP (QUALIFIED SWPPP PRACTITIONER) FIELD RECOMMENDATIONS.

-AT THE COMPLETION OF PROJECT, CONTRACTOR SHALL REMOVE ALL CONSTRUCTION BMPS FROM SITE AND DISPOSE IN A LEGAL MANNER.

LEGEND

SYMBOL	DESCRIPTION
	GRAVEL BAGS AND/OR SANDBAGS PER BMP KEYNOTES
	FIBER ROLL
	FLOW DIRECTION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

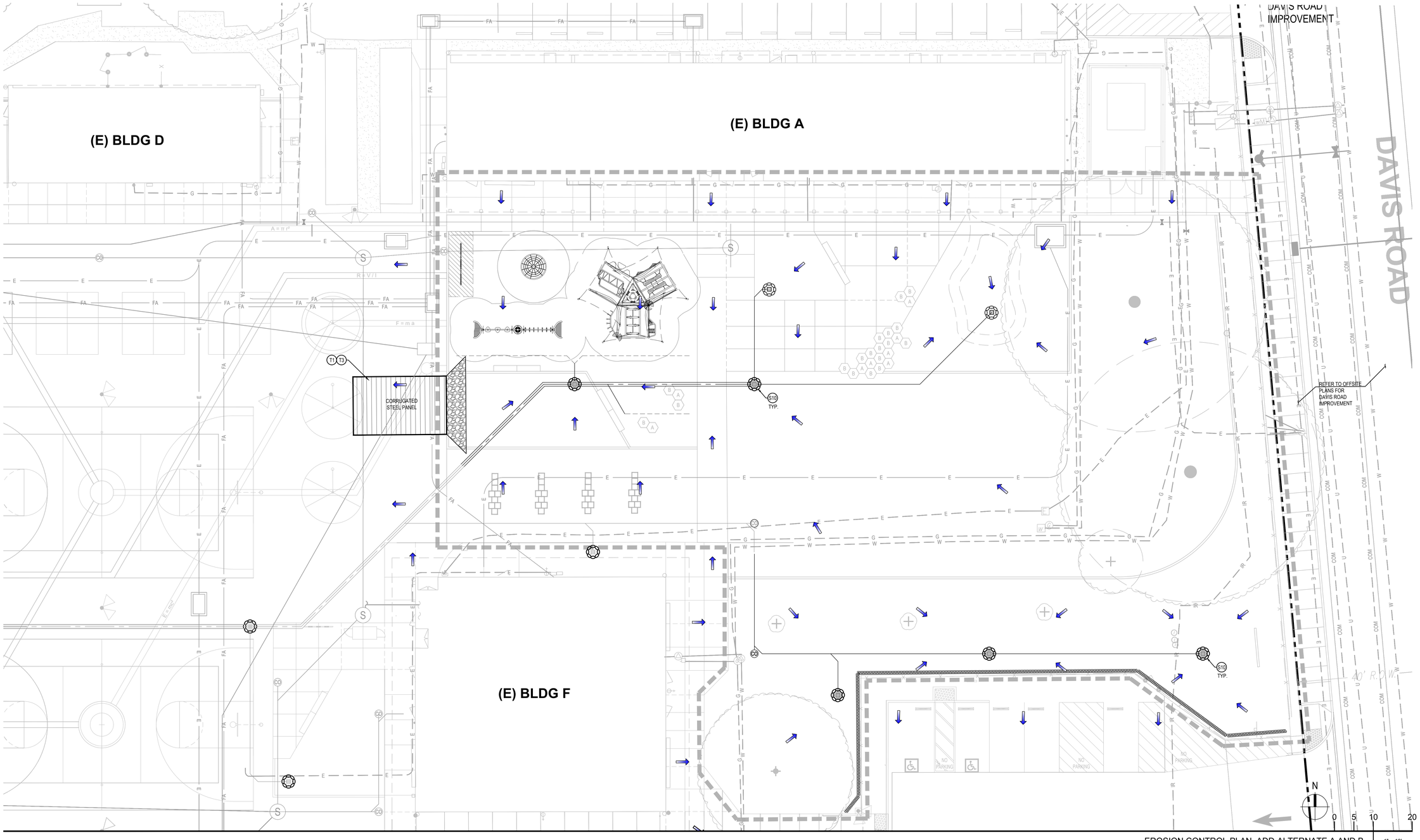
Date
Revision

Date 04/24/2026
Submittal DSA SUBMITTAL

Job Number	31942
Checked By	CD
Scale	1" = 10'

EROSION CONTROL PLAN

2C6.01



EROSION CONTROL PLAN, ADD-ALTERNATE A AND B 1" = 10'

DISCHARGE LOCATIONS

W#	STORMWATER STORAGE (E.G. BIORETENTION) OR CONTAINMENT (E.G. CISTERN)

STORM WATER STORAGE OR CONTAINMENT

D#	DISCHARGE LOCATION

SAMPLING LOCATIONS

B#	POLLUTANT SAMPLE LOCATION - BACKGROUND SAMPLE
C#	POLLUTANT SAMPLE LOCATION - CONTRACTORS YARD
S#	POLLUTANT SAMPLE LOCATION - SITE
R#	POLLUTANT SAMPLE LOCATION - RUN-ON

THE SAMPLE LOCATIONS SHOWN ARE THE MINIMUM REQUIREMENT FOR THE PROJECT SITE AND RISK LEVEL 2. SAMPLE LOCATIONS MAY BE RELOCATED IF FIELD CONDITIONS WILL NOT ALLOW FOR SATISFACTORY SAMPLING. ANY ADJUSTMENTS TO SAMPLING LOCATIONS MUST MEET THE INTENDED PURPOSE ORIGINALLY DESIGNATED FOR THAT LOCATION AND MUST BE DOCUMENTED WITH A SWPPP AMENDMENT FORM.

EROSION CONTROL BMPs: ***

KEY NOTE	DESCRIPTION
E2	EC-2, PRESERVATION OF EXISTING VEGETATION
E3	EC-3, HYDRAULIC MULCH
E4	EC-4, HYDROSEEDING
E5	EC-5, SOIL BINDERS
E6	EC-6, STRAW MULCH
E7	EC-7, GEOTEXTILES AND MATS
E15	EC-15, SOIL PREPARATION/ROUGHENING

*** KEYNOTES NOT SHOWN ON PLAN ARE LISTED AS ALTERNATIVE SURFACE STABILIZATION; COORDINATE USE AND LOCATION WITH QSP.

SEDIMENT CONTROL BMPs:

S5	SE-5, FIBER ROLLS
S6	SE-6, GRAVEL BAG BERM (ACCEPTABLE FOR USE IN PLACE OF FIBER ROLLS)
S10	SE-10, STORM DRAIN INLET PROTECTION

TRACKING CONTROL BMPs:

T1	TC-1, STABILIZED CONSTRUCTION ENTRANCE/EXIT (MODIFIED AS SHOWN)
T3	TC-3, ENTRANCE/OUTLET TIRE WASH

OVERALL SITE BMPs: (PROJECT-WIDE APPLICATION)

SC-10, NON-STORMWATER DISCHARGES
WE-1, WIND EROSION CONTROL
WM-1, MATERIAL DELIVERY AND STORAGE
WM-2, MATERIAL USE
WM-3, STOCKPILE MANAGEMENT
WM-4, SPILL PREVENTION AND CONTROL
WM-5, SOLID WASTE MANAGEMENT
WM-6, HAZARDOUS WASTE MANAGEMENT
WM-7, CONTAMINATED SOIL MANAGEMENT
WM-8, CONCRETE WASTE MANAGEMENT
WM-9, SANITARY/SEPTIC WASTE MANAGEMENT
WM-10, LIQUID WASTE MANAGEMENT

OVERALL SITE BMPs: (PROJECT-WIDE APPLICATION)

EC-1, SCHEDULING
SE-7, STREET SWEEPING AND VACUUMING (FOR ALL PAVED AREAS)
NS-1, WATER CONSERVATION PRACTICES
NS-3, PAVING AND GRINDING OPERATIONS
NS-6, ILLICIT CONNECTION/DISCHARGE
NS-7, POTABLE WATER/IRRIGATION
NS-8, VEHICLE AND EQUIPMENT CLEANING
NS-9, VEHICLE AND EQUIPMENT FUELING
NS-10, VEHICLE AND EQUIPMENT MAINTENANCE
NS-12, CONCRETE CURING
NS-13, CONCRETE FINISHING

EROSION CONTROL NOTES

-SEE SHEET C0.01 FOR EROSION AND SEDIMENT CONTROL NOTES.

-SEE SHEET C0.01 FOR BMP MAINTENANCE NOTES.

-ALL BMPS PER CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA)(UNLESS NOTED OTHERWISE) AND ARE AVAILABLE AT www.casqa.org.

-BMPS "NOT" CALLED OUT PER PLAN, ARE SHOWN FOR REFERENCE AS BMP OPTIONS PER QSP (QUALIFIED SWPPP PRACTITIONER) FIELD RECOMMENDATIONS.

-AT THE COMPLETION OF PROJECT, CONTRACTOR SHALL REMOVE ALL CONSTRUCTION BMPS FROM SITE AND DISPOSE IN A LEGAL MANNER.

LEGEND

SYMBOL	DESCRIPTION
	GRAVEL BAGS AND/OR SANDBAGS PER BMP KEYNOTES
	FIBER ROLL
	FLOW DIRECTION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWINNEY
R.C.E. 68369
EXP. 9-30-27
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

©LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

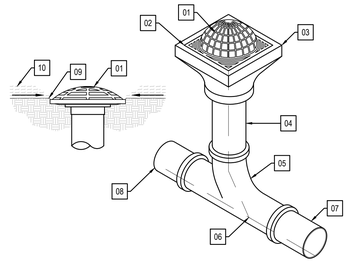
Date
Revision

Date 04/24/2026
Submittal DSA SUBMITTAL

Job Number	31942
Checked By	CD
Scale	1" = 10'

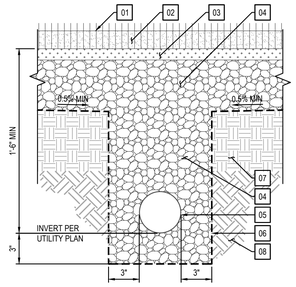
EROSION CONTROL PLAN, ADD-ALTERNATE A AND B

2C6.02A



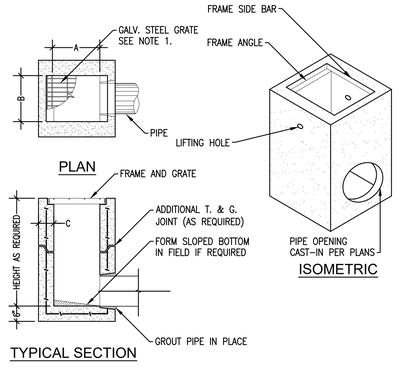
01	12" SQUARE BLACK ATRIUM GRATE. NDS PART NO. 1290 OR APPROVED EQUAL	06	INVERT ELEVATION PER PLAN
02	TG ELEVATION PER PLAN	07	STORM DRAIN PER PLAN
03	12" NDS PART NO. 1230 AND 1243 OR APPROVED EQUAL	08	PLUG IF AT END OF RUN
04	4" PVC SDR 35 RISER	09	GRATE RIM FLUSH WITH FINISHED GRADE UNLESS NOTED OTHERWISE
05	WYE FITTING	10	MATERIAL PER LANDSCAPE PLANS

12" SQUARE ATRIUM PLANTER DRAIN — NTS — 08



01	FINISH GRADE	05	4" PERFORATED DRAIN PIPE WITH SOCK (PERFORATIONS DOWN).
02	SYNTHETIC TURF SYSTEM; SEE LANDSCAPE DETAILS	06	SUBGRADE LINER PER LANDSCAPE DETAILS
03	SHOCK PAD; SEE LANDSCAPE DETAILS	07	SUBGRADE PREPARATION PER GEOTECHNICAL REPORT
04	CALTRANS CLASS II PERMEABLE BASE ROCK PER SPECIFICATIONS.	08	UNDISTURBED NATIVE SUBGRADE

PLAY AREA SUBDRAIN — NTS — 04



OLDCASTLE PRECAST GROUP OR EQUIVALENT DROP INLET TABLE

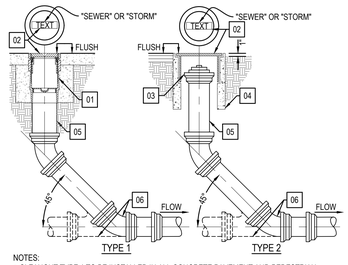
MODEL No.	CPC MODEL REF.	A		B		C	
		IN	MM	IN	MM	IN	MM
CB1212TE	EK	12	300	12	300	4	100
CB1818TE	CK	18	450	18	450	5	125
CB1824TE	1K+	18	450	24	600	5	125
CB2424TE	2K	24	600	24	600	5	125
CB2430TE	3K	24	600	30	750	5	125
CB3030TE	5K	30	750	30	750	6	150
CB2436TE	1L	24	600	36	900	6	150
CB3636TE	1M	36	900	36	900	6	150
CB2448TE	3L	24	600	48	1200	6	150
CB3648TE	3M	36	900	48	1200	6	150
CB4848TE	1R	48	1200	48	1200	6	150

NOTES :

1. FRAMES AND GRATES MAY BE SPECIFIED FOR PEDESTRIAN OR H20 TRAFFIC LOADING. ALL GRATES ARE BICYCLE PROOF.
2. ½" MAX. GRATE OPENINGS IN PATH-OF-TRAVEL IN ALL DIRECTIONS WHERE PATH-OF-TRAVEL IS MULTI-DIRECTIONAL.

OLDCASTLE PRECAST PRECAST (www.oldcastleprecast.com) DRAIN INLET W-IN-12 OR EQUIVALENT

DRAIN INLET — NTS — 03

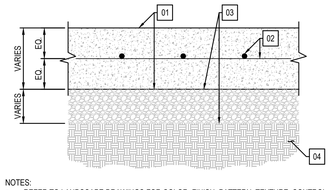


NOTES:

- CLEANOUT TYPE 1 TO BE INSTALLED IN ALL CONCRETE PAVEMENT AND PEDESTRIAN HARDSCAPE AREAS. LID SHALL BE INSTALLED FLUSH WITH FINISHED SURFACE. PROVIDE PCC COLLAR BELOW HARDSCAPE PER MANUFACTURES REQUIREMENTS.
- CLEANOUT TYPE 2 TO BE INSTALLED IN ASPHALT PAVEMENT AND PLANTED AREAS. CLEANOUT RIM TO BE INSTALLED FLUSH WITH FINISHED SURFACE OF AC PAVING OR 1" ABOVE FINISHED GRADE IN PLANTER AREAS AS APPLIES.

01	ZURN ZN-1400-HD-SM OR APPROVED EQUAL	04	BROOKS 1-RT CLEANOUT OR APPROVED EQUAL
02	CLEANOUT LID WITH "SEWER" OR "STORM"	05	PIPE SIZE PER PLAN
03	SOLVENT WELD X F.I.P.T. COUPLING WITH M.I.P.T. PLUG WITH MALE SQUARE NUT.	06	WYE FITTING AT LINE CLEANOUT, 45° ELBOW AT TERMINAL CLEANOUT

CLEANOUT — NTS — 06

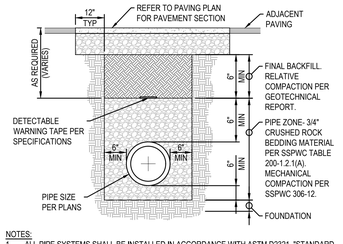


NOTES:

- REFER TO LANDSCAPE DRAWINGS FOR COLOR, FINISH, PATTERN, TEXTURE, CONTROL JOINTS, EXPANSION JOINTS, AND THICKENED EDGE.
- CONCRETE DOWELING PER LANDSCAPE DRAWINGS AND PROJECT GEOTECHNICAL REPORT RECOMMENDATIONS.
- DO NOT ALLOW CONCRETE OVER-POUR INTO ADJACENT PLANTERS.
- MINIMUM CONCRETE STRENGTH PER SPECIFICATION SECTION 321313.

01	CONCRETE PAVING PEDESTRIAN: 4" THICK VEHICULAR: 5" THICK	03	COMPACTED BASE COURSE PEDESTRIAN: 4" THICK CL II AB VEHICULAR: 6" THICK CL II AB
02	REINFORCEMENT (BOTH PEDESTRIAN AND VEHICULAR): #4 BARS @ 24" O.C. AND E.W.	04	SUBGRADE PREPARATION PER PROJECT GEOTECHNICAL REPORT

CONCRETE PAVEMENT — NTS — 02



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
2. IF UNSTABLE FOUNDATION SOIL IS ENCOUNTERED, THE GEOTECHNICAL FIELD INSPECTOR SHALL DETERMINE OVEREXCAVATION DEPTH AND FOUNDATION RE-FILL MATERIAL.
3. CONTRACTOR SHALL PROVIDE HAND EXCAVATED "BELL HOLE" FOR EACH PIPE JOINT SO THAT THE WEIGHT OF PIPE DOES NOT BEAR ON THE BELL. CONTRACTOR SHALL RE-FILL AND HAND-TAMP EACH "BELL HOLE" PRIOR TO COMPLETING THE PLACEMENT OF PIPE BEDDING.
4. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL WHEN REQUIRED BY GEOTECHNICAL REPORT. FILTER FABRIC IF USED SHALL SATISFY THE REQUIREMENTS FOR A TYPE 180N, NONWOVEN GEOTEXTILE PER SSPWC 213-2 (LATEST EDITION).

PIPE TRENCH - STORM DRAIN — NTS — 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
KATHLEEN M. SWENEY
R.C.E. 68369
EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date
DSA SUBMITTAL	Submittal Date 04/24/2026

Job Number	31942
Checked By	CD
Scale	N/A

DETAILS

2C7.01

ABBREVIATIONS

&	AND	GA.	GAUGE
∠	ANGLE	GALV.	GALVANIZED
@	AT	GND.	GROUND
℄	CENTERLINE	GR.	GRADE
⌀	DIAMETER OR ROUND		
#	POUND OR NUMBER	HDR	HEADER
		HT.	HEIGHT
ADJ.	ADJACENT		
AGGR.	AGGREGATE	LT.	LIGHT
AL.	ALUMINUM		
APPROX.	APPROXIMATE	MAX.	MAXIMUM
ARCH.	ARCHITECTURAL	MET.	METAL
AC.	ASPHALT	MFR.	MANUFACTURER
ACC.	ACCESSIBLE	MIN.	MINIMUM
		MTD.	MOUNTED
B.C.R.	BEGINNING OF CURVE RADIUS	MTL.	MATERIAL
B.O.C.	BACK OF CURB		
B.O.W.	BOTTOM OF WALL	N.I.C.	NOT IN CONTRACT
B.O.S.	BOTTOM OF SLOPE	N.T.S.	NOT TO SCALE
BLDG.	BUILDING		
BLK.	BLOCK	O.C.	ON CENTER
		O.D.	OUTSIDE DIAMETER (DIM.)
C.E.	CIVIL ENGINEER		
C.I.P.	CAST IN PLACE	PA	PLANTING AREA
CLKG.	CAULKING	PED.	PEDESTRIAN
CMU.	CONCRETE MASONRY UNIT	PRCST.	PRECAST
CONC.	CONCRETE	P.I.P.	POURED IN PLACE
CONSTR.	CONSTRUCTION	P.O.T.	POINT OF TANGENCY
CONT.	CONTINUOUS	P.T.S.	POST TENSION SLAB
CTR.	CENTER		
		QTY	QUANTITY
D.A.	DISABLED ACCESS		
DET.	DETAIL	R.	RISER
DIA.	DIAMETER	RAD.	RADIUS
DIM.	DIMENSION	REINF.	REINFORCED
DN.	DOWN	REQ.	REQUIRED
DWGS.	DRAWINGS		
		SCHED.	SCHEDULE
E.J.	EXPANSION JOINT	SHT.	SHEET
EL.	ELEVATION	SPEC.	SPECIFICATION
ELEC.	ELECTRICAL	S.S.	STAINLESS STEEL
EQ.	EQUAL	STD.	STANDARD
EXP.	EXPANSION	STRL.	STRUCTURAL
EXT.	EXTERIOR		
		T.	TREAD
F.G.	FINISH GRADE	T.C.	TOP OF CURB
F.S.	FINISH SURFACE	T.O.S.	TOP OF SLOPE
F.O.B.	FACE OF BUILDING	T.O.W.	TOP OF WALL
F.O.C.	FACE OF CURB	TYP.	TYPICAL
F.O.W.	FACE OF WALL	TBD.	TO BE DETERMINED
		VEH.	VEHICULAR
		VERT.	VERTICAL
		W/	WITH
		W/O	WITHOUT

PLANTING NOTES

1. REFER TO CIVIL ENGINEER'S DRAWINGS FOR UTILITY LOCATIONS, TREE SUBDRAINAGE STUBOUTS, (IF REQUIRED), AND FINAL GRADING. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND LANDSCAPE ARCHITECT FOR DIRECTION AS TO HOW TO PROCEED.
2. VERIFY LOCATIONS OF ALL PERTINENT EXISTING AND PROPOSED SITE IMPROVEMENTS. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS, CONTACT THE LANDSCAPE ARCHITECT FOR INSTRUCTION PRIOR TO COMMENCING WORK.
3. EXACT LOCATIONS OF PLANT MATERIALS SHALL BE REVIEWED BY THE LANDSCAPE ARCHITECT IN THE FIELD PRIOR TO INSTALLATION. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ADJUST PLANTS TO EXACT LOCATION IN FIELD.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL PLANT COUNTS AND SQUARE FOOTAGES. QUANTITIES SHOWN ON PLANS TAKE PRECEDENCE OVER WRITTEN QUANTITIES IN "PLANTING LEGEND."
5. PROVIDE MATCHING FORMS AND SIZES FOR ALL PLANT MATERIALS WITHIN EACH SPECIES AND SIZE DESIGNATED ON THE DRAWINGS.
6. PRUNE NEWLY PLANTED TREES ONLY AS DIRECTED BY LANDSCAPE ARCHITECT.
7. ALIGNED AND EQUALLY SPACED, IN ALL DIRECTIONS, ALL SHRUBS TO BE AS DESIGNATED PER THESE NOTES AND DRAWINGS.
8. ALL TREES IN ROWS TO BE ALIGNED. (UNLESS NOTED OTHERWISE ON PLANS)
9. TREES SHALL BEAR SAME RELATION TO FINISH GRADE AS AT PLACE OF GROWTH.
10. FINISH GRADES OF ALL TURF AREAS SHALL BE (1") BELOW ADJACENT CURB OR PAVEMENT. FINISH GRADES OF ALL SHRUB AREAS SHALL BE (2-1/2") BELOW ADJACENT CURB, PAVEMENT OR HEADER.
11. CONTRACTOR SHALL SUBMIT FOR APPROVAL COLOR PHOTOS OF ALL TREES, SHRUBS, AND GROUNDCOVER. PHOTOS SHOULD INCLUDE A PERSON FOR SCALE PURPOSES, PHOTOS SHALL BE OF THE ACTUAL PLANT MATERIAL TO BE USED ON THE PROJECT. ALL PLANT MATERIAL SHALL BE OF A QUALITY AS DETERMINED BY THE LANDSCAPE ARCHITECT. MATERIAL FOUND UNSUITABLE FOR THE DESIGN OR SPECIFICATION INTENT WILL BE REJECTED.
12. PROVIDE A (3") LAYER OF MULCH AT PROPOSED TREE, SHRUB, AND GROUNDCOVER PLANTING AREAS, EXCEPT AREAS WITH JUTE MESHING.
13. CONTRACTOR SHALL CONDUCT AGRICULTURAL SUITABILITY AND FERTILITY SOILS TESTING PER SOIL PREPARATION SPECIFICATION. ANALYSIS SHALL INCLUDE RECOMMENDATIONS FOR SOIL PREPARATION AND BACKFILL MIX AS WELL AS RECOMMENDATIONS FOR POST MAINTENANCE FERTILIZATION. SUBMIT SOILS ANALYSES AND SAMPLES OF AMENDMENTS TO LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO SOIL PREPARATION.
14. QUANTITIES LISTED ON PLANT LEGEND ARE PER SHEET. CONTRACTOR MUST VERIFY QUANTITIES GIVEN ON THE PLANS WITH ACTUAL QUANTITIES SHOWN.
15. PROVIDE ROOT BARRIERS IN ADDITION TO THOSE INDICATED ON THE PLANS FOR ALL TREES WITHIN 5' OF ANY HARDSCAPE.
16. DO NOT INSTALL WATERING BASINS AROUND TREES WHEN PLANTED IN TURF. PROVIDE A CIRCULAR TURF-FREE ZONE TO OUTSIDE EDGE OF ROOTBALL. PLACE ONLY 2-INCHES OF WOOD MULCH IN THIS AREA AND NO CLOSER THAN 4-INCHES FROM TRUNK.
17. PLANT ALL TREES A MIN. OF 5' FROM ANY UTILITIES. THE LANDSCAPE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO COMMENCING WORK.
18. TREES ARE TO BE A MINIMUM OF 5' AWAY FROM ANY HARDSCAPE SUCH AS CURBS, WALKS, ETC.
19. LANDSCAPE MAINTENANCE PERIOD IS 90 DAYS.
20. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

TREE REMOVAL AND PROTECTION NOTES

1. CONTRACTOR SHALL RETAIN THE SERVICES OF AN INDEPENDENT REGISTERED CONSULTING ARBORIST.
2. THE ARBORIST SHALL PROVIDE CONTRACTOR WITH RECOMMENDATIONS AND SPECIFICATIONS AS TO THE REMOVAL OF THE EXISTING TREE.
3. ARBORIST SHALL BE ON-SITE TO OBSERVE THE REMOVAL OF TREE.
4. THE ARBORIST SHALL BE CERTIFIED WITH THE AMERICAN SOCIETY OF CONSULTING ARBORISTS OR INTERNATION SOCIETY OF ARBORICULTURE.
5. CONTRACTOR SHALL FOLLOW ALL ARBORIST RECOMMENDATIONS AND SPECIFICATIONS, UNLESS OTHERWISE DIRECTED BY CLIENT/ARCHITECT.

LANDSCAPE GRADING AND DRAINAGE NOTES

1. REFER TO CIVIL ENGINEER'S GRADING PLANS FOR SITE GRADING, DRAINAGE, AND UTILITY LOCATIONS. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND LANDSCAPE ARCHITECT FOR DIRECTION AS TO HOW TO PROCEED.
2. REFER TO CIVIL ENGINEER'S DRAWINGS FOR SUBDRAINAGE POINT OF IN CONNECTION TO STORM DRAIN.
3. THE CONTRACTOR SHALL REQUEST OBSERVATION AS REQUIRED 48 HOURS ADVANCE OF PERFORMING WORK.
4. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA 800/227-2600) OR DIG ALERT (800-422-4133) 48 HOURS PRIOR TO ANY EXCAVATION.
5. ALL GRADING OPERATIONS SHALL CONFORM TO LOCAL GUIDELINES.
6. FIELD VERIFY EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION AND ELEVATION IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION.
7. NO CHANGE IN CONTRACT PRICE WILL BE ALLOWED FOR ACTUAL OR CLAIMED DISCREPANCY BETWEEN EXISTING GRADE AND THOSE SHOWN ON PLANS AFTER CONTRACTOR HAS ACCEPTED EXISTING GRADES AND MOVED ONTO THE SITE.
8. ALL PROPOSED GRADES ARE TO MEET AND BLEND IN WITH EXISTING GRADING AT PROJECT LIMIT AND EXISTING SIDEWALK. PRECISE ELEVATIONS INDICATED ON PLANS TO BE VERIFIED IN FIELD TO AS-BUILT CONDITION.
9. THE DEBRIS CREATED BY LANDSCAPE GRADING OPERATIONS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LEGALLY DISPOSED OF OFF-SITE.
10. FINAL LANDSCAPE GRADING SHALL BE REVIEWED BY THE LANDSCAPE ARCHITECT IN THE FIELD PRIOR TO INSTALLATION OF PLANTING.

LAYOUT AND MATERIALS NOTES

1. THE CONTRACTOR SHALL LAYOUT AND FIELD VERIFY ALL DIMENSIONS OF DRIVEWAY, PLANTERS, WALKS, SLOPES AND RELATED WORK PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE.
2. VERIFY LOCATIONS OF ALL PERTINENT EXISTING AND PROPOSED SITE IMPROVEMENTS. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS, CONTACT THE LANDSCAPE ARCHITECT FOR INSTRUCTION PRIOR TO COMMENCING WORK.
3. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE.
4. THIS DRAWING INCLUDES THE LOCATION OF AREA DRAINS FOR REFERENCE. REFER TO RELATED CIVIL ENGINEER'S DRAWINGS FOR CONSTRUCTION DETAILS AND UTILITY CONNECTIONS.
5. REFER TO ELECTRICAL ENGINEER'S DRAWINGS FOR LIGHT FIXTURE SCHEDULE AND CIRCUITRY AS NECESSARY.
6. REFER TO SOIL ENGINEER'S GEOTECHNICAL REPORT FOR SUB-BASE MATERIALS AND COMPACTION.
7. WHERE DIMENSIONS ARE CALLED AS "EQUAL", ALL REFERENCED ITEMS SHALL BE SPACED EQUALLY, MEASURED TO THEIR CENTERLINES.
8. ALL MEASUREMENTS ARE TO FACE OF WALL, CURB OR OTHER FIXED SITE IMPROVEMENT, UNLESS OTHERWISE NOTED. DIMENSIONS TO CENTERLINES AS INDICATED.
9. INSTALL ALL INTERSECTING ELEMENTS AT 90 DEGREES TO EACH OTHER UNLESS OTHERWISE NOTED.
10. ALL DRAINS/ BASINS SHOULD HAVE BLACK ATRIUM TYPE GRATES WITHIN SHRUBS/GROUNDCOVER AREAS AND BLACK FLAT TYPE GRATES IN TURF AREAS.

GENERAL NOTES

1. BASE INFORMATION INCLUDING THE LOCATION OF PROPERTY LINES, EASEMENTS, BUILDINGS, ROADS AND CURBS HAVE BEEN TAKEN FROM THE CIVIL ENGINEER'S DRAWINGS. REFER TO CIVIL ENGINEER'S DRAWINGS FOR ADDITIONAL INFORMATION.
2. REFER TO THE CIVIL ENGINEER'S DRAWINGS FOR PROPOSED UTILITY INFORMATION INCLUDING STORM DRAIN, SEWER, WATER, ELECTRICAL, GAS, TELEPHONE AND CABLE TV.
3. REFER TO CITY AND/OR COUNTY STANDARD PLANS AND SPECIFICATIONS WHERE APPLICABLE.
4. VERIFY SITE INFORMATION, INCLUDING PROPERTY LINES, EXISTING ABOVE GROUND AND BELOW GROUND UTILITIES AND STRUCTURES, AND OTHER INFORMATION AFFECTING THE SCOPE OF WORK INCLUDED ON THESE DRAWINGS. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND THE LANDSCAPE ARCHITECT FOR DIRECTION ON HOW TO PROCEED.
5. EXCAVATION IN THE VICINITY OF UTILITIES AND EXISTING MATERIALS SHALL BE UNDERTAKEN WITH CARE. THE CONTRACTOR BEARS FULL RESPONSIBILITY FOR THIS WORK. ANY DAMAGE CAUSED BY ANY PERSON, VEHICLE, EQUIPMENT, OR TOOL RELATED TO THE EXECUTION OF THE CONTRACT SHALL BE REPAIRED IMMEDIATELY AT NO EXPENSE TO THE OWNER.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION REQUIRED TO ACCOMPLISH ALL CONSTRUCTION OPERATIONS. ALL PIPING, CONDUIT, SLEEVES, ETC., SHALL BE SET IN PLACE PRIOR TO INSTALLATION OF CONSTRUCTION ITEMS.
7. CONTRACTOR SHALL BE RESPONSIBLE TO CONSULT WITH SITE SUPERINTENDENT, APPROPRIATE AGENCIES AND PLANS, FOR THE LOCATIONS OF ALL UNDER-GROUND UTILITIES, PIPES AND STRUCTURES. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR ANY COST INCURRED DUE TO DAMAGE OF SAID UTILITIES.
8. CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED WHEN IT IS OBVIOUS THAT UNKNOWN OBSTRUCTIONS, AREA DISCREPANCIES AND/OR GRADE DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. SUCH CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATIONS.
9. CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT OF ANY EXISTING MATERIALS THAT ARE DAMAGED DURING CONSTRUCTION.
10. PRIOR TO INSTALLATION OF ANY CONSTRUCTION ITEM, FORMS WITH STEEL IN PLACE AND COMPACTED SUBGRADE COMPLETE, SHALL BE OBSERVED AND REVIEWED BY THE LANDSCAPE ARCHITECT.
11. ALL WALLS AND WALKS SHOULD HAVE SMOOTH, CONTINUOUS CURVES AS INDICATED ON PLANS.
12. ALL PROPERTY LINES, LOT LINES, AND TOP OF SLOPE LINES SHALL BE VERIFIED PRIOR TO COMMENCING WORK.
13. ALL ELECTRICAL JUNCTION BOXES FOR LIGHTS SHALL BE IN PLANTING AREAS AND LOCATION REVIEWED BY THE LANDSCAPE ARCHITECT. STAKE LOCATION PRIOR TO INSTALLATION.
14. SEE CIVIL ENGINEER'S DRAWINGS FOR CURBS AND A/C PAVING.
15. REFER TO CIVIL ENGINEER'S DRAWINGS FOR ELEVATIONS AND LOCATION OF DRAINAGE STRUCTURES PRIOR TO INSTALLATION OF WALKS, FOOTINGS AND OTHER STRUCTURES.
16. REFER TO GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION. IF NOTES ON THE PLANS DIFFER FROM THE GEOTECHNICAL REPORT, PROVIDE THE MOST STRINGENT REQUIREMENT.
17. RAISE ALL VAULTS/UTILITIES BOXES TO GRADE WITHIN LIMITS OF WORK. FIELD VERIFY PRIOR TO BID.

SITE FURNISHINGS LEGEND

SYM.	DESCRIPTION	MFR.	MODEL #	COLOR	FIN/ PTRN	QTY.	DET
	TRASH RECEPTACLE	QCP	24" CALIFORNIA ROUND QR-CAL2436W-A19 QR-CAL2436W-M19	NATURAL	ACID ETCH	T:1 R:1	IN-GROUND MOUNT PER MANUF
	8 FT. PICNIC TABLE (BID ALT 3)	QCP	STANDARD PICNIC TABLE #Q-STD90PT	FRENCH GRAY	CRAFTS MAN ETCH	3	PER MANUF
	ACCESSIBLE PICNIC TABLE (BID ALT 3)	QCP	ADA PICNIC TABLE #Q-STD90T-ADA	FRENCH GRAY	CRAFTS MAN ETCH	1	PER MANUF
	HEXAGONAL PEDESTAL	QCP	CUSTOMIZED HEXAGON 36" DIA X 28"H (A) 36" DIA X 14"H (B)	FRENCH GRAY	CRAFTS MAN ETCH	-BASE BID A: 0 , B: 5 -ALT 2 A: 2 , B: 8 -ALT 3 A: 6 , B: 20	01/ 2L5.02

PLAYGROUND EQUIPMENT LEGEND

SYM.	DESC.	MANUF.	MODEL #	COLOR	DET.	QTY.
	CHALLENGE STADIUM W/ LEANING LADDERS, CLIMBER, SWAY STATION, CENTRAL HUB, STADIUM SHADE.	GAMETIME	#13814, #13802 #13807, #13808 #13809, #13801 #13806, #13813 #13805, #13803 #13811, #13804	PIP ORANGE	2L5.03	1
	VISTA TREE TOP	GAMETIME	#5958SP	PIP BLUE	2L5.03	1
	2 WAY X-POD STEP W/ TRIANGULAR SHROUD, LOOP LADDER, CLIMBING WALL	GAMETIME	#26057, #26095 #26071, #26094 #26078, #26067	PIP YELLOW	2L5.03	1
	JOINT USE CHIN-UP BAR STATION	GAMETIME	#13575	PIP YELLOW	2L5.03	1

NOTE: PLAYGROUND EQUIPMENT SHALL BE SUBMITTED AS A DEFERRED APPROVAL ITEM.

MATERIALS KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
01	CONCRETE PAVING - TYPE 1	01/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
02	CONCRETE FLUSH CURB @A.C. PAVING & PLANTING AREA	10/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
03	SYNTHETIC TURF	09/ 2L5.01	PLAYGROUND GRASS BY FOREVER LAWN
04	PAVEMENT MARKINGS	PER PLAN	STREETBOND PAINT SYSTEM, COLOR PER PLAN
05	HOPSCOTCH	04/ 2L5.02	STREETBOND PAINT SYSTEM, COLOR PER DETAIL
06	GROUTED COBBLE	12/ 2L5.01	4 X 8 NOYA FROM CALIFORNIA ROCK AND READYMIX
07	CONCRETE FREESTANDING WALL	17/ 2L5.01	COLOR: NATURAL GRAY/ SANDBLST SIDES/SMOOTH TOP
08	SITE FURNISHINGS	-	REFER TO SITE FURNISHINGS LEGEND ON 2L0.01
09	PLAY EQUIPMENT	-	REFER TO PLAY EQUIPMENT LEGEND ON 2L0.01
10	RENOVATED SCHOOL SIGN	03/ 2L5.02	POWDER COATED COLOR PER DETAIL
11	CONCRETE FLUSH CURB @SYNTHETIC TURF & A.C. PAVING	14/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
12	CONCRETE FLUSH CURB @ PLANTING AREA	11/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
13	CONCRETE FLUSH CURB @SYNTHETIC TURF & PLANTING AREA	15/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM

REFERENCE KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COMMENTS
A	EXISTING PAVING		PROTECT IN PLACE
B	EXISTING BUILDING CANOPY		PROTECT IN PLACE
C	EXISTING BUILDING COLUMN		PROTECT IN PLACE
D	EXISTING GATE		PROTECT IN PLACE
E	EXISTING FENCE		PROTECT IN PLACE
F	EXISTING UTILITY		PROTECT IN PLACE
G	EXISTING TREE		PROTECT IN PLACE
H	A.C. PAVING	PER CIVIL	
J	BASIN	PER CIVIL	
K	EXISTING PAVEMENT MARKINGS		PROTECT IN PLACE

SHEET INDEX

2L0.01 LANDSCAPE NOTES AND LEGENDS

2L1.01 MATERIALS AND LAYOUT PLAN

2L3.01 ENLARGEMENT PLAN

2L5.01 CONSTRUCTION DETAILS
2L5.02 CONSTRUCTION DETAILS
2L5.03 CONSTRUCTION DETAILS

2L6.01 IRRIGATION PLAN
2L6.02 IRRIGATION PLAN
2L6.03 IRRIGATION N & L
2L6.04 IRRIGATION DETAILS
2L6.05 IRRIGATION DETAILS
2L6.06 IRRIGATION DETAILS
2L6.07 IRRIGATION WATER CALCS

2L7.01 PLANTING PLAN
2L7.02 PLANTING PLAN
2L7.03 PLANTING DETAILS

GENERAL SCOPE OF WORK

1. SITEWORK INCLUDING CONCRETE HARDSCAPE
2. PLANTING AND IRRIGATION

MWELO REQUIREMENTS

A.	WATER EFFICIENT LANDSCAPE WORKSHEET, HYDROZONE INFORMATION TABLE, WATER BUDGET CALCULATIONS	SHEET 2L6.07
B.	LANDSCAPE DESIGN PLAN	SHEET 2L7.01, 2L7.02
C.	IRRIGATION DESIGN PLAN	SHEET 2L6.01, 2L6.02

W.E.L.O. COMPLIANCE STATEMENT

I HAVE COMPLIED WITH THE CRITERIA OF THE WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE PLANTING & IRRIGATION DESIGN PLAN.

NAOMI NISHIMOTO, LANDSCAPE ARCHITECT	4995	4.16.2026
NAME	PLA #	DATE

LANDSCAPE MAINTENANCE STATEMENT

1. ALL LANDSCAPE IMPROVEMENTS WILL BE MAINTAINED BY PROPERTY OWNER.

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ 2L5.01
	AREA DRAIN (PER CIVIL)		EXPANSION JOINT	02/ 2L5.01
CO	CLEAN OUT - PER CIVIL		MATCHLINE	
	TRENCH INLET (PER CIVIL)		PROPERTY LINE/ RIGHT OF WAY	
S	MAN HOLE - PER CIVIL	PA	PLANTING AREA	
	DIRECTION OF RAMP; DOWN SLOPE		ALIGN	
	EXISTING TREE PROTECT IN PLACE			

NOTE: UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE CIVIL AND ELEC DWGS FOR DETAILS AND EXACT LOCATIONS. FINAL LOCATIONS TO BE REVIEWED BY LANDSCAPE ARCHITECT.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT NAOMI NISHIMOTO 4995 SIGNATURE 08/07/25 RENEWAL DATE 10/31/2026 STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

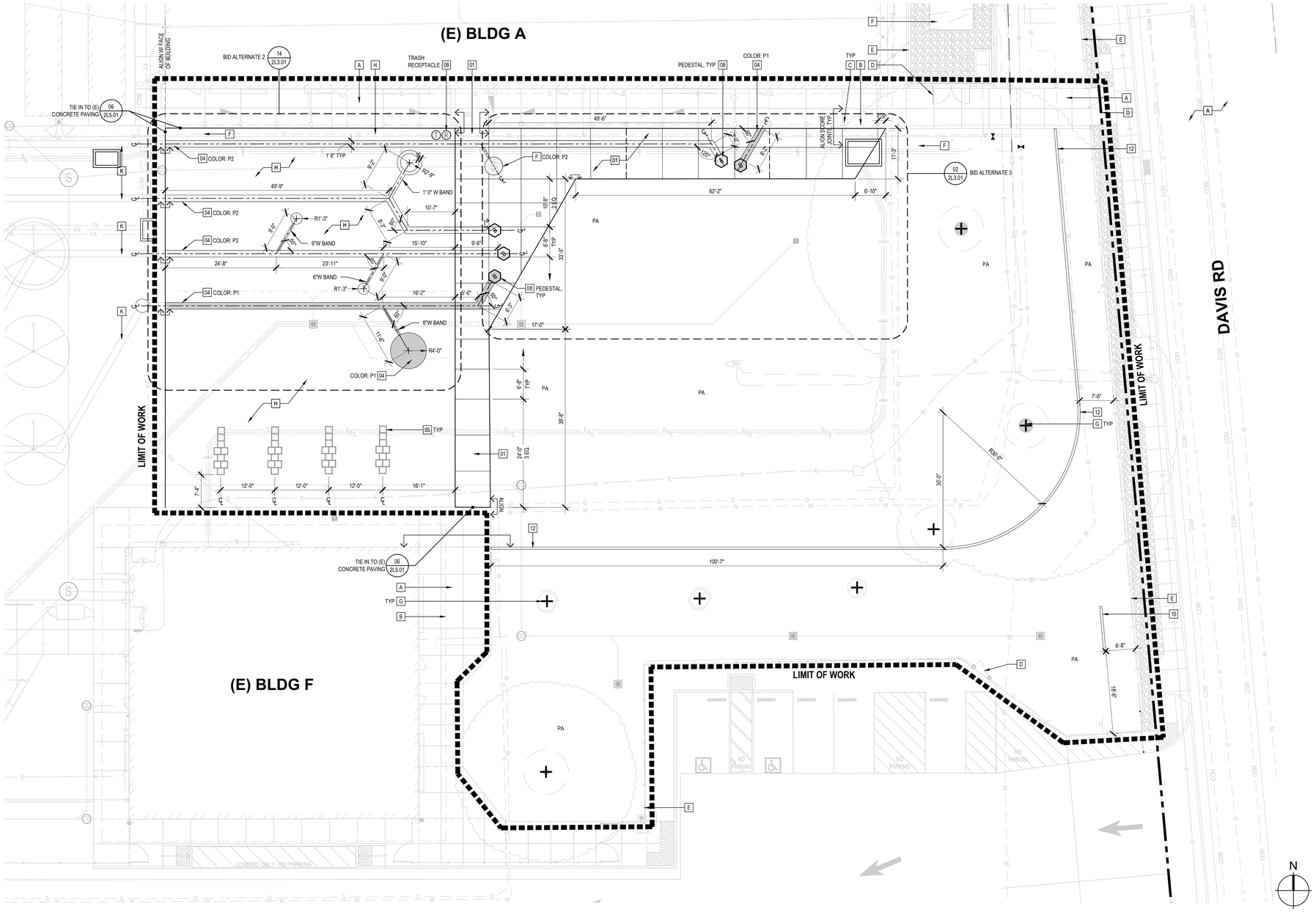
Revision
Date

Submittal
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026
Date

Job Number	31942
Checked By	EW
Scale	AS NOTED

LANDSCAPE NOTES AND LEGENDS

2L0.01



MATERIALS AND LAYOUT PLAN - BASE BID | 1" = 10'-0" | 02

ADDITIONAL LAYOUT NOTES

1. SEE SHEET 2L0.01 FOR LANDSCAPE LAYOUT NOTES.
2. PLAN MEASUREMENTS ARE TO FACE OF WALL, CURB, OR OTHER FIXED SITE IMPROVEMENT, UNLESS NOTED OTHERWISE ON PLANS.

LAYOUT SYMBOL LEGEND

- POINT OF BEGINNING (P.O.B.)
- ALIGN/FLUSH
- CENTER LINE
- BASELINE

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ 2L5.01
	AREA DRAIN (PER CIVIL)		EXPANSION JOINT	02/ 2L5.01
CO	CLEAN OUT - PER CIVIL		MATCHLINE	
	TRENCH INLET (PER CIVIL)		PROPERTY LINE/ RIGHT OF WAY	
S	MAN HOLE - PER CIVIL	PA	PLANTING AREA	
	DIRECTION OF RAMP: DOWN SLOPE		ALIGN	
	EXISTING TREE PROTECT IN PLACE			

NOTE: UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE CIVIL AND ELEC DWGS FOR DETAILS AND EXACT LOCATIONS. FINAL LOCATIONS TO BE REVIEWED BY LANDSCAPE ARCHITECT.

COLORS LEGEND

- P1 - BLUE C:46, M:29, Y:0, K:0
- P2 - YELLOW C:3, M:34, Y:100, K:0

NOTE:
1. COLOR ON PEDESTAL TO BE PAINTED ON SITE.
2. COLOR AT SYN TURF TO BE INTEGRATED.

REFERENCE KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COMMENTS
A	EXISTING PAVING		PROTECT IN PLACE
B	EXISTING BUILDING CANOPY		PROTECT IN PLACE
C	EXISTING BUILDING COLUMN		PROTECT IN PLACE
D	EXISTING GATE		PROTECT IN PLACE
E	EXISTING FENCE		PROTECT IN PLACE
F	EXISTING UTILITY		PROTECT IN PLACE
G	EXISTING TREE		PROTECT IN PLACE
H	A.C. PAVING	PER CIVIL	
J	BASIN	PER CIVIL	
K	EXISTING PAVEMENT MARKINGS		PROTECT IN PLACE

MATERIALS KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
01	CONCRETE PAVING - TYPE 1	01/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
02	CONCRETE FLUSH CURB @A.C. PAVING & PLANTING AREA	10/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
03	SYNTHETIC TURF	09/ 2L5.01	PLAYGROUND GRASS BY FOREVER LAWN
04	PAVEMENT MARKINGS	PER PLAN	STREETBOND PAINT SYSTEM, COLOR PER PLAN
05	HOPSCOTCH	04/ 2L5.02	STREETBOND PAINT SYSTEM, COLOR PER DETAIL
06	GROUTED COBBLE	12/ 2L5.01	4 X 8 NOYA FROM CALIFORNIA ROCK AND READYMIX
07	CONCRETE FREESTANDING WALL	17/ 2L5.01	COLOR: NATURAL GRAY/ SANDBLST SIDES/SMOOTH TOP
08	SITE FURNISHINGS	-	REFER TO SITE FURNISHINGS LEGEND ON 2L0.01
09	PLAY EQUIPMENT	-	REFER TO PLAY EQUIPMENT LEGEND ON 2L0.01
10	RENOVATED SCHOOL SIGN	03/ 2L5.02	POWDER COATED COLOR PER DETAIL
11	CONCRETE FLUSH CURB @SYNTHETIC TURF & A.C. PAVING	14/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
12	CONCRETE FLUSH CURB @ PLANTING AREA	11/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
13	CONCRETE FLUSH CURB @SYNTHETIC TURF & PLANTING AREA	15/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — ERIC WILLIAMS — No. 6496 — STATE OF CALIFORNIA
SIGNATURE 08/07/25
10/31/2026 RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

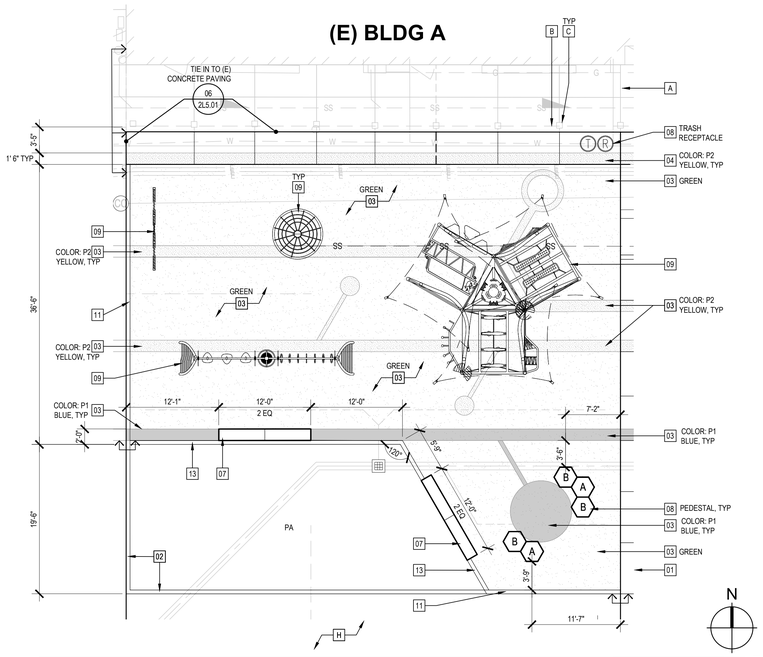
Date / Revision

Submittal / Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

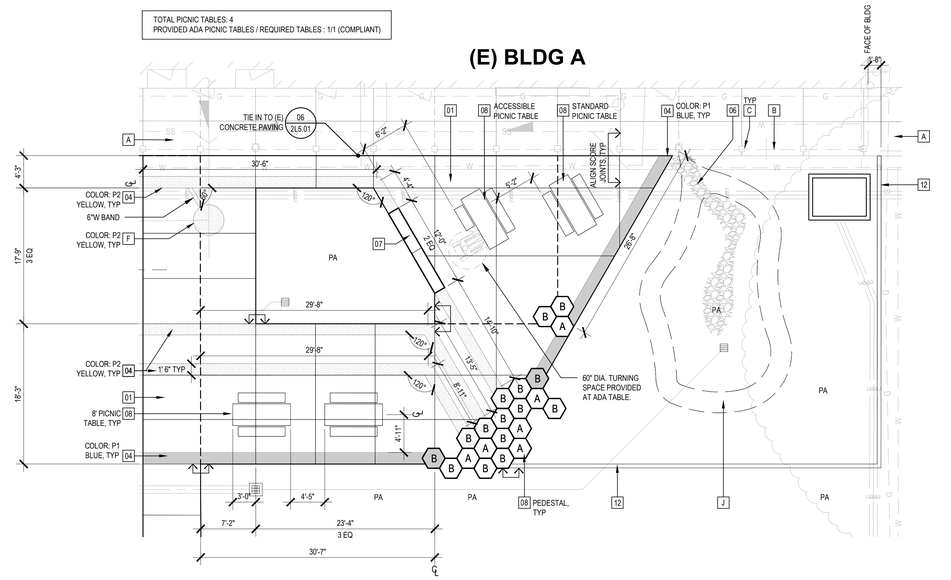
MATERIALS AND LAYOUT PLAN

2L1.01



MATERIALS AND LAYOUT PLAN ENLARGEMENT - BID ALTERNATE 2

1/8" = 1'-0" | 14



MATERIALS AND LAYOUT PLAN ENLARGEMENT - BID ALTERNATE 3

1/8" = 1'-0" | 02

ADDITIONAL LAYOUT NOTES

1. SEE SHEET 2L0.01 FOR LANDSCAPE LAYOUT NOTES.
2. PLAN MEASUREMENTS ARE TO FACE OF WALL, CURB, OR OTHER FIXED SITE IMPROVEMENT, UNLESS NOTED OTHERWISE ON PLANS.

LAYOUT SYMBOL LEGEND

- POINT OF BEGINNING (P.O.B.)
- ALIGN/FLUSH
- CENTER LINE
- BASELINE

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ 2L5.01
	AREA DRAIN (PER CIVIL)		EXPANSION JOINT	02/ 2L5.01
CO	CLEAN OUT - PER CIVIL		MATCHLINE	
	TRENCH INLET (PER CIVIL)		PROPERTY LINE/ RIGHT OF WAY	
S	MAN HOLE - PER CIVIL	PA	PLANTING AREA	
	DIRECTION OF RAMP; DOWN SLOPE		ALIGN	
	EXISTING TREE PROTECT IN PLACE			

NOTE: UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE CIVIL AND ELEC DWGS FOR DETAILS AND EXACT LOCATIONS. FINAL LOCATIONS TO BE REVIEWED BY LANDSCAPE ARCHITECT.

COLORS LEGEND

P1 - BLUE C:46, M:29, Y:0, K:0

P2 - YELLOW C:3, M:34, Y:100, K:0

NOTE:
1. COLOR ON PEDESTAL TO BE PAINTED ON SITE.
2. COLOR AT SYN TURF TO BE INTEGRATED.

REFERENCE KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COMMENTS
A	EXISTING PAVING		PROTECT IN PLACE
B	EXISTING BUILDING CANOPY		PROTECT IN PLACE
C	EXISTING BUILDING COLUMN		PROTECT IN PLACE
D	EXISTING GATE		PROTECT IN PLACE
E	EXISTING FENCE		PROTECT IN PLACE
F	EXISTING UTILITY		PROTECT IN PLACE
G	EXISTING TREE		PROTECT IN PLACE
H	A.C. PAVING	PER CIVIL	
J	BASIN	PER CIVIL	
K	EXISTING PAVEMENT MARKINGS		PROTECT IN PLACE

MATERIALS KEYNOTE LEGEND

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
01	CONCRETE PAVING - TYPE 1	01/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
02	CONCRETE FLUSH CURB @A.C. PAVING & PLANTING AREA	10/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
03	SYNTHETIC TURF	09/ 2L5.01	PLAYGROUND GRASS BY FOREVER LAWN
04	PAVEMENT MARKINGS	PER PLAN	STREETBOND PAINT SYSTEM, COLOR PER PLAN
05	HOPSCOTCH	04/ 2L5.02	STREETBOND PAINT SYSTEM, COLOR PER DETAIL
06	GROUTED COBBLE	12/ 2L5.01	4 X 8 NOYA FROM CALIFORNIA ROCK AND READYMIX
07	CONCRETE FREESTANDING WALL	17/ 2L5.01	COLOR: NATURAL GRAY/ SANDBLST SIDES/SMOOTH TOP
08	SITE FURNISHINGS	-	REFER TO SITE FURNISHINGS LEGEND ON 2L0.01
09	PLAY EQUIPMENT	-	REFER TO PLAY EQUIPMENT LEGEND ON 2L0.01
10	RENOVATED SCHOOL SIGN	03/ 2L5.02	POWDER COATED COLOR PER DETAIL
11	CONCRETE FLUSH CURB @SYNTHETIC TURF & A.C. PAVING	14/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
12	CONCRETE FLUSH CURB @ PLANTING AREA	11/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM
13	CONCRETE FLUSH CURB @SYNTHETIC TURF & PLANTING AREA	15/ 2L5.01	COLOR: NATURAL GRAY FINISH: MEDIUM BROOM

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT
MATTHEW HIMOTO CHEN
No. 6395
STATE OF CALIFORNIA
SIGNATURE
08/07/25
RENEWAL DATE
10/31/2026

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

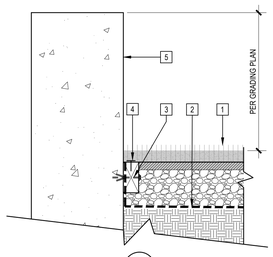
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

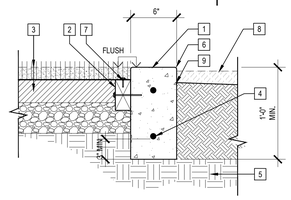
ENLARGEMENT PLAN

2L3.01



1 SYNTHETIC TURF SYSTEM PER (09 -)
2 FILTER FABRIC, LAP UNDER HEADER
3 2X4X16 TREX HEADER ATTACHED W/ ZINC-PLATED & CERAMIC COATED 1/4"X4" MASONRY SCREW 4' MAX O.C. AND NO FURTHER THAN 6" FROM EACH END
4 ATTACH TURF FABRIC TO NAILER PER TURF MANUFACTURERS RECOMMENDATIONS
5 CONCRETE FRESSTANDING WALL PER MATERIALS/LAYOUT PLAN AND (17 -)

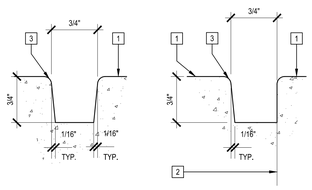
SYN. TURF @ VERTICAL SURFACE — 1 1/2" = 1'-0" — 16



1 CONCRETE FLUSH CURB; REFER TO MATERIALS PLAN FOR FINISH.
2 2X4X16 TREX HEADER ATTACHED W/ ZINC-PLATED & CERAMIC COATED 1/4"X4" MASONRY SCREW 4' MAX O.C. AND NO FURTHER THAN 6" FROM EACH END
3 SYNTHETIC TURF SYSTEM; REFER TO DTL. (09 -)
4 (2) #4 CONTINUOUS HORIZONTAL REBAR.
5 SUBGRADE; REFER TO CIVIL DWG'S
6 TOOLED RADIUS, 1/4" R, TYP.
7 ATTACHED SYNTHETIC TURF TO NAILER PER MANUFACTURER'S RECOMMENDATIONS
8 PLANTING AREA; FINISH GRADE TOP OF BARK MULCH OR TURF.
9 AMENDED TOP SOIL; FIN. GRADE ADJACENT TO CONC. BAND; 1" BELOW CONC. BAND AT TURF; 2.5" BELOW CONC. BAND AT SHRUB AND GROUNDCOVER AREA.

NOTES:
A. PROVIDE SCORE JOINT EVERY 10'-0" OR TO ALIGN WITH PAVING JOINTS (02 -)
B. FOR SYNTHETIC TURF DRAINAGE REFER TO CIVIL GRADING AND DRAINAGE PLANS

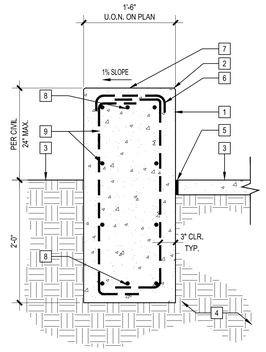
BID ALT 2: CONC. FLUSH CURB @ SYNTHETIC TURF & PLANTING AREA — 1 1/2" = 1'-0" — 15



1 CONCRETE WALL PER MATERIALS PLAN.
2 COLD JOINT.
3 1/8" TOOLED/STONED CORNERS & EDGES.

NOTES:
A. PROVIDE REVEAL @ ALL COLD JOINTS.
B. REVEAL SHOULD BE CONTINUOUS ON SIDES & TOP OF WALL, UNLESS OTHERWISE NOTED ON PLAN OR ELEVATION.
C. REFER TO PLANS & ELEVATIONS FOR JOINT SIZE & LOCATION.
D. ALIGN ALL FORM JOINTS W/REVEALS. CUSTOM CUT FORMS AS REQUIRED.

CONCRETE WALL REVEALS — FULL / SAME — 18



1 CONCRETE FREE-STANDING WALL PER MATERIALS PLAN. REFER TO KEYNOTE LEGEND FOR COLOR & FINISH
2 1/8" EASED EDGE RADIUS, TYP. ALL EDGES, NO CHAMFERS
3 FINISH SURFACE/FINISH GRADE; REFER TO MATERIALS PLAN FOR TYPE.
4 OVER-EXCAVATION, SUBGRADE SCARIFICATION/COMPACTION SHALL BE PER GEOTECHNICAL REPORT
5 EXPANSION JOINT PER (08 -)
6 ⌐¬ #4 @ 12" O.C.
7 TOP OF WALL PER CIVIL GRADING PLAN
8 (3) #4 CONTINUOUS AT TOP AND BOTTOM
9 #4 @ 12" O.C. EACH WAY AND EACH FACE W/ STD 90 DEG HOOKS EA END

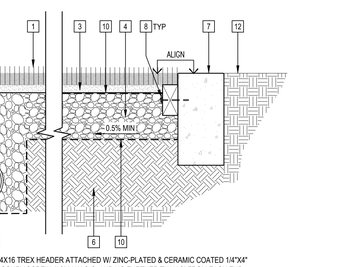
NOTES:
A. REVEAL (18 -)
B. REFER TO PLANS & ELEVATIONS FOR LOCATION OF JOINTS.
C. ALL FORM SEAMS ARE TO ALIGN WITH REVEALS SHOWN ON ELEVATIONS & PLANS. PROVIDE CUSTOM FORM BOARDS AS REQUIRED.
D. PROVIDE PERMANENT NON-SACRIFICIAL ANTI-GRAFFITI COATING ON ALL EXPOSED WALL SURFACES.(SEE SPECS)
E. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED
F. DSA SSS REVIEW IS NOT REQUIRED PER IR A-22

CONCRETE FREE-STANDING WALL — 1" = 1'-0" — 17

1 COBBLE. COLOR AND FINISH PER MATERIALS PLAN. SET COBBLES 1/3 MAX DEPTH INTO MORTAR SETTING BED. COBBLES SHALL TOUCH AND BE ARRANGED TO MINIMIZE EXPOSED MORTAR
2 2" DEEP 2,000 PSI MIN MORTAR SETTING BED, COLOR TO MATCH COBBLE
3 COBBLE SHALL CONTAIN THE PERIMETER WITH NO MORTAR OVERPOUR
4 COMPACTED SUBGRADE PER GEOTECH
5 MIRAFI 140N FILTER FABRIC BELOW MORTAR SHALL NOT BE EXPOSED

NOTE:
A. FIELD VERIFY LOCATIONS WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION
B. MAINTAIN POSITIVE FLOW AWAY FROM WATER SOURCE.
C. REFER TO LANDSCAPE MATERIALS AND LAYOUT PLANS FOR COBBLE EXTENTS AND ADDITIONAL REQUIREMENTS

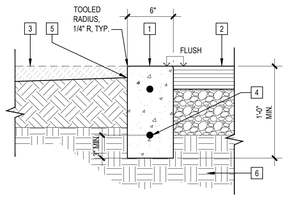
BID ALT 2: GROUTED COBBLE — 1" = 1'-0" — 12



1 CONCRETE FLUSH CURB; REFER TO MATERIALS PLAN FOR FINISH.
2 PLANTING AREA; FINISH GRADE TOP OF BARK MULCH OR TURF.
3 #4 CONTINUOUS HORIZONTAL REINFORCING.
4 AMENDED TOP SOIL; FIN. GRADE ADJACENT TO CONC. BAND; 1" BELOW CONC. BAND AT TURF. 2.5" BELOW CONC. BAND AT SHRUB AND GROUNDCOVER AREA.
5 1/4" TOOLED RADIUS; TYP. AT BOTH SIDES OF BAND.
6 COMPACTED SUBGRADE; REFER TO CIVIL DWG'S.

NOTES:
A. PROVIDE SCORE JOINT EVERY 10'-0" OR TO ALIGN WITH PAVING JOINTS & EXPANSION JOINT EVERY 30' & AT EVERY CHANGE IN DIRECTION (02 -)

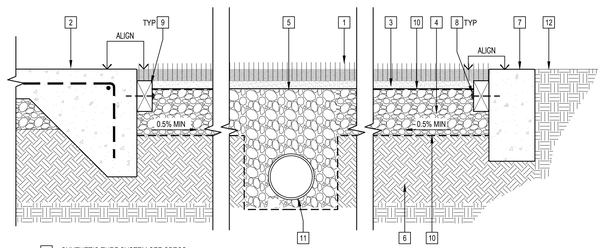
CONCRETE FLUSH CURB @ PLANTING AREA — 3" = 1'-0" — 11



1 CONCRETE FLUSH CURB; REFER TO MATERIALS PLAN FOR FINISH.
2 A.C. PAVING WHERE OCCURS; REFER TO CIVIL DWG'S.
3 PLANTING AREA WHERE OCCURS; FINISH GRADE TOP OF BARK MULCH OR TURF.
4 (2) #4 CONTINUOUS HORIZONTAL REBAR.
5 AMENDED TOP SOIL FIN. GRADE ADJACENT TO CONC. BAND: 1" BELOW CONC. BAND AT TURF. 1-1/2" BELOW CONC. BAND AT SHRUB AND GROUNDCOVER AREA.
6 COMPACTED SUBGRADE; REFER TO CIVIL DWG'S.

NOTES:
A. PROVIDE TOOLED JOINT EVERY 10'-0" OR TO ALIGN WITH PAVING JOINTS & EXPANSION JOINT EVERY 30' & AT EVERY CHANGE IN DIRECTION (02 -)
B. FOR DRAINAGE REFER TO CIVIL GRADING AND DRAINAGE PLANS

BID ALT 2: CONC. FLUSH CURB @ SYNTHETIC TURF & A.C. PAVING — 1 1/2" = 1'-0" — 14



1 SYNTHETIC TURF SYSTEM SEE SPECS
2 CONCRETE PAVING WITH THICKENED EDGE SEE (07 -)
3 1.5" THICK SBR CUSHION LAYER PER MANUFACTURE MAX CRITICAL FALL HEIGHT: 8'
4 MIN 3" THICK COMPACTED PERMEABLE AGGREGATE BASE PER CIVIL
5 MIRAFI 140N FILTER FABRIC WRAPPED AROUND 3/4" ANGULAR WASHED STONE COMPACTED AROUND STORM DRAIN
6 COMPACTED SUBGRADE
7 CONC. FLUSH CURB @ ADJACENT SURFACE (14, 15 -)
8 2X4X16 TREX HEADER ATTACHED W/ ZINC-PLATED & CERAMIC COATED 1/4"X4" MASONRY SCREW 4'-0" MAX O.C. AND NO FURTHER THAN 6" FROM EACH END
9 ATTACH TURF FABRIC TO NAILER PER TURF MANUF. RECOMMENDATIONS. ELEVATION OF NAILER VARIES PER SYSTEM. SET INFILL OR THATCH LAYER FLUSH FOR ADA TRANSITION. SUBMIT SHOP DRAWINGS FOR REVIEW.
10 MIRAFI 140N FILTER FABRIC
11 PERFORATED DRAIN LINE. SIZE,DEPTH,LOCATION PER CIVIL (04 2C7.01)
12 ADJACENT SURFACE/FINISH GRADE; REFER TO MATERIALS PLAN

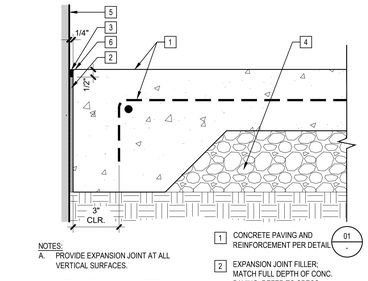
NOTE:
A. FOR SYN TURF ADJACENT TO VERTICAL SURFACE CONDITION PER (16 -)

BID ALT 2: SYNTHETIC TURF - PLAYGROUND — 1 1/2"=1'-0" — 09

1 CONCRETE FLUSH CURB; REFER TO MATERIALS PLAN FOR FINISH.
2 2X4X16 TREX HEADER ATTACHED W/ ZINC-PLATED & CERAMIC COATED 1/4"X4" MASONRY SCREW 4' MAX O.C. AND NO FURTHER THAN 6" FROM EACH END
3 SYNTHETIC TURF SYSTEM; REFER TO DTL. (09 -)
4 (2) #4 CONTINUOUS HORIZONTAL REBAR.
5 SUBGRADE; REFER TO CIVIL DWG'S
6 A.C. PAVING; REFER TO CIVIL DWG'S.
7 ATTACHED SYNTHETIC TURF TO NAILER PER MANUFACTURER'S RECOMMENDATIONS

NOTES:
A. PROVIDE TOOLED JOINT EVERY 10'-0" OR TO ALIGN WITH PAVING JOINTS & EXPANSION JOINT EVERY 30' & AT EVERY CHANGE IN DIRECTION (02 -)
B. FOR DRAINAGE REFER TO CIVIL GRADING AND DRAINAGE PLANS

CONC. FLUSH CURB @ A.C. PAVING & PLANTING AREA — 1 1/2"=1'-0" — 10



NOTES:
A. PROVIDE EXPANSION JOINT AT ALL VERTICAL SURFACES.
B. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
C. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

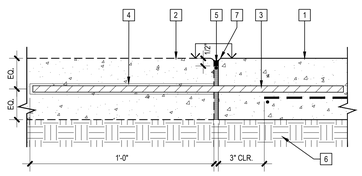
1 CONCRETE PAVING AND REINFORCEMENT PER DETAIL (01 -)
2 EXPANSION JOINT FILLER; MATCH FULL DEPTH OF CONC. PAVING; REFER TO SPECS FOR MATERIAL
3 JOINT SEALANT; COLOR TO MATCH CONCRETE COLOR W/SEEDED SILICA SAND
4 BASE MATERIAL AND SUBGRADE PER DETAIL (01 -)
5 FACE OF VERTICAL SURFACE
6 1/4" RADIUS

EXPANSION JOINT AT VERTICAL SURFACE — 3" = 1'-0" — 08

1 CONCRETE PAVING; REFER TO DTL. (01 -)
2 ADJACENT SURFACE/ FINISH GRADE; REFER TO PER MATERIALS PLAN
3 #4 REINFORCING; CONTINUOUS
4 EXTEND REINFORCEMENT FROM PAVING INTO THICKENED EDGE & WRAP ENDS
5 THICKENED EDGE; 9" DEPTH FOR PEDESTRIAN PAVING; 12" DEPTH FOR VEHICULAR PAVING
6 BASE MATERIAL & COMPACTED SUBGRADE; REFER TO DTL. (01 -)
7 EASE ALL EDGES; 1/4"R, TYP.

NOTE:
FOR EDGE CONDITION ADJACENT TO VERTICAL SURFACE REFER TO DTL. (08 -)

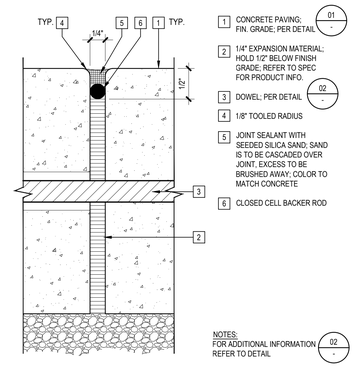
CONC. PAVING THICKENED EDGE — 1 1/2" = 1'-0" SHT REF# — 07



1 NEW CONCRETE PAVING AND REINFORCEMENT; REFER TO DTL. (01 -)
2 EXISTING CONCRETE PAVING
3 1/2" X 24" SMOOTH STEEL DOWEL AT 18" O.C.
4 5/8" SLIP SLEEVE DRILLED INTO EXISTING CONCRETE PAVING; DOWEL TO HAVE FREE MOVEMENT ON THIS SIDE
5 EXPANSION JOINT PER (04 -)
6 BASE MATERIAL AND COMPACTED SUBGRADE; REFER TO DTL. (01 -)
7 1/8" RADIUS; AT NEW CONCRETE PAVING

NOTES:
A. PROVIDE AT ALL LOCATIONS WHERE NEW CONCRETE JOINS EXISTING CONCRETE.
B. PROVIDE CLEAN SAWCUT AT EXISTING PAVING. EXTEND PROPOSED PAVING AS REQUIRED TO CLOSEST ADJACENT JOINT.
C. SEE CIVIL PLANS FOR LIMIT OF DEMOLITION.
D. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
E. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

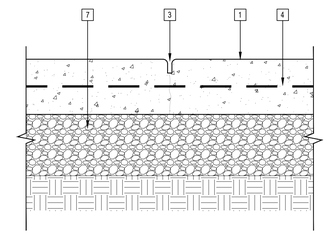
CONCRETE PAVING TIE-IN — 3"=1'-0" — 06



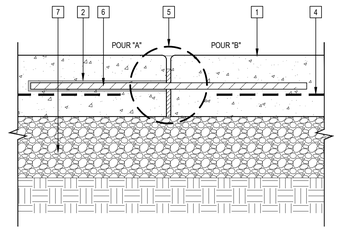
1 CONCRETE PAVING; REFER TO DETAIL (01 -)
2 1/4" EXPANSION MATERIAL; HOLD 1/2" BELOW FINISH GRADE; REFER TO SPEC FOR PRODUCT INFO.
3 DOWEL; PER DETAIL (02 -)
4 1/8" TOOLED RADIUS
5 JOINT SEALANT WITH SEEDED SILICA SAND; SAND IS TO BE CASCADED OVER JOINT, EXCESS TO BE BRUSHED AWAY; COLOR TO MATCH CONCRETE
6 CLOSED CELL BACKER ROD

NOTES:
FOR ADDITIONAL INFORMATION REFER TO DETAIL (02 -)

EXPANSION JOINT ENLARGEMENT — N.T.S. — 04



A. SAWCUT CONTROL JOINT

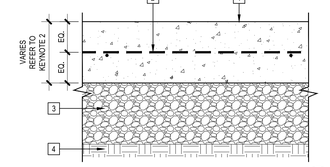


B. EXPANSION JOINT

1 CONCRETE PAVING; REFER TO DETAIL (01 -)
2 SPEED DOWEL; BY SIKA CORPORATION CONCRETE ACCESSORIES; PRODUCT # PSD12/ #4TX
3 SAWCUT CONTROL JOINT; 1/8-INCH WIDE; CUT TO 1/4 DEPTH OF SLAB; PROVIDE TIGHT 1/8-INCH RADIUS ON EDGE OF PAVING BEFORE SAWCUTTING.
4 CONCRETE PAVING REINFORCEMENT; REFER TO DETAIL (01 -)
5 JOINT ENLARGEMENT; REFER TO DETAIL (04 -)
6 PEDESTRIAN: 1/2"Ø SMOOTH STEEL DOWEL; 18" @ 24" O.C. VEHICULAR: 5/8"Ø SMOOTH STEEL DOWEL; 18" @ 24" O.C.
7 AGGREGATE BASE AND SUBGRADE; REFER TO PAVING DETAIL (01 -)

NOTES:
A. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
B. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

CONCRETE PAVING JOINTS — 3" = 1'-0" — 02



1 CONCRETE PAVING; REFER TO MATERIALS PLAN KEYNOTE LEGEND FOR FINISH & COLOR.
2 FOR PAVING THICKNESS & REINFORCEMENT SEE CIVIL (02 2C7.01)
3 AGGREGATE BASE SEE CIVIL (02 2C7.01)
4 SUBGRADE COMPACTION & OVER EXCAVATION SEE CIVIL (02 2C7.01)

NOTES:
A. SAWCUT & EXPANSION JOINTS; REFER TO DETAIL. (02 -)
B. PROVIDE DOWELS WHERE NEW CONCRETE TIES INTO EXISTING PER DETAIL. (06 -)
C. PROVIDE THICKENED EDGE WHERE PAVING IS ADJACENT TO PLANTING AREAS, AT COLUMNS, AT SITE AND BLDG. WALLS, AND AT OTHER VERTICAL SURFACES. (07 -)
D. DO NOT ALLOW CONCRETE OVER-POUR INTO ADJACENT PLANTING AREA.
E. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
F. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

CONCRETE PAVING — 3" = 1'-0" — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — EDWARD WISHNUBHIMOTO — 5995 — SIGNATURE — 08/07/25 — 10/31/2026 — RENEWAL DATE — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

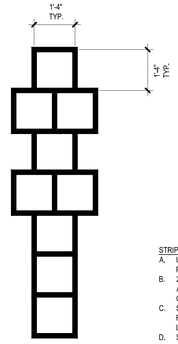
Date
Revision

Submittal — Date
100% SCHEMATIC DESIGN — 08/29/2025
100% DESIGN DEVELOPMENT — 01/09/2026
DSA SUBMITTAL — 04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

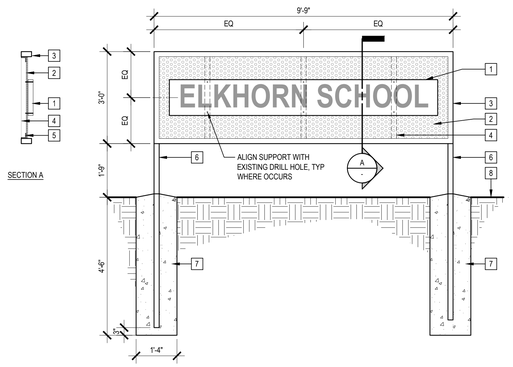
CONSTRUCTION DETAILS

2L5.01



STRIPING NOTES:
A. USE 2 COATS OF PAINT AS PER SPECIFICATIONS.
B. 2" STRIPING-TYPICAL FOR ALL PAINTED COURTS ON CONCRETE AND A/C.
C. STRIPING DIMENSIONS REFER TO THE CENTER LINE OF THE 2" STRIPE.
D. STRIPING COLOR PER 2L3.01

BASE BID HOPSCOTCH STRIPING | 1/2" = 1'-0" | 04



SECTION A

1 EXISTING SCHOOL SIGN, REMOVE AND PROTECT.

2 1/8" THICK PERFORATED METAL PANEL. 3/32" DIA HOLES ON 3/16" STAGGERED CENTERS, 23% OPEN. PAINT YELLOW TO MATCH SIGN LETTERS.

3 2"X4" 11 GA. TUBE STEEL FRAME

4 2"X2" 11 GA TUBE STEEL SUPPORT. ALIGN CENTER OF SUPPORT WITH EXISTING DRILL HOLES IN SCHOOL SIGN WHERE POSSIBLE. USE CARRIAGE BOLTS TO ATTACH SIGN TO SUPPORTS

5 2"X2" ANGLE WELDED TO FRAME

6 2"x2"x3/16" HSS POSTS, PAINTED TO MATCH EXISTING

7 CONCRETE POST FOOTING

8 FINISH GRADE

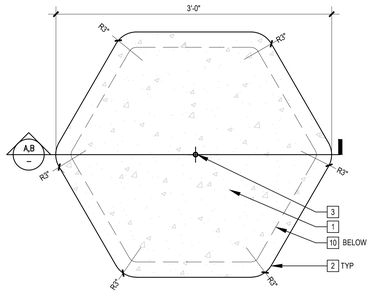
NOTES

A. APPLY NEW COAT OF PAINT TO MATCH EXISTING BLUE AND YELLOW. FIELD TO BE BLUE. LETTERS TO BE YELLOW. PAINT BOLT ENDS BLUE TO MATCH

B. PERF METAL TO BE YELLOW TO MATCH LETTERS. T.S. FRAME AND POSTS TO BE BLUE TO MATCH SIGN FIELD.

C. GRIND ALL WELDS SMOOTH

MONUMENT SIGNAGE RELOCATION | 1/2" = 1'-0" | 03



PLAN VIEW

1 PRECAST CONCRETE HEXAGONAL STOOL, SEE SITE FURNISHINGS LEGEND FOR FINISH AND COLOR

2 4" EASED EDGE RADIUS, TYP. ALL EDGES

3 1/2" DIA CIP HEADED ANCHOR BOLT W/6" EMBED

4 #4 TIES W/ 135 DEGREE HOOKS @ 12" O/C

5 CONC. PAVING THICKENED EDGE (07 2L5.01)

6 PLANTING AREA

7 BASE MATERIAL AND COMPACTED SUBGRADE PER GEOTECHNICAL REPORT

8 (4) #5 CONT LONGITUDINAL BARS T&B W/ STD 90 DEGREE HOOK AT EA END, TYP.

9 CORE DRILL 3" DIA HOLE CENTERED IN FOOTING BELOW. GROUT THREADED ROD IN PLACE. COORDINATE LOCATION TO AVOID CONFLICT W/ FOOTING TIES.

10 CONCRETE PAD BENEATH PEDESTAL. MIX DESIGN, COLOR, AND FINISH TO MATCH ADJACENT PAVING.

11 CONCRETE FOOTING

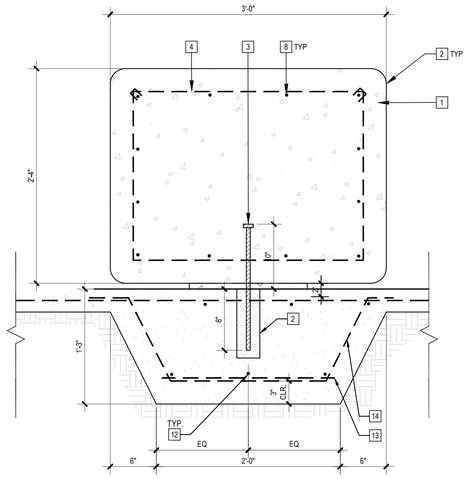
12 (3) #4 CONT LONGITUDINAL BARS T&B W/ STD 90 DEGREE HOOK AT EA END, TYP.

13 (3) LONGITUDINAL BARS MATCHING SIZE OF PAVING REINFORCEMENT

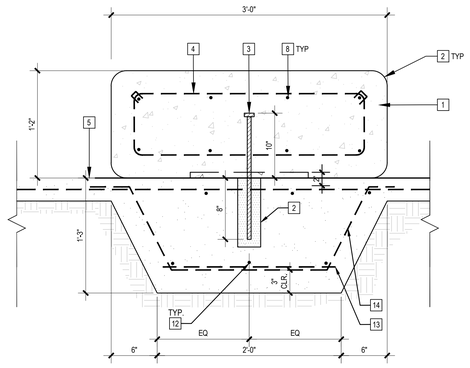
14 TRANSVERSE BARS MATCHING SIZE AND SPACING OF PAVING REINFORCEMENT

NOTES:

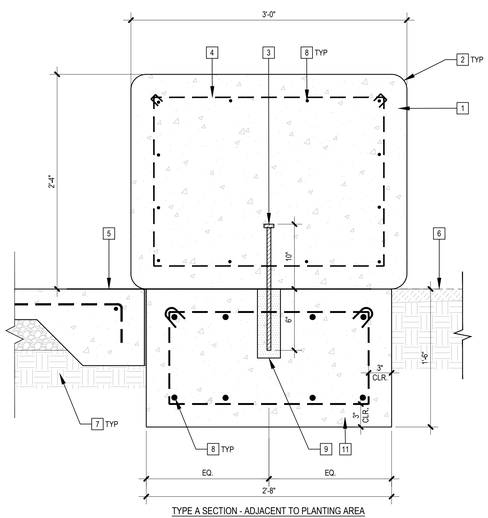
A. IF COLOR TO BE PAINTED ON SITE, APPLY 1 COAT OF PRIME AND 2 COATS OF COLOR. PRECAST UNITS FROM IF COLOR TO BE INTEGRATED,PRECAST UNITS FROM MANUFACTURE TO BE SMOOTH FINISH



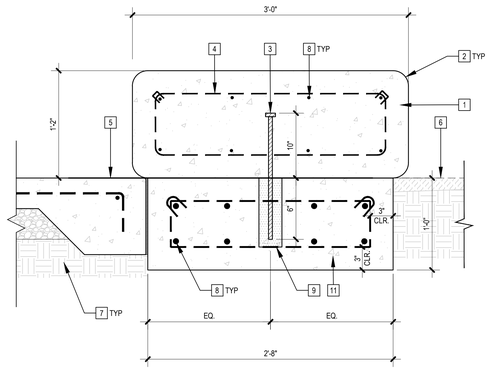
TYPE A SECTION - THICKENED EDGE CONDITION



TYPE B SECTION - THICKENED EDGE CONDITION



TYPE A SECTION - ADJACENT TO PLANTING AREA



TYPE B SECTION - ADJACENT TO PLANTING AREA

BID ALT 3: PRECAST CONC. PEDESTAL | 1 1/2" = 1'-0" | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT
EDWARD WISHIMOTO
6049
STATE OF CALIFORNIA
SIGNATURE
08/07/25
DATE
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

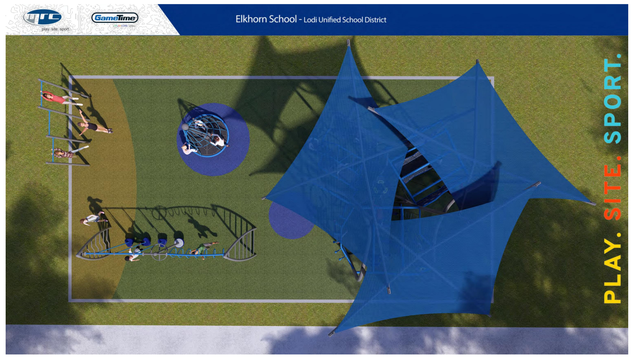
Revision	Date

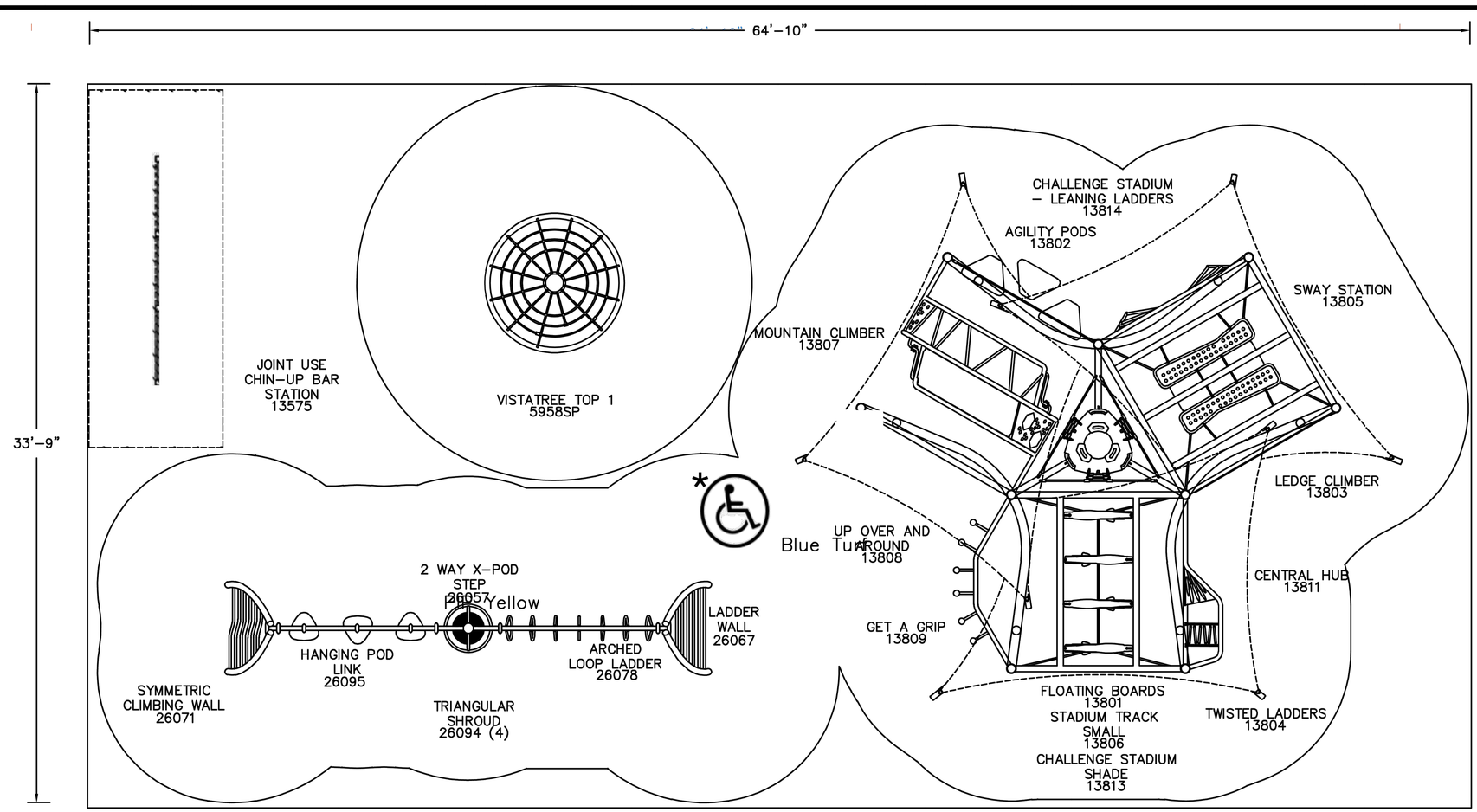
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

CONSTRUCTION DETAILS

2L5.02





*Entire play area is accessible

6' use zone shown by black line around all play equipment

This Unit includes play events and routes or travel specifically designed for special needs users. It is the opinion of the manufacturer that these play events and routes of travel conform to the accessibility requirements of the ADA (Americans with Disabilities Act)

Total Elevated Play Components	0		
Total Elevated Play Components Accessible By Ramp	0	Required	0
Total Elevated Components Accessible By Transfer	0	Required	0
Total Accessible Ground Level Components Shown	17	Required	0
Total Different Types Of Ground Level Components	4	Required	0

GameTime®
A PLAYCORE Company
150 PlayCore Drive SE
Fort Payne, AL 35967
www.gametime.com

ISO 9001 CERTIFIED
ISO 14001 CERTIFIED

Elkhorn School

Lodi Unified School District

Representative
MRC

This play equipment is recommended for children ages
5-12

Minimum Area Required:

Scale: 1" = 5'-0"

This drawing can be scaled only when in an 11" x 17" format

IMPORTANT: Soft resilient surfacing should be placed in the use zones of all equipment, as specified for each type of equipment, and at depths to meet the critical fall heights as specified by the U.S. consumer Product Safety Commission, ASTM standard F 1487 and Canadian Standard CAN/CSA-Z-614

Drawn By:
ko

Date:
02.18.26

Drawing Name:
Option 3

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT
NAOMI NISHIMOTO
STATE OF CALIFORNIA
SIGNATURE
09/07/25
DATE
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

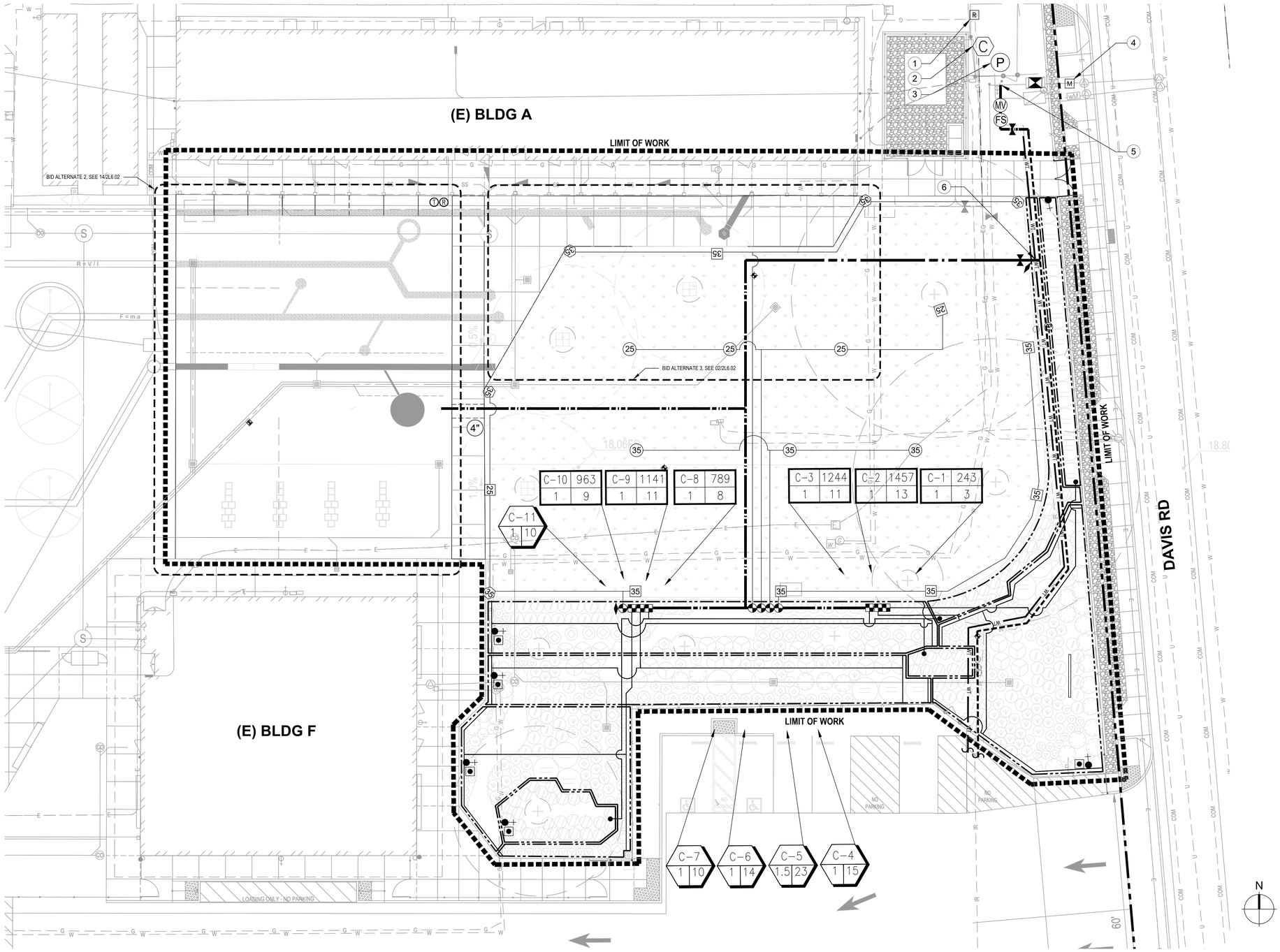
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

CONSTRUCTION DETAILS

2L5.03



IRRIGATION PLAN | 1" = 20'-0" | 02

NOTES:

1. ONE BUBBLER SYMBOL IS SHOWN AT TREES FOR GRAPHIC CLARITY ONLY. INSTALL MINIMUM TWO BUBBLERS AT EACH TREE. INSTALL REQUIRED NUMBER OF BUBBLERS AS DETAILED.
2. IRRIGATION EQUIPMENT MAY BE SHOWN WITHIN HARDSCAPE FOR GRAPHIC CLARITY ONLY. INSTALL ALL IRRIGATION EQUIPMENT WITHIN PLANTED AREAS. IRRIGATION PIPE AND WIRE CROSSING BENEATH HARDSCAPE SURFACES SHALL BE CONTAINED WITHIN SLEEVING OR SCHEDULE 40 PVC CONDUIT. SLEEVING SIZE SHALL BE A MINIMUM OF TWO TIMES THE AGGREGATE DIAMETER OF ALL PIPES CONTAINED WITH SLEEVE. PROVIDE VERTICAL SWEEP FOR ALL ELECTRICAL CONDUIT ON EACH SIDE OF HARDSCAPE AND TERMINATE ENDS AT 12" MINIMUM DEPTH AND 12" FROM HARDSCAPE SURFACE.
3. UNSIZED LATERAL LINE PIPING LOCATED DOWN STREAM OF 1" PIPING SHALL BE 3/4" IN SIZE (TYPICAL).
4. SIZING OF LATERAL PIPE SHALL BE AS FOLLOWS:

0.75"	0-6 GPM
1"	7-12 GPM
1.25"	13-20 GPM

5. SIZING OF LATERAL PIPE FOR DRIPLINE (12" O.C. GRID WITH 0.6 GPH OR LESS EMITTERS) SHALL BE AS FOLLOWS:

0.75	0-500 FT
1"	501-1100 FT
1.25"	1101-2000 FT
1.5"	2001-3000 FT

PLAN NOTES LEGEND

1. WIRED RAIN SENSOR, MOUNT ON FENCE.
2. IRRIGATION CONTROLLER "C". REMOVE THE EXISTING CONTROLLER AND MOUNT ON EXTERIOR WALL IN THE ORIGINAL CONTROLLER'S LOCATION AS DETAILED. CONNECT TO THE EXISTING 120 VOLT A.C. ELECTRICAL SERVICE INSTALLED AT THIS LOCATION .
3. EXISTING BOOSTER PUMP WITH A DISCHARGE PRESSURE OF 90 PSI.
4. 1.5" WATER METER WITH 2" SERVICE LINE FOR IRRIGATION TO BE PROVIDED BY OTHER, REFER TO CIVIL PLANS. MAXIMUM IRRIGATION DEMAND: 30 GPM AT 60 PSI STATIC PRESSURE AT WATER METER LOCATION.
5. CONNECT TO THE EXISTING 3" MAINLINE AT THIS LOCATIONS. MAXIMUM IRRIGATION DEMAND: 30 GPM AT 75 PSI STATIC PRESSURE AT STUB-OUT LOCATION.

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ♦ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — TIMOTHY GRIBBEN — 5995 — STATE OF CALIFORNIA
SIGNATURE
08/07/25
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

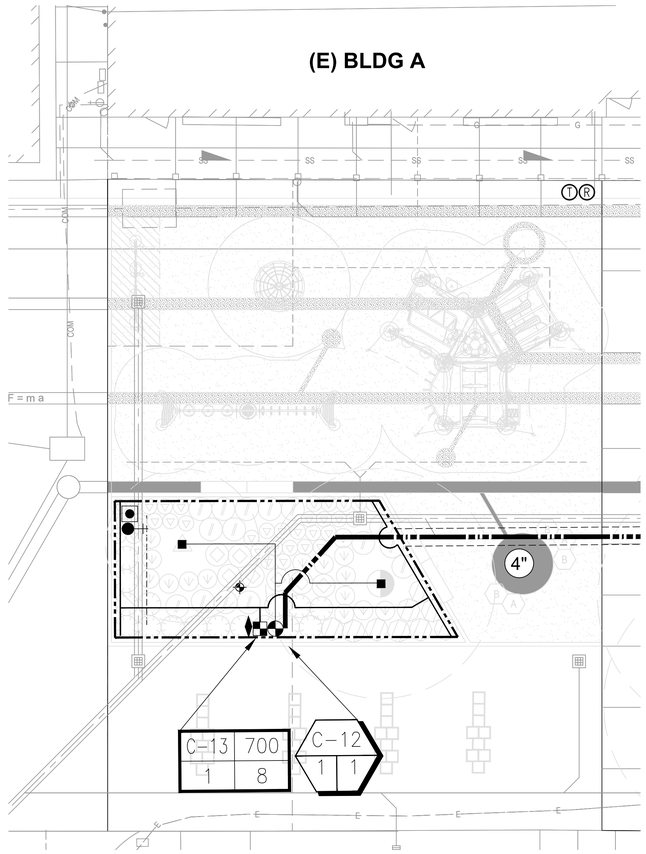
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	07/09/2026
DSA SUBMITTAL	04/24/2026

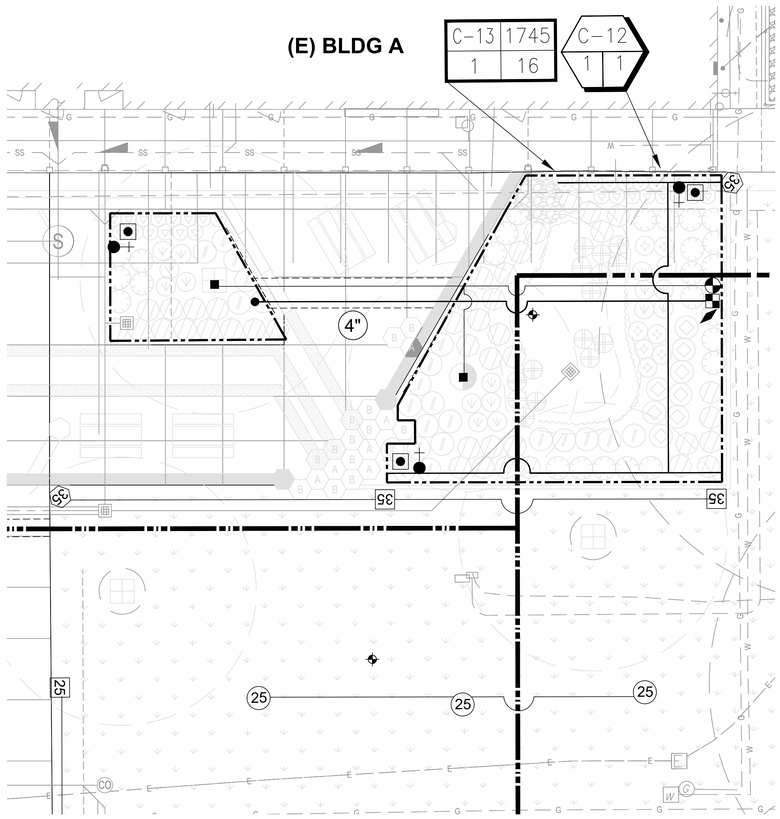
Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION PLAN

2L6.01



IRRIGATION PLAN ENLARGEMENT - BID ALTERNATE 2 | 1/8" = 1'-0" | 14



IRRIGATION PLAN ENLARGEMENT - BID ALTERNATE 3 | 1/8" = 1'-0" | 02

NOTES:

1. ONE BUBBLER SYMBOL IS SHOWN AT TREES FOR GRAPHIC CLARITY ONLY. INSTALL MINIMUM TWO BUBBLERS AT EACH TREE. INSTALL REQUIRED NUMBER OF BUBBLERS AS DETAILED.
2. IRRIGATION EQUIPMENT MAY BE SHOWN WITHIN HARDSCAPE FOR GRAPHIC CLARITY ONLY. INSTALL ALL IRRIGATION EQUIPMENT WITHIN PLANTED AREAS. IRRIGATION PIPE AND WIRE CROSSING BENEATH HARDSCAPE SURFACES SHALL BE CONTAINED WITHIN SLEEVING OR SCHEDULE 40 PVC CONDUIT. SLEEVING SIZE SHALL BE A MINIMUM OF TWO TIMES THE AGGREGATE DIAMETER OF ALL PIPES CONTAINED WITH SLEEVE. PROVIDE VERTICAL SWEEP FOR ALL ELECTRICAL CONDUIT ON EACH SIDE OF HARDSCAPE AND TERMINATE ENDS AT 12" MINIMUM DEPTH AND 12" FROM HARDSCAPE SURFACE.
3. UNSIZED LATERAL LINE PIPING LOCATED DOWN STREAM OF 1" PIPING SHALL BE 3/4" IN SIZE (TYPICAL).
4. SIZING OF LATERAL PIPE SHALL BE AS FOLLOWS:

0.75"	0-6 GPM
1"	7-12 GPM
1.25"	13-20 GPM

5. SIZING OF LATERAL PIPE FOR DRIPLINE (12" O.C. GRID WITH 0.6 GPH OR LESS EMITTERS) SHALL BE AS FOLLOWS:

0.75	0-500 FT
1"	501-1100 FT
1.25"	1101-2000 FT
1.5"	2001-3000 FT

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT
TAMOMIHIMOTO
No. 6395
STATE OF CALIFORNIA
SIGNATURE
08/07/25
DATE
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION PLAN

2L6.02

IRRIGATION NOTES

1. THESE IRRIGATION DRAWINGS ARE DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. ALL PIPING, VALVES, AND OTHER IRRIGATION COMPONENTS MAY BE SHOWN WITHIN PAVED AREAS FOR GRAPHIC CLARITY ONLY AND ARE TO BE INSTALLED WITHIN PLANTING AREAS. DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, CONDUIT, AND OTHER ITEMS WHICH MAY BE REQUIRED. INVESTIGATE THE STRUCTURAL AND FINISHED CONDITION AFFECTING THE CONTRACT WORK INCLUDING OBSTRUCTIONS, GRADE DIFFERENCES OR AREA DIMENSIONAL DIFFERENCES. IN THE EVENT OF FIELD DISCREPANCY WITH CONTRACT DOCUMENTS, PLAN THE INSTALLATION WORK ACCORDINGLY BY NOTIFICATION AND APPROVAL OF THE OWNER'S AUTHORIZED REPRESENTATIVE AND ACCORDING TO THE CONTRACT SPECIFICATIONS. NOTIFY AND COORDINATE IRRIGATION CONTRACT WORK WITH APPLICABLE CONTRACTORS FOR THE LOCATION AND INSTALLATION OF PIPE, CONDUIT OR SLEEVES THROUGH OR UNDER WALLS, ROADWAYS, PAVING AND STRUCTURES BEFORE CONSTRUCTION. IN THE EVENT THESE NOTIFICATIONS ARE NOT PERFORMED, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR REQUIRED REVISIONS.

2. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, STANDARDS, AND REGULATIONS. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE NATIONAL ELECTRIC CODE; THE UNIFORM PLUMBING CODE, PUBLISHED BY THE WESTERN PLUMBING OFFICIALS ASSOCIATION; AND OTHER STATE OR LOCAL LAWS OR REGULATIONS. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR REGULATIONS. THE CONTRACTOR SHALL FURNISH WITHOUT ANY EXTRA CHARGE, ANY ADDITIONAL MATERIAL AND LABOR WHEN REQUIRED BY THE COMPLIANCE WITH THESE CODES AND REGULATIONS.

3. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF IRRIGATION SYSTEM WITH LAYOUT AND INSTALLATION OF THE PLANT MATERIALS TO INSURE THAT THERE WILL BE COMPLETE AND UNIFORM IRRIGATION COVERAGE OF PLANTING IN ACCORDANCE WITH THESE DRAWINGS, AND CONTRACT DOCUMENTS. THE IRRIGATION LAYOUT SHALL BE CHECKED BY THE CONTRACTOR AND OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO CONSTRUCTION TO DETERMINE IF ANY CHANGES, DELETIONS, OR ADDITIONS ARE REQUIRED. IRRIGATION SYSTEM SHALL BE INSTALLED AND TESTED PRIOR TO INSTALLATION OF PLANT MATERIAL.

4. THE INTENT OF THIS IRRIGATION SYSTEM IS TO PROVIDE THE MINIMUM AMOUNT OF WATER REQUIRED TO SUSTAIN GOOD PLANT HEALTH.

5. IT IS THE RESPONSIBILITY OF THE MAINTENANCE CONTRACTOR AND/OR OWNER TO PROGRAM THE IRRIGATION CONTROLLER(S) TO PROVIDE THE MINIMUM AMOUNT OF WATER NEEDED TO SUSTAIN GOOD PLANT HEALTH. THIS INCLUDES MAKING ADJUSTMENTS TO THE PROGRAM FOR SEASONAL WEATHER CHANGES, PLANT MATERIAL, WATER REQUIREMENTS, MOUNDS, SLOPES, SUN, SHADE AND WIND EXPOSURE.

6. IT IS THE RESPONSIBILITY OF A LICENSED ELECTRICAL CONTRACTOR TO PROVIDE 120 VOLT A.C. (2.5 AMP DEMAND PER CONTROLLER) ELECTRICAL SERVICE TO THE CONTROLLER LOCATION(S). IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO COORDINATE THE ELECTRICAL SERVICE STUB-OUT TO THE CONTROLLER(S). PROVIDE PROPER GROUNDING PER CONTROLLER MANUFACTURER'S INSTRUCTIONS AND IN ACCORDANCE WITH LOCAL CODES.

7. PROVIDE EACH CONTROLLER WITH ITS OWN GROUND ROD. SEPARATE THE GROUND RODS BY A MINIMUM OF EIGHT FEET. THE GROUND ROD SHALL BE AN EIGHT FOOT LONG BY 5/8" DIAMETER U.L. APPROVED COPPER CLAD ROD. INSTALL NO MORE THAN 6" OF THE GROUND ROD ABOVE FINISH GRADE. CONNECT #6 GAUGE WIRE WITH A U.L. APPROVED GROUND ROD CLAMP TO ROD AND BACK TO GROUND SCREW AT BASE OF CONTROLLER WITH APPROPRIATE CONNECTOR. MAKE THIS WIRE AS SHORT AS POSSIBLE, AVOIDING KINKS OR BENDING.

8. SCHEDULE A MEETING WHICH INCLUDES REPRESENTATIVES OF THE IRRIGATION CONTROLLER MANUFACTURER, THE MAINTENANCE CONTRACTOR, THE OWNER AND THE IRRIGATION CONTRACTOR AT THE SITE FOR INSTRUCTION ON THE PROPER PROGRAMMING AND OPERATION OF THE IRRIGATION CONTROLLER.

9. INSTALL 3" DETECTABLE TAPE ABOVE ALL PRESSURIZED MAIN LINES AS DETAILED. USE CHRISTY MODEL #TA-DT-3-BIRR FOR POTABLE IRRIGATION SYSTEMS IRRIGATION WATER SYSTEMS.

10. INSTALL 2-WIRE CABLE ALONG THE MAIN LINE. CONTACT CONTROLLER REPRESENTATIVE FOR A PRE-CONSTRUCTION MEETING.

11. INSTALL 2-WIRE CABLE WITHIN 1.25" CONDUIT WITH LONG SWEEPS IN AND OUT OF EACH VALVE BOX. SEAL ALL CONDUIT OPENINGS WITH WATERPROOF FOAM.

12. INSTALL A 14"X19" GREY ELECTRICAL PULL BOX EVERY 200' AND AT EVERY CHANGE IN DIRECTION. ONLY SPLICE TWO WIRE CABLE AT THREE WAY WIRE CONNECTIONS.

13. IRRIGATION CONTROL WIRES: SOLID COPPER WITH U.L. APPROVAL FOR DIRECT BURIAL IN GROUND. SIZE #14AWG WIRE WITH A JACKETED 2-CONDUCTOR. PREFERRED WIRE MAKE AND MODEL IS P7072D. ALL SPLICING SHALL BE MADE WITH 3-M DBR/Y-6 WATERPROOF SPLICE KIT.

14. DECODER GROUNDING SHALL BE PROVIDED EVERY 500 FEET OR EVERY 8 DECODERS, WHICHEVER IS SMALLER, AT THE CONTROLLER AND AT THE LAST DECODER OR AT THE END OF THE 2 WIRE PATH., . GROUND WITH A 5/8" X 8' COPPER CLAD GROUNDING ROD. #6 COPPER WIRE TO SURGE DEVICE/DECODER. INCLUDE A SURGE ARRESTOR AT EACH GROUNDING LOCATION. A SPLIT BOLT CONNECTION TO BE USED TO CONNECT THE SURGE DEVICE TO THE GROUND WIRE WITH A DBR/Y-6 WATERPROOF CONNECTOR.

15. SPLICING OF JACKETED 2-WIRE IS PERMITTED IN VALVE BOXES ONLY. LEAVE A 24" LONG COIL OF WIRE AT EACH SPLICE AND A 24" LONG EXPANSION LOOP IN ALL PULL BOXES.

16. <u>VALVE BOXES IN TURF AREAS:</u> INSTALL GREEN PLASTIC VALVE BOXES WITH BOLT DOWN, NON HINGED COVER MARKED "IRRIGATION CONTROL VALVE". BOX BODY SHALL HAVE KNOCK OUTS. ACCEPTABLE VALVE BOX MANUFACTURER'S INCLUDE NDS, CARSON OR APPROVED EQUAL.

17. <u>VALVE BOXES WITHIN PLANTED AREA WITH MULCH:</u> INSTALL BLACK PLASTIC VALVE BOXES WITH BOLT DOWN, NON HINGED COVER MARKED "IRRIGATION CONTROL VALVE". BOX BODY SHALL HAVE KNOCK OUTS. ACCEPTABLE VALVE BOX MANUFACTURER'S INCLUDE NDS, CARSON OR APPROVED EQUAL.

18. <u>VALVE BOXES WITHIN HARDSCAPE AND DG AREAS:</u> INSTALL REMOTE CONTROL VALVES IN A RECTANGULAR CONCRETE VALVE BOX. CHRISTY MODEL B09BOX WITH A CHRISTY NO9R LID OR APPROVED EQUAL. GATE VALVES AND QUICK COUPLING VALVES SHALL BE IN A 10" ROUND CONCRETE BOX BY CHRISTY, MODEL NO. FO8.

19. INSTALL REMOTE CONTROL VALVE BOXES 12" FROM WALK, CURB, LAWN, HEADER BOARD, BUILDING, OR LANDSCAPE FEATURE. AT MULTIPLE VALVE BOX GROUPS, INSTALL EACH BOX AN EQUAL DISTANCE FROM THE WALK, CURB, LAWN, HEADER BOARD, BUILDING, OR LANDSCAPE FEATURE, AND PROVIDE 12" FROM THE WALK, CURB, HEADER BOARD, BUILDING, OR LANDSCAPE FEATURE AND INSTALL EACH BOX 12" APART.

20. VALVE LOCATIONS SHOWN ARE DIAGRAMMATIC. INSTALL IN GROUND COVER/SHRUB AREAS (AVOID LAWN AREAS WHERE POSSIBLE).

21. THE CONTRACTOR SHALL LABEL CONTROL LINE WIRE AT EACH REMOTE CONTROL VALVE WITH A 2 1/4" X 2 3/4" POLYURETHANE I.D. TAG, INDICATING IDENTIFICATION NUMBER OF VALVE (CONTROLLER AND STATION NUMBER). ATTACH LABEL TO CONTROL WIRE. THE CONTRACTOR SHALL PERMANENTLY STAMP ALL VALVE BOX LIDS WITH APPROPRIATE IDENTIFICATION AS NOTED IN CONSTRUCTION DETAILS.

22. THE REMOTE CONTROL VALVES SPECIFIED ON THE DRAWINGS IS A PRESSURE REDUCING TYPE. SET THE DISCHARGE PRESSURE AS FOLLOWS:

A. SPRAY HEADS=40 PSI
B. ROTARY HEADS=60 PSI
C. DRIP EMITTERS=35 PSI
D. BUBBLERS= 30 PSI

23. FLUSH AND ADJUST IRRIGATION OUTLETS AND NOZZLES FOR OPTIMUM PERFORMANCE AND TO PREVENT OVER SPRAY ONTO WALKS, ROADWAYS, AND/OR BUILDINGS. SELECT THE BEST DEGREE OF THE ARC AND RADIUS TO FIT THE EXISTING SITE CONDITIONS AND THROTTLE THE FLOW CONTROL AT EACH VALVE TO OBTAIN THE OPTIMUM OPERATING PRESSURE FOR EACH CONTROL ZONE.

24. SET SPRINKLER HEADS PERPENDICULAR TO FINISH GRADE.

25. LOCATE EMITTER OUTLETS ON UPHILL SIDE OF PLANT OR TREE.

26. LOCATE BUBBLERS ON UPHILL SIDE OF PLANT OR TREE.

27. INSTALL A HUNTER HCV SERIES, KBI CV SERIES, OR APPROVED EQUAL SPRING LOADED CHECK VALVE IN SPRINKLER RISER ASSEMBLIES WHERE LOW OUTLET DRAINAGE WILL CAUSE EROSION AND/OR EXCESS WATER.

28. WHERE IT IS NECESSARY TO EXCAVATE ADJACENT TO EXISTING TREES, USE CAUTION TO AVOID INJURY TO TREES AND TREE ROOTS. EXCAVATE BY HAND IN AREAS WHERE TWO (2) INCH AND LARGER ROOTS OCCUR. BACK FILL TRENCHES ADJACENT TO TREE WITHIN TWENTY-FOUR (24) HOURS. WHERE THIS IS NOT POSSIBLE, SHADE THE SIDE OF THE TRENCH ADJACENT TO THE TREE WITH WET BURLAP OR CANVAS.

29. THE IRRIGATION SYSTEM DESIGN IS BASED ON THE MINIMUM OPERATING PRESSURE SHOWN ON THE IRRIGATION DRAWINGS. VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION. REPORT ANY DIFFERENCE BETWEEN THE WATER PRESSURE INDICATED ON THE DRAWINGS AND THE ACTUAL PRESSURE READING AT THE IRRIGATION POINT OF CONNECTION TO THE OWNER'S AUTHORIZED REPRESENTATIVE.

30. IRRIGATION DEMAND: REFER TO PLANS.

31. THE EXISTING MAIN LINE SHOWN ON THE DRAWINGS IS DIAGRAMMATIC. VERIFY AND LOCATE EXISTING MAIN LINE IN FIELD. REPORT TO ARCHITECT IN WRITING ANY DEVIATION OF EXISTING MAIN LINE LOCATION FROM THAT SHOWN ON THE DRAWINGS.

32. AT POINT OF CONNECTION AT EXISTING MAIN LINE FOR NEW REMOTE CONTROL VALVES OR QUICK COUPLING VALVES, INSTALL A SERVICE SADDLE WITH REQUIRED TAPPED OUTLET SIZE. ROMAC 2025, OR APPROVED EQUAL.

33. AT POINTS OF CONNECTION BETWEEN EXISTING SOLVENT WELD MAIN LINE AND A NEW MAIN LINE BRANCH, USE THE FOLLOWING PROCEDURE:

A. REMOVE A PORTION OF EXISTING MAINLINE.
B. FABRICATE A TEE WITH TWO 12" SECTIONS OF PIPE ON EACH SIDE OF A SCH 80 TEE. USE A SCH 80 COUPLING ON ONE SIDE OF PIPE TO CONNECT NEW SECTION TO OLD. USE A ROMAC, HYMAX OR SMITH BLAIR REPAIR COUPLING WITHOUT A CENTER STOP ON OTHER SIDE OF TEE TO CONNECT EXISTING MAINLINE. NO SLIP FIXES ARE ALLOWED.

35. PIPE THREAD SEALANT COMPOUND SHALL BE RECTOR SEAL #5.

36. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR MINOR CHANGES IN THE IRRIGATION LAYOUT DUE TO OBSTRUCTIONS NOT SHOWN ON THE IRRIGATION DRAWINGS SUCH AS LIGHTS, FIRE HYDRANTS, SIGNS, ELECTRICAL ENCLOSURES, ETC.

37. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR CHANGES IN THE IRRIGATION LAYOUT AND VALVE ZONING DUE TO VARIATIONS IN THE EXISTING SITE CONDITIONS SUCH AS EXPOSURE FROM BUILDINGS, TRELLISES, TREES, ETC., AS WELL AS SLOPE AND SOIL CONDITIONS. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT AND IRRIGATION CONSULTANT OF THE PROPOSED CHANGES PRIOR TO INSTALLATION FOR APPROVAL.

38. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING THE IRRIGATION SYSTEM DESIGN IF THE PLANTING DESIGN CHANGES FROM THE ORIGINAL PLAN AND NEEDS TO ADAPT TO THE NEW PLANTING DESIGN. THE LANDSCAPE CONTRACTOR NEEDS TO NOTIFY THE LANDSCAPE ARCHITECT AND IRRIGATION CONSULTANT OF PROPOSED CHANGES PRIOR TO INSTALLATION FOR APPROVAL.

39. CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLEMENTAL HAND WATERING OF ALL PLANT MATERIAL WITHIN DRIPLINE AREAS UNTIL THE PLANTS ARE SUFFICIENTLY ESTABLISHED.

IRRIGATION LEGEND

SYMBOL	DESCRIPTION
	CONTROLLER AND STATION NUMBER FLOW (GPM) REMOTE CONTROL VALVE SIZE (IN INCHES) ASSOCIATED REMOTE CONTROL VALVE
	CONTROLLER AND STATION NUMBER AREA (SQ. FT.) FLOW (GPM) REMOTE CONTROL VALVE SIZE (IN INCHES) ASSOCIATED REMOTE CONTROL VALVE
	MAIN LINE: 2.5" THROUGHOUT: 1120-SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS. 18" COVER.
	EXISTING MAIN LINE
	LATERAL LINE: 3/4" AND LARGER: 1120-SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS. 12" COVER.
	DRIPLINE LATERAL LINE: 3/4" AND LARGER: 1120-SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS. 12" COVER.
(XX) SLEEVING SIZE	SLEEVING: SCHEDULE 40 PVC PLASTIC PIPE. COVER TO BE AS INDICATED IN SPECIFICATIONS OR AS INDICATED ABOVE FOR PIPE DEPTH OF COVER.
WT WT WT	TWO WIRE CABLE: APPROXIMATE ROUTING OF TWO WIRE CABLE PATH WITHIN 1.25" SCH 40 PVC CONDUIT. INSTALL SCH 40 ELECTRICAL LONG SWEEP ELBOWS AT ALL CHANGES IN DIRECTION AND INTO AND OUT OF VALVE OR PULL BOXES. REFER TO DETAILS FOR MORE INFORMATION.
PVC LATERAL; SUPPLY HEADER; EXHAUST HEADER; DRIP ZONE EXTENTS	DRIPLINE REMOTE CONTROL VALVE DRIP ZONE: RAIN BIRD XFCV SERIES DRIPLINE WITH XF DRIPLINE INSERT FITTINGS, PART #XFCV-06-12. TUBING TO BE INSTALLED 4" BELOW GRADE IN A 12" O.C. GRID ACCORDING TO DETAILS. SIZE EXHAUST HEADERS AS FOLLOWS: 1": 0-10 GPM, 1.25": 11-20 GPM. ALL EXHAUST HEADERS SHALL BE 1" SCH 40 PVC OR 1" SCH 40 FLEXIBLE PVC. USE SCH. 40 PVC SOLVENT WELD FITTINGS. EXTEND PVC HEADERS TO THE ENDS OF ALL DRIP ZONES TO BALANCE FLOW IF REQUIRED. SEE DETAILS FOR FURTHER INFORMATION.
PVC LATERAL; DRIP ZONE EXTENTS	DRIPLINE REMOTE CONTROL VALVE APPROXIMATE CONNECTION POINT BETWEEN DRIPLINE TUBING AND PVC SUPPLY WHEN DRIP ZONE IS LESS THAN 3 GPM AND NO PVC SUPPLY/EXHUST HEADERS ARE NEEDED. REFER TO DRIPLINE TUBING CONNECTION DETAIL FOR MORE INFORMATION.

IRRIGATION LEGEND

SYMBOL	MODEL NUMBER	DESCRIPTION	NOZZLE GPM	OPERATING PSI	OPERATING RADIUS (FEET)
35	5006+-FC-SAM-R/ 5000-MPR-35	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	7.58	45	30-35
35	5006+-PC-SAM-R/ 5000-MPR-35	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	3.81	45	30-35
35	5006+-PC-SAM-R/ 5000-MPR-35	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	1.92	45	30-35
30	5006+-PC-SAM-R/ 5000-MPR-30	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	1.40	45	25-30
25	5006+-FC-SAM-R/ 5000-MPR-25	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	3.82	45	20-25
25	5006+-PC-SAM-R/ 5000-MPR-25	RAIN BIRD POP-UP GEAR DRIVEN ROTOR (TURF)	2.0	45	20-25
■	1401 SERIES	RAIN BIRD BUBBLER (TREE) MIN. 2 PER TREE. REFER TO BUBBLER DETAIL FOR QUANTITY OF BUBBLERS PER TREE SIZE.	0.25	30	TRICKLE
●+	770T03G	MATCO OR EQUAL BALL VALVE (DRIP MANUAL FLUSH VALVE)			
◉	OPERIND	RAIN BIRD DRIP ZONE INDICATOR			
	PEB SERIES	RAIN BIRD REMOTE CONTROL VALVE			
	XCZ-100-PRB-LC	RAIN BIRD REMOTE CONTROL VALVE DRIP ZONE KIT (3-20GPM)			
◄►	44-LRC	RAIN BIRD 1" TWO-PIECE QUICK COUPLING VALVE (YELLOW LOCKING RUBBER COVER)			
⋈	T113-K SERIES	NIBCO BRASS GATE VALVE (LINE SIZE)-2.5" AND SMALLER			
MV	3300-2.5"	SUPERIOR MASTER VALVE-2.5" (NORMALLY OPEN)			
FS	QS200-20	FLOMEC FLOW SENSOR - 2"			
C	ESP-LXD/ESPLXD-SM75/ NCC-WF/LXMMSS	RAIN BIRD ESP-LXD 75 STATION CONTROLLER IN A STAINLESS STEEL WALL MOUNTED ENCLOSURE WITH A WIFI NETWORK COMMUNICATION CARTRIDGE.			
—	IQ-CLOUD	ACCESS TO THE RAIN BIRD IQ CLOUD.			
R	WR2-RFC	RAIN BIRD WIRELESS RAIN/FREEZE SENSOR			
—	FD101TURF	RAIN BIRD DECODER (1 PER SINGLE VALVE GROUPING)			
—	FD202TURF	RAIN BIRD DECODER (1 PER VALVE GROUPINGS OF 2)			
—	FD401TURF	RAIN BIRD DECODER (1 PER VALVE GROUPINGS OF 3-4)			
—	LSP1TURF	LIGHTENING ARRESTOR (1 EVERY 500 FEET ALONG MAIN) REFER TO DETAILS FOR INSTALLATION INSTRUCTIONS.			
—	SD210TURF	RAIN BIRD SENSOR DECODER (1 PER FLOW SENSOR)			
—	NOT SHOWN ON PLANS	ROUTE TWO WIRE CABLE TO ALL REMOTE CONTROL VALVES. SIZE #14AWG WIRE WITH A JACKETED 2-CONDUCTOR. PREFERRED WIRE MAKE AND MODEL IS PAIGE P7072D . ALL SPLICING SHALL BE MADE WITH 3-M DBR/Y-6 WATERPROOF SPLICE KITS OR APPROVED EQUAL. INSTALL 2 WIRE CABLE WITHIN 1.25" SCH 40 ELECTRICAL CONDUIT. PULL BOXES SHALL BE LOCATED EVERY 200' NO SPLICES ARE ALLOWED BETWEEN VALVES. REFER TO DETAIL FOR INSTALLATION INSTRUCTIONS.			
P	-	EXISTING BOOSTER PUMP			
⋈	-	EXISTING 3" BACKFLOW PREVENTER			

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ♦ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — MATTHEW SHIMOTSU — 6498 — SIGNATURE — 08/07/25 — 10/31/2026 — RENEWAL DATE — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

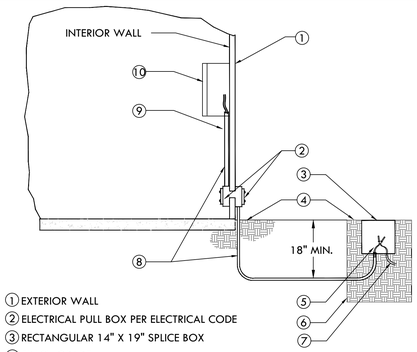
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION NOTES AND LEGEND

2L6.03

Xref .\Base\TB_dsa.dwg

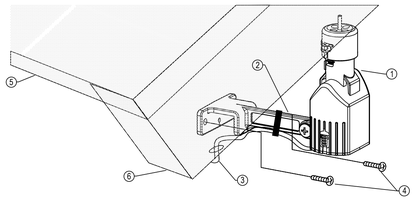


1. EXTERIOR WALL
2. ELECTRICAL PULL BOX PER ELECTRICAL CODE
3. RECTANGULAR 14" X 19" SPLICE BOX
4. FINISH GRADE
5. DBY SPLICE KIT
6. PLANTER
7. DIRECT BURIAL LOW VOLTAGE WIRES ROUTED TO REMOTE CONTROL VALVES
8. SCHEDULE 40 GRAY PVC ELECTRICAL CONDUIT WITH SWEEPS FOR LOW VOLTAGE WIRE. ROUTE CONDUIT TO NEAREST PLANTER AND PLACE IN SPLICE BOX.
9. LOW VOLTAGE WIRES TO CONTROLLER
10. CONTROLLER(S)

NOTE:
WHEN POSSIBLE USE DIRECT WIRE PULLS FROM CONTROLLER TO REMOTE CONTROL VALVES. IF NECESSARY USE MULTI-STRAND WIRE FROM CONTROLLER TO SPLICE BOX. MAKE SPLICES WATER TIGHT WITH DBY CONNECTORS. SPLICES TO OCCUR IN SPLICE BOX ONLY.

1 INTERIOR MOUNTED CONTROLLER
SCALE: NONE

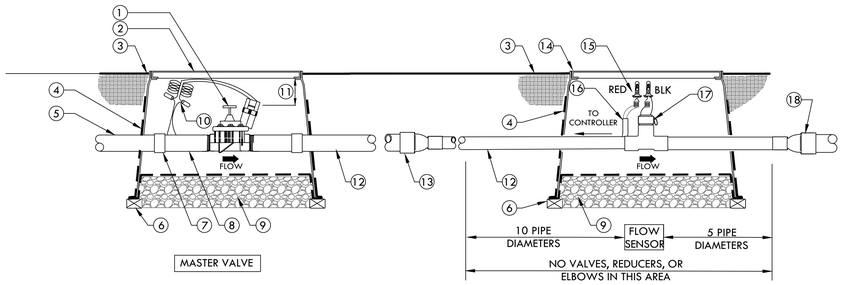
NOTES:
1. ALL ELECTRICAL WORK MUST CONFORM TO LOCAL CODES. REFER TO PRODUCT LITERATURE FOR ADDITIONAL INSTALLATION REQUIREMENTS.
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.



SECTION

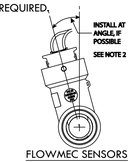
1. IRRITROL RAIN SENSOR MODEL NUMBER RS500.
2. ADJUSTABLE MOUNTING BRACKET.
3. CONNECTION WIRE ROUTED THROUGH BUILDING WITHIN ELECTRICAL CONDUIT TO THE IRRIGATION CONTROLLER.
4. STAINLESS STEEL SCREWS.
5. ROOF.
6. EAVE.

2 RAIN SENSOR - WIRED
SCALE: NONE



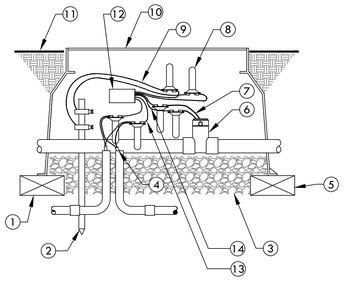
MASTER VALVE

1. MASTER CONTROL VALVE WITH FLOW CONTROL AND MANUAL BLEED (PRESSURE REGULATOR WHERE SHOWN ON PLANS). CENTER WITHIN BOX.
2. 14" X 19" RECTANGULAR PLASTIC VALVE BOX WITH BOLT DOWN LID. INSTALL BOX AS SHOWN IN BOX INSTALLATION DETAIL.
3. FINISH GRADE.
4. 1/2" MESH, 19 GAUGE HOT DIPPED GALVANIZED STEEL WIRE TO COVER VALVE BOX BOTTOM AND CUTOUTS.
5. PVC MAIN LINE FROM BACKFLOW OR PUMP.
6. BRICK-ONE ON EACH CORNER.
7. SCH 80 PVC COUPLING- 2 TOTAL
8. SCHEDULE 80 PVC TOE NIPPLE- 4" IN LENGTH - 2 TOTAL.
9. PEA GRAVEL OR 3/4" DRAIN ROCK- 4" [100mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).
10. VALVE CONTROL WIRE- PROVIDE 3M-DBY SEAL PACKS AT ALL SPLICES AND 36" OF EXCESS UF WIRE IN A 1" DIAMETER COIL. FOR TWO-WIRE PROJECTS ROUTE CONDUIT AND TWO CABLE INTO VALVE BOX AND USE DECODER THAT IS COMPATIBLE WITH CONTROLLER AND VALVE.
11. 3" MIN 6" MAX.
12. SCH 80 PVC MAIN LINE TO FLOW SENSOR.
13. IF NECESSARY INSTALL A SCH. 80 REDUCING COUPLING, TYP.
14. 10" ROUND PLASTIC VALVE BOX WITH BOLT DOWN LID. INSTALL BOX AS SHOWN IN BOX INSTALLATION DETAIL.
15. 18 GAUGE AWG DIRECT BURIAL WIRE. FLOW SENSOR WIRE MUST BE RUN IN 1" PVC CONDUIT FROM FLOW SENSOR TO CONTROLLER ENCLOSURE. PROVIDE 3M-DBY SEAL PACKS AT ALL SPLICES AND 36" OF EXCESS WIRE IN A 1" DIAMETER COIL. FOR TWO-WIRE PROJECTS ROUTE CONDUIT AND TWO CABLE INTO SENSOR BOX AND USE SENSOR DECODER THAT IS COMPATIBLE WITH CONTROLLER AND SENSOR.
16. SCH 40 PVC CONDUIT FOR SENSOR WIRE OR TWO WIRE CABLE FROM CONTROLLER.
17. FLOW SENSOR MUST BE INSTALLED WITH INSERT (TOP) POSITIONED VERTICALLY AND BODY (TEE) POSITIONED HORIZONTALLY. FOR FLOWMEC SENSORS INSTALL ON 45° ANGLE.
18. SCH. 80 REDUCING COUPLING UPSIZING TO MAIN LINE SERVICING IRRIGATION SYSTEM IF REQUIRED.



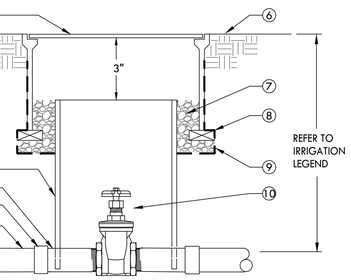
FLOWMEC SENSORS

3 MASTER VALVE & FLOW SENSOR INSTALLATION
SCALE: NONE



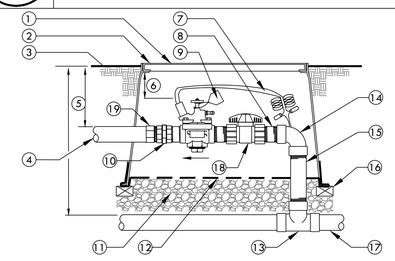
1. 2-WIRE PATH JACKETED/ TWISTED FROM CONTROLLER/DECODER. ALLOW 24" SLACK PER DECODER
2. INSTALL 5/8" DIAMETER COPPER GROUND ROD OF 8' LENGTH IN A 10" ROUND BOX WITH BRASS CLAMPS (1 OF 2)
3. PEA GRAVEL OR 3/4" DRAIN ROCK- 4" [100mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).
4. JACKETED 2-WIRE PATH TO NEXT DECODER
5. BRICK-1 EACH CORNER.
6. FLOW SENSOR
7. FLOW SENSOR WIRE (1 OF 2)
8. 3M DBR/Y-6 (6 TOTAL)
9. GREEN/YELLOW WIRE FROM SD-210TURF TO GROUNDING ROD BRASS CLAMP
10. 10" ROUND VALVE BOX
11. FINISH GRADE
12. RAIN BIRD SD-210TURF
13. BLUE WIRES(2) FROM SD-210TURF TO TWO WIRE PATH
14. RED & BLACK WIRE FROM SD-210TURF DECODER TO FLOW SENSOR

4 RAIN BIRD FLOW SENSOR DECODER
SCALE: NONE



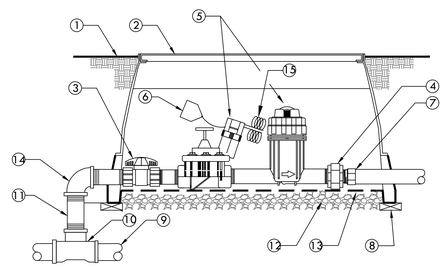
1. 10" ROUND PLASTIC VALVE BOX WITH BOLT DOWN LID.
2. 8" CLASS 160 OR SCHEDULE 40 PVC PIPE (NOTCH TO FIT OVER MAIN LINE PIPE).
3. SCH 80 TOE NIPPLE. 6" IN LENGTH. (2 TOTAL)
4. SCH 80 COUPLING (2 TOTAL)
5. PVC MAIN LINE.
6. FINISH GRADE.
7. PEA GRAVEL OR 3/4" DRAIN ROCK - 4" DEEP (NO SOIL IN VALVE BOX).
8. BRICK-2 TOTAL.
9. 19 GAUGE 1/2" SQUARE WIRE MESH. WRAP UP SIDES OF BOX.
10. GATE VALVE WITH X-TOP HANDLE.

5 GATE VALVE - 3" AND SMALLER
SCALE: NONE



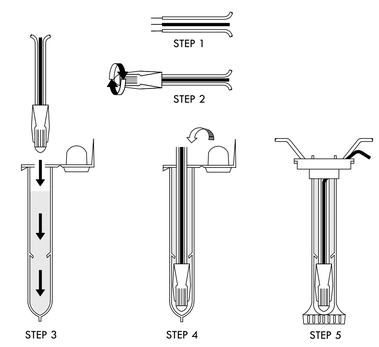
1. REMOTE CONTROL VALVE WITH FLOW CONTROL AND MANUAL BLEED (PRESSURE REGULATOR WHERE SHOWN ON PLANS).
2. USE A NDS PRO SERIES 14" X 19" RECTANGULAR PLASTIC VALVE BOX WITH BOLT DOWN LID FOR 1" VALVES. FOR 1.5" AND LARGER VALVES INSTALL BALL VALVE WITHIN A SEPARATE 10" ROUND BOX OR ONE BALL VALVE PER MANIFOLD OF VALVES. GATE VALVE SIZE SHALL BE SAME AS LARGEST VALVE WITHIN MANIFOLD. ONE VALVE PER BOX- NO EXCEPTIONS. INSTALL BOX AS SHOWN IN BOX INSTALLATION DETAIL.
3. FINISH GRADE.
4. PVC LATERAL LINE.
5. REFER TO IRRIGATION SPECS.
6. 3" [75mm] MIN, 6" [150mm] MAX.
7. VALVE CONTROL WIRE- PROVIDE SEAL PACKS AT ALL SPLICES AND 3' [1m] OF EXCESS UF WIRE IN A 1" [25mm] DIAMETER COIL.
8. SCHEDULE 80 PVC NIPPLE (3 TOTAL).
9. VALVE I.D. TAG (CONTROLLER AND STATION NUMBER).
10. SCHEDULE 80 PVC THREADED UNION.
11. PEA GRAVEL OR 3/4" DRAIN ROCK- 4" [100mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).
12. 19 GAUGE 1/2" [12mm] SQUARE WIRE MESH.
13. SCHEDULE 40 OR 80 PVC TEE. REFER TO LEGEND FOR TYPE.
14. SCHEDULE 80 PVC 90° ELBOW (TxT).
15. SCHEDULE 80 PVC NIPPLE- LENGTH AS REQUIRED.
16. BRICK-1 EACH CORNER.
17. PVC MAIN LINE.
18. SCHEDULE 80 PVC UNION BALL VALVE (ONE PER VALVE).
19. SCHEDULE 40 MALE ADAPTER

6 REMOTE CONTROL VALVE
SCALE: NONE



1. FINISH GRADE.
2. RECTANGULAR PLASTIC VALVE BOX WITH BOLT DOWN LID. ONE VALVE PER BOX- NO EXCEPTIONS. INSTALL BOX AS SHOWN IN BOX INSTALLATION DETAIL.
3. SCHEDULE 80 PVC UNION BALL VALVE (ONE PER VALVE).
4. SCHEDULE 80 PVC THREADED UNION.
5. REMOTE CONTROL VALVE DRIP ZONE KIT. (SHALL INCLUDE VALVE, FILTER AND A 40 PSI PRESSURE REDUCING VALVE)
6. VALVE I.D. TAG (CONTROLLER AND STATION NUMBER).
7. SCHEDULE 40 MALE ADAPTER
8. BRICK-1 EACH CORNER.
9. PVC MAIN LINE.
10. SCHEDULE 40 OR 80 PVC TEE. REFER TO LEGEND FOR TYPE.
11. SCHEDULE 80 PVC NIPPLE-(4-TOTAL) LENGTH AS REQUIRED.
12. PEA GRAVEL OR 3/4" [20mm] DRAIN ROCK - 4" [102mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).
13. 19 GAUGE 1/2" [13mm] SQUARE WIRE MESH.
14. SCHEDULE 80 PVC 90° ELBOW (TxT).
15. VALVE CONTROL WIRE- PROVIDE 3M-DBY SEAL PACKS AT ALL SPLICES AND 3' [1m] OF EXCESS UF WIRE IN A 1" [25mm] DIAMETER COIL.

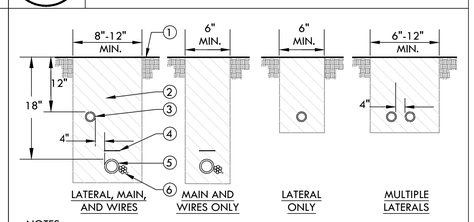
7 REMOTE CONTROL VALVE (DRIPZONE)
SCALE: NONE



NOTE:
MAXIMUM # OF WIRES PER CONNECTOR:
- 3-#14 GAUGE
- 2-#12 GAUGE

INSTRUCTIONS:
1. STRIP WIRES APPROXIMATELY 1/2" FROM ENDS TO EXPOSE WIRE.
2. TWIST CONNECTOR AROUND WIRES CLOCKWISE UNTIL HAND TIGHT, DO NOT OVERTIGHTEN.
3. INSERT WIRE ASSEMBLY TO BOTTOM OF GEL-FILLED TUBE. CHECK TO MAKE SURE CONNECTOR HAS BEEN PUSHED PAST LOCKING FINGERS AND IS SEATED AT THE BOTTOM OF THE TUBE.
4. PLACE WIRES WHICH EXIT TUBE IN WIRE EXIT HOLES AND CLOSE CAP UNTIL IT SNAPS.
5. INSPECT FINAL SPLICE ASSEMBLY THAT IT IS SECURED.

8 WEATHERPROOF WIRE SPLICE ASSEMBLY
SCALE: NONE



NOTES:
1. ALL MAIN SUPPLY LINES AND LATERAL LINES SHALL BE PLACED IN SLEEVES UNDER PAVED SURFACES. INSTALL LOW VOLTAGE WIRES WITHIN A SEPARATE CONDUIT UNDER PAVED SURFACES. DO NOT TAPE WIRES WITHIN CONDUIT. EXTEND SLEEVES A MINIMUM OF 12" BEYOND HARDSCAPE ON EACH SIDE OF SLEEVE.
2. REUSE SALVAGED EXCAVATED FILL AND COMPACT TO ORIGINAL DENSITY IN LANDSCAPE AREAS. ALL OTHER AREAS SHALL BE AT 95% COMPACTION. BACKFILL MATERIAL SHALL BE THE EARTH EXCAVATED FROM THE TRENCHES, FREE FROM ROCKS (ANYTHING LARGER THAN 2"), CONCRETE CHUNKS, AND OTHER FOREIGN OR COARSE MATERIALS.
3. WHEN 12" POP-UP SPRINKLER HEADS ARE USED, INCREASE THE DEPTH OF LATERAL TO 18" AT THE SPRINKLER LOCATION ONLY.

1. FINISH GRADE.
2. CLEAN BACKFILL MATERIAL.
3. LATERAL LINE.
4. 3" DETECTABLE WARNING TAPE OVER MAIN LINE. INSTALL 3" ABOVE MAIN LINE. USE CHRISTY MODEL #TA-DT-3-BIRR FOR POTABLE IRRIGATION SYSTEMS OR #TA-DT-3-PRW FOR RECYCLED IRRIGATION WATER SYSTEMS
5. MAIN LINE.
6. LOW VOLTAGE CONTROL WIRES, TWO-WIRE CABLE, OR CONDUIT WITH WIRES. FOR MULTIPLE WIRES, TAPE AND BUNDLE WIRES AT 10 FT. INTERVALS. WIRING SHALL BE LAID OUT LOOSELY IN THE TRENCH.

9 TRENCHING
SCALE: NONE

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ◆ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — NATHANIEL CHRISTOPHER HIMMOTO — 6178 — SIGNATURE — 08/07/25 — RENEWAL DATE — 10/31/2026 — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision — Date

Submittal — Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

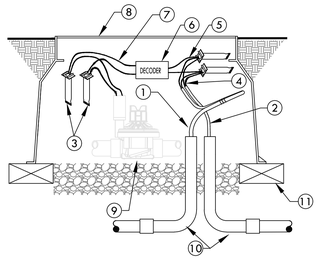
Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION DETAILS

2L6.04

Xref ..\Base\TB_dsa.dwg

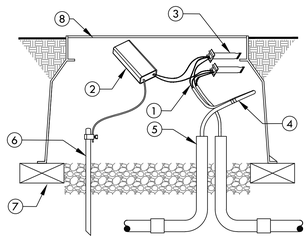
NOTE:
1. ALL DECODERS SHALL HAVE A VALVE NUMBER ADDRESSED AT CONTROLLER PRIOR TO INSTALLATION.
2. USE U.F. SAFETY CABLE STRIPPER BY KING INNOVATION (MODEL NUMBER 46200) FOR ALL TWO-WIRE SPLICE CONNECTIONS.



① #14AWG TWO WIRE CABLE FROM CONTROLLER. REFER TO IRRIGATION NOTES FOR MODEL NUMBER OF WIRE. ALLOW A 24" SLACK PER DECODER. USE ELECTRICAL TAPE TO HOLD SLACK CABLES TOGETHER.
② TWO WIRE CABLE TO NEXT DECODER
③ 3M DBR/Y-6 OR APPROVED EQUAL WATERPROOF SPLICE KIT (4 TOTAL)
④ A MAXIMUM OF 4" OF WIRE SHALL BE STRIPPED FROM TWO WIRE CABLE WHEN SPLICING AT DECODERS.
⑤ CONNECT CORRECT DECODER WIRES TO TWO WIRE CABLES.
⑥ DECODER
⑦ CONNECT CORRECT DECODER WIRES TO VALVE SOLENOID WIRES
⑧ VALVE BOX. REFER TO REMOTE CONTROL VALVE DETAIL FOR INSTALLATION INSTRUCTIONS.
⑨ REMOTE CONTROL VALVE. REFER TO REMOTE CONTROL VALVE DETAIL FOR INSTALLATION INSTRUCTIONS.
⑩ 1.25" CONDUIT FOR 2 WIRE CABLE WITH LONG SWEEPS IN AND OUT OF EACH VALVE BOX. SEAL ALL CONDUIT OPENINGS WITH WATERPROFF FOAM.
⑪ BRICK-ONE ON EACH CORNER

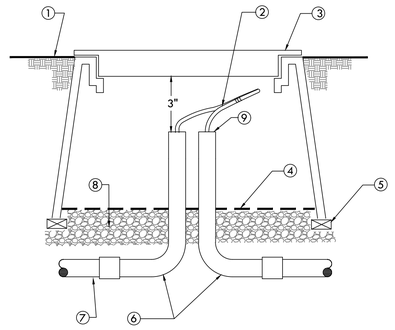
1 DECODER WIRING IN CONDUIT
SCALE: NONE

NOTE:
TWO WIRE DECODER SYSTEMS MUST BE PROPERLY GROUNDED IN ORDER TO PROTECT AGAINST LIGHTNING SURGES. THE COMMUNICATION CABLE MUST BE GROUNDED NO FURTHER THAN 500' FROM ANY DECODER OR FOR EVERY EIGHT DECODERS AND AT THE END OF THE TWO WIRE PATH. THE SURGE DEVICE MUST BE A RAIN BIRD MODEL LSP-1TURF. THE MINIMUM DISTANCE BETWEEN THE SURGE ARRESTOR AND THE GROUND ROD SHOULD BE 3' (91.4CM). WEATHERTRAK RECOMMENDS A SPLIT BOLT CONNECTION TO BE USED TO CONNECT THE SURGE DEVICE TO THE GROUND WIRE WITH A 3M DBY-6 WATERPROOF CONNECTOR.



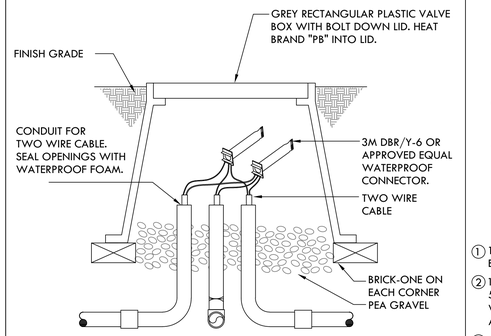
① 2-WIRE PATH JACKETED/ TWISTED FROM CONTROLLER. ALLOW A 24" SLACK PER DECODER
② RAIN BIRD LSP1TURF SURGE PROTECTOR, FD-401, FD-601 OR SD-210. ONE EVERY 500' OR EVERY 8 DECODERS WHICHEVER IS SMALLER. STARTING FROM CONTROLLER.
③ 3M DBR/Y-6 OR APPROVED EQUAL WATERPROOF SPLICE KIT (4 TOTAL)
④ 2-WIRE PATH JACKETED/ TWISTED TO NEXT DECODER
⑤ 1.25" CONDUIT FOR 2 WIRE CABLE WITH LONG SWEEPS IN AND OUT OF EACH VALVE BOX. SEAL ALL CONDUIT OPENINGS WITH WATERPROOF FOAM.
⑥ INSTALL 5/8" DIAMETER COPPER GROUND ROD OF 8' LENGTH. REQUIRED COPPER GROUND CLAMP.
⑦ BRICK-ONE ON EACH CORNER
⑧ GREY RECTANGULAR PLASTIC VALVE BOX WITH BOLT DOWN LID. HEAT BRAND "GR" INTO LID.

2 LIGHTNING ARRESTOR
SCALE: NONE

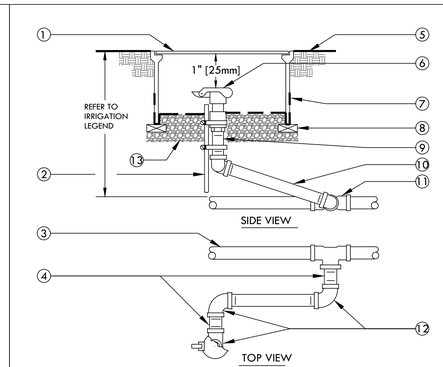


① FINISH GRADE
② 24" LOOP OF TWO WIRE CABLE.
③ GREY RECTANGULAR PLASTIC VALVE BOX WITH BOLT DOWN LID. HEAT BRAND "PB" INTO LID.
④ 18 GAUGE 1/2" [13mm] SQUARE STAINLESS STEEL WIRE MESH.
⑤ BRICK-ONE ON EACH CORNER
⑤ SCHEDULE 40 PVC SWEEP ELLS
⑥ SCHEDULE 40 U.L. LISTED PVC CONDUIT
⑦ PEA GRAVEL OR 3/4" [20mm] DRAIN ROCK - 4" [102mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).
⑧ SEAL ALL CONDUIT OPENINGS WITH WATERPROOF FOAM.

3 IRRIGATION TWO WIRE PULL BOX
SCALE: NONE



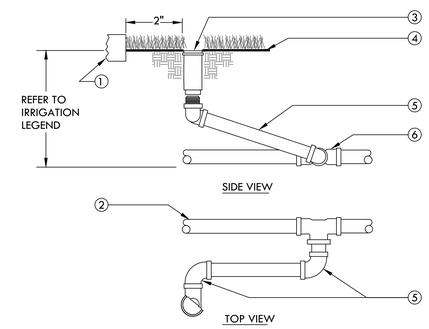
4 2-WIRE SPLICE BOX AT MAIN LINE TEE OR 3 WAY WIRE BRANCH
SCALE: NONE



① 10" ROUND PLASTIC VALVE BOX WITH BOLT DOWN LID.
② 1 1/4" x 1 1/4" x 3/16" [30mm x 30mm x 5mm] ANGLE IRON 30" [760mm] LONG W/2 STAINLESS STEEL STRAPS (ONE AROUND QCV).
③ PVC MAIN LINE.
④ 3" [75mm] LONG SCHEDULE 80 PVC THREADED NIPPLE.
⑤ FINISH GRADE.
⑥ QUICK COUPLING VALVE.
⑦ 19 GAUGE 1/2" [13mm] SQUARE WIRE MESH.
⑧ BRICK - 2 TOTAL.
⑨ SCHEDULE 80 PVC THREADED NIPPLE.
⑩ 10" [250mm] LONG SCHEDULE 80 PVC THREADED NIPPLE.
⑪ UPC APPROVED SCHEDULE 40 PVC TEE OR ELBOW.
⑫ SCHEDULE 80 PVC THREADED 90° ELL.
⑬ PEA GRAVEL OR 3/4" DRAIN ROCK- 4" [100mm] DEEP BELOW VALVE (NO SOIL IN VALVE BOX).

NOTE:
NIPPLES AND FITTINGS TO BE SAME SIZE AS VALVE IPT INLET THREAD SIZE.

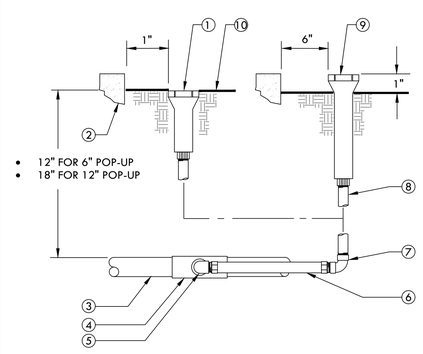
5 QUICK COUPLING VALVE
SCALE: NONE



NOTES:
1. SET SPRINKLER 1" ABOVE FINISH GRADE AT TIME OF INSTALLATION - LOWER TO FINISH GRADE WHEN TURF IS WELL ESTABLISHED.

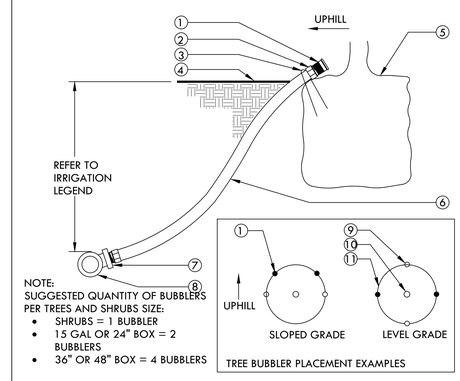
① WALL, WALK, CURB OR HEADER.
② PVC LATERAL LINE.
③ POP-UP ROTARY SPRINKLER.
④ FINISH GRADE.
⑤ UNITIZED SWING JOINT: 3/4"-LASCO MODEL T732-212
1"-LASCO MODEL T932-212.
⑥ SCHEDULE 40 PVC TEE OR ELBOW WITH THREADED OUTLET.

6 POP-UP ROTARY SPRINKLER - TURF
SCALE: NONE



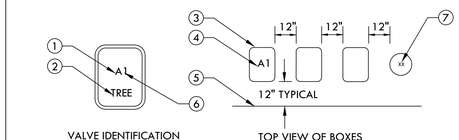
① POP-UP LAWN.
② WALL, WALK, CURB OR BUILDING.
③ PVC LATERAL LINE.
④ SCH. 40 PVC TEE OR ELBOW.
⑤ 1/2" SCH. 40 PVC STREET ELL.
⑥ 1/2" FLEXIBLE IPS HOSE 6" LONG WITH MALE ADAPTERS.
⑦ 1/2" SCH. 40 PVC THREADED 90° ELL.
⑧ 1/2" [13mm] FLEXIBLE IPS HOSE 6" [150mm] LONG WITH MALE ADAPTERS OR 1/2" [13mm] FLEXIBLE SWING JOINT (1/2" x 6") [13mm x 150mm] WITH A MINIMUM PRESSURE RATING OF 100 PSI [690kPa].
⑨ POP-UP SHRUB SPRAY SPRINKLER OR BUBBLER.
⑩ FINISH GRADE.

7 POP-UP SPRAY SPRINKLER RISER
SCALE: NONE



① BUBBLER (TO BE INSTALLED ON TOP OF ROOTBALL).
② 1/2" SCH. 40 MALE ADAPTER (2 TOTAL).
③ 6" STAPLE.
④ FINISH GRADE.
⑤ TREE OR SHRUB ROOTBALL.
⑥ 1/2" IPS FLEXIBLE PVC. USE WELD-ON 795 SOLVENT CEMENT OR EQUAL WHEN BONDING PVC HOSE TO FITTINGS.
⑦ PVC TEE (SST), ELBOW (ST) OR FEMALE ADAPTER.
⑧ PVC LATERAL LINE.
⑨ TREE STAKES.
⑩ TREE OR SHRUB.
⑪ EDGE OF ROOTBALL (TYPICAL).

8 TREE AND SHRUB BUBBLER
SCALE: NONE



VALVE IDENTIFICATION
① CONTROLLER ID.
② ALL TREE VALVES TO HAVE TREE BRANDED INTO LID.
③ RECTANGULAR VALVE BOX.
④ HEAT BRAND VALVE TYPE PER TABLE OR CONTROLLER ID AND STATION NUMBER INTO LID.
⑤ EDGE OF LAWN, WALK, FENCE, CURB, ETC.
⑥ STATION NUMBER.
⑦ ROUND VALVE BOX FOR QCV AND GATE VALVE. HEAT BRAND VALVE TYPE INTO INTO LID PER TABLE.

TOP VIEW OF BOXES

ITEMS TO BRAND:	BRAND CODE
GATE VALVE	GV
PRESSURE REDUCER	PRV
MASTER VALVE	MV
FLOW SENSOR	FS
HYDROMETER	HM
MAIN LINE AIR RELIEF	ARV
REMOTE CONTROL VALVE	A___
QUICK COUPLER	QC
SPLICE BOX	SB
PULL BOX	PB
LIGHTNING ARRESTOR	LA
GROUND ROD	GR

INSTRUCTIONS:
1. CENTER VALVE BOX OVER REMOTE CONTROL VALVE TO FACILITATE SERVICING VALVE.
2. SET BOXES 1" ABOVE FINISH GRADE OR MULCH COVER IN GROUND COVER/SHRUB AREA AND FLUSH WITH FINISH GRADE IN TURF AREA.
3. SET RCV AND VALVE BOX ASSEMBLY IN GROUND COVER/SHRUB AREA WHERE POSSIBLE. INSTALL IN LAWN ONLY IF GROUND COVER DOES NOT EXIST ADJACENT TO LAWN.
4. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE OF LAWN, WALK, FENCE, CURB, ETC.
5. AVOID HEAVILY COMPACTING SOIL AROUND VALVE BOXES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOX SIDES.
6. INSTALL EXTENSION BY VALVE BOX MANUFACTURER AS REQUIRED TO COMPLETELY ENCLOSE ASSEMBLY FOR EASY ACCESS.

9 VALVE BOX INSTALLATION
SCALE: NONE

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ♦ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — NATHANIEL HIMOTO — 6462 — STATE OF CALIFORNIA
SIGNATURE
08/07/25
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

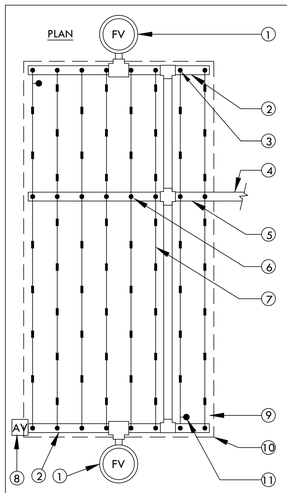
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION DETAILS

2L6.05

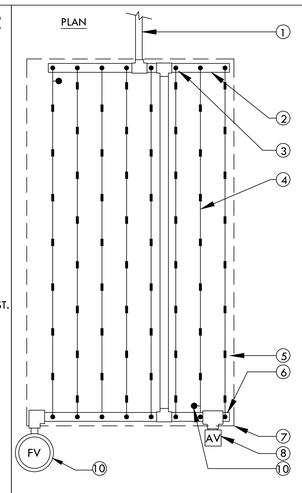
Xref ..\Base\TB_dsa.dwg



1. FLUSH VALVE PLUMBED TO FLUSH MANIFOLD AT LOW POINT
2. 1" FLEXIBLE PVC IPS HOSE FLUSH MANIFOLD.
3. MANIFOLD-TO-ELBOW CONNECTION (TYP).
4. PVC LATERAL LINE FROM VALVE. MINIMUM SIZE TO BE 1" UNLESS OTHERWISE NOTED.
5. PVC SUPPLY MANIFOLD. EXTEND TO END OF ZONE/EXHAUST HEADER.
6. MANIFOLD-TO-TEE CONNECTION.
7. DRIPLINE LATERAL.
8. AIR/VACUUM RELIEF PLUMBED TO PVC EXHAUST. INSTALL AT HIGH POINT.
9. PERIMETER LATERALS 2" [50mm] TO 4" [100mm] FROM EDGE.
10. AREA PERIMETER.
11. DRIPLINE OPERATION INDICATOR LOCATED AT THE ENDS OF EACH DRIPLINE ZONE.

NOTE:
1. THE TOTAL LENGTH OF ALL INTERCONNECTED DRIP LINE OFF A SINGLE PVC SUPPLY LINE CONNECTION OR A SINGLE RUN OF DRIPLINE SHALL NOT EXCEED 300 FT.
2. INSTALL DRIPLINE 2-4" BELOW GRADE AND STAKE DOWN EVERY 4' OR AS REQUIRED.

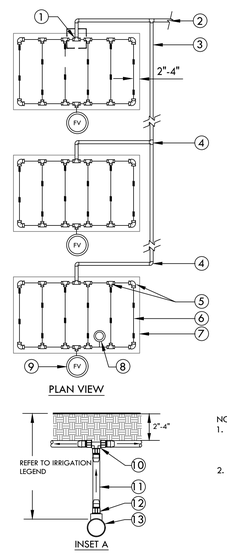
1 RAIN BIRD XFCV CENTER FEED LAYOUT
SCALE: NONE



1. PVC LATERAL LINE FROM VALVE. MINIMUM SIZE TO BE 1" UNLESS OTHERWISE NOTED.
2. PVC FLUSH MANIFOLD. MINIMUM SIZE TO BE 1" UNLESS OTHERWISE NOTED.
3. MANIFOLD-TO-ELBOW CONNECTION (TYP).
4. DRIPLINE LATERAL.
5. PERIMETER LATERALS 2" [50mm] TO 4" [100mm] FROM EDGE.
6. 1" FLEXIBLE PVC IPS HOSE FLUSH MANIFOLD.
7. AREA PERIMETER.
8. AIR/VACUUM RELIEF PLUMBED TO PVC EXHAUST. INSTALL AT HIGH POINT.
9. DRIP OPERATION INDICATOR LOCATED AT THE ENDS OF EACH DRIPLINE ZONES.
10. AUTOMATIC FLUSH VALVE PLUMBED TO FLUSH MANIFOLD AT LOW POINT.

NOTE:
1. THE TOTAL LENGTH OF ALL INTERCONNECTED DRIP LINE OFF A SINGLE PVC SUPPLY LINE CONNECTION OR A SINGLE RUN OF DRIPLINE SHALL NOT EXCEED 300 FT.
2. INSTALL DRIPLINE 2-4" BELOW GRADE AND STAKE DOWN EVERY 4' OR AS REQUIRED.

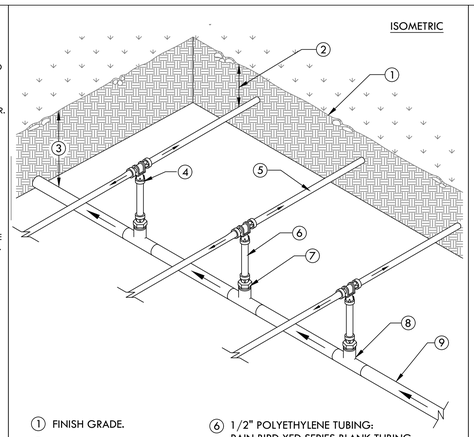
2 RAIN BIRD XFCV END FEED LAYOUT
SCALE: NONE



1. PVC TO DRIPLINE TEE CONNECTION. REFER TO INSET A.
2. PVC LATERAL LINE FROM VALVE. MINIMUM SIZE TO BE 1". SIZE AS FOLLOWS:
   1" = 0-12 GPM
   1.25 = 13-20 GPM
3. 1" PVC SUPPLY. EXTEND TO EACH ISLAND PLANTER.
4. SCH. 40 PVC TEE OR ELBOW (SxSxS OR SxS).
4. 1" PVC SUPPLY. EXTEND TO ENDS OF ZONE/EXHAUST HEADER.
5. TWIST LOCK FITTING. TLF-ELBW-0600 OR TLF-TEE-0600.
6. RAIN BIRD XFCV DRIPLINE
7. AREA PERIMETER.
8. DRIPLINE OPERATION INDICATOR LOCATED AT THE ENDS OF EACH DRIPLINE ZONE. MIN. 2 PER VALVE.
9. FLUSH VALVE PLUMBED TO FLUSH MANIFOLD AT LOW POINT
10. TWIST LOCK FITTING. TLF-ELBW-0600 OR TLF-TEE0600.
11. 1/2" POLYETHYLENE TUBING; RAIN BIRD XFD SERIES BLANK TUBING.
12. TWIST LOCK FITTING: TLF-MPT6-0600.
13. SCH 40 PVC TEE (SxSxT) WITH 1/2" FPT OUTLET.

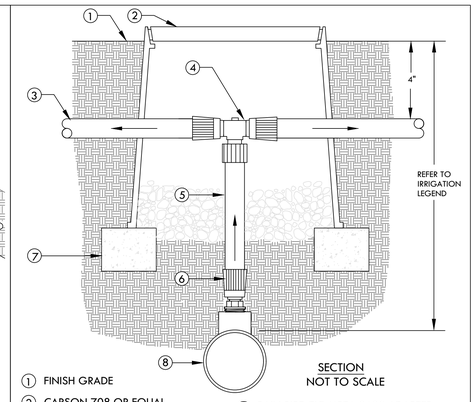
NOTE:
1. THE TOTAL LENGTH OF ALL INTERCONNECTED DRIP LINE OFF A SINGLE PVC SUPPLY LINE CONNECTION OR A SINGLE RUN OF DRIPLINE SHALL NOT EXCEED 300 FT.
2. INSTALL DRIPLINE 2"-4" BELOW GRADE AND STAKE DOWN EVERY 4' OR AS REQUIRED.

3 RAIN BIRD XFCV ISLAND LAYOUT
SCALE: NONE



1. FINISH GRADE.
2. DEPTH OF TUBING PER IRRIGATION LEGEND.
3. DEPTH OF PVC LATERAL LINE PER IRRIGATION LEGEND.
4. TWIST LOCK TEE FITTING. TLF-TEE-0600.
5. RAIN BIRD XFCV DRIPLINE
6. 1/2" POLYETHYLENE TUBING: RAIN BIRD XFD SERIES BLANK TUBING.
7. TWIST LOCK FITTING: TLF-MPT6-0600.
8. SCH 40 PVC TEE WITH 1/2" FPT OUTLET.
9. PVC LATERAL LINE FROM REMOTE CONTROL VALVE.

4 RAIN BIRD XFCV CENTER FEED MANIFOLD
SCALE: NONE

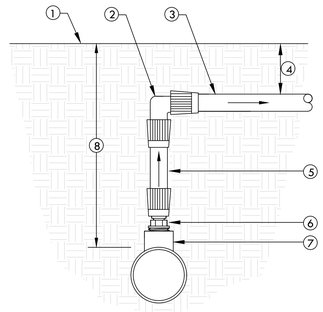


SECTION
NOT TO SCALE

1. FINISH GRADE
2. CARSON 708 OR EQUAL. COLOR: BLACK. USE PURPLE FOR RECYCLED WATER SYSTEMS.
3. DRIPLINE TUBING
4. RAIN BIRD TLF TEE-0600
5. BLANK 5/8" [16mm] POLY TUBING, LENGTH AS NECESSARY.
6. RAIN BIRD TLF-MPT6-0600 ADAPTER
7. BRICK (1 OF 2)
8. SCH 40 PVC TEE (SxSxT) WITH 1/2" FPT OUTLET.
8. PVC LATERAL LINE SUPPLY. MINIMUM SIZE TO BE 1" UNLESS SIZED DIFFERENTLY ON DRAWINGS. USE SCH 40 PVC 1"x1"x1/2" TEE OR 90° ELBOW.

NOTE:
USE ONLY WHEN THE TOTAL LENGTH OF DRIP LINE SERVICED FROM THIS PVC CONNECTION IS LESS THAN 300 FT.

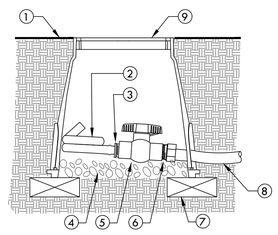
5 DRIPLINE TO PVC CONNECTION-SINGLE SOURCE DRIP AREAS ONLY
SCALE: NONE



SECTION/ELEVATION
NOT TO SCALE

1. FINISH GRADE
2. RAIN BIRD TWIST LOCK ELBOW (TLF-ELBW-0600)
3. DRIPLINE TUBING
4. DEPTH OF TUBING PER IRRIGATION LEGEND.
5. BLANK 5/8" [16mm] POLY TUBING, LENGTH AS NECESSARY.
6. RAIN BIRD TLF-MPT6-0600 ADAPTER
7. SCH 40 PVC TEE (SxSxT) WITH 1/2" FPT OUTLET.
8. DEPTH OF PVC LATERAL LINE PER IRRIGATION LEGEND

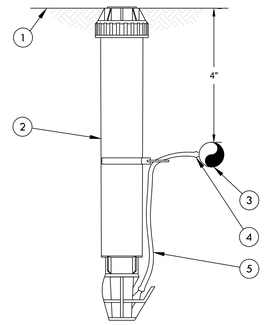
6 DRIPLINE MANIFOLD TO ELBOW CONNECTION
SCALE: NONE



NOTE:
ALLOW A MINIMUM 18" OF DRIPLINE HOSE IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX.

1. FINISH GRADE
2. 1/2" POLYETHYLENE TUBING: RAIN BIRD XFD SERIES BLANK TUBING. MIN. 18" IN LENGTH.
3. TWIST LOCK MALE ADAPTER. TLF-MPT6-0600.
4. PEA GRAVEL SUMP (4" DEEP).
5. 1/2" SCH. 40 THREADED BALL VALVE.
6. 1/2" SCH. 40 MALE ADAPTER.
7. BRICK. 2 TOTAL.
8. 1/2" IPS PVC HOSE FROM DRIPLINE OR EXHAUST HEADER.
9. 6" ROUND PLASTIC VALVE BOX.

7 DRIPLINE-FLUSH POINT
SCALE: NONE



NOTE:
USE XERIMAN TOOL XM-TOOL TO INSERT BARB TRANSFER FITTING DIRECTLY INTO DRIPLINE TUBING.

1. FINISH GRADE
2. MICRO-SPRAY POP-UP: RAIN BIRD XERI-POP XP-600X WITH 4-VAN NOZZLE
3. SUB-SURFACE DRIPLINE
4. 1/4" BARB TRANSFER FITTING: RAIN BIRD XBFCONN
5. 1/4" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED)

8 DRIPLINE INDICATOR
SCALE: NONE
DET: --------

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ♦ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — RUSSELL DONALD MITCHELL — 2989 — STATE OF CALIFORNIA
SIGNATURE
08/07/25
DATE
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	
Scale	AS NOTED

IRRIGATION DETAILS

2L6.06

Xref ..\Base\TB_dsa.dwg

WATER USAGE CALCULATIONS

WATER USE ESTIMATION & IRRIGATION SCHEDULE - CONTROLLER C

WATER TYPE	POTABLE
CITY	Stockton
ETO	54.4
DATE	4/16//2026

Nearest City to project with published ET data

REGULAR LANDSCAPE AREAS

STATION/HYDROZONE	GPM	AREA (sq.ft) (HA)	WATER USE TYPE (LW=LOW, MW=MOD, HW=HIGH)	PLANT TYPE	IRRIGATION TYPE	PLANT FACTOR (PF)	IRRIGATION EFFICIENCY (IE)	PRECIP. RATE/ APPLICATION RATE (IN/HR)	ETAF (PF/IE)	CYCLES PER DAY	DAYS PER WEEK	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ETWU (GALLONS PER YEAR)	PERCENTAGE OF LANDSCAPE
												MONTHLY ETO													
												1.2	2.0	3.4	4.9	6.7	7.9	8.5	7.5	5.7	3.7	1.8	1.1		
												TOTAL RUN TIME IN MINUTES PER DAY													
C-1	1	243	LW	SHRUB GC LW	DRIP LINE 12"	0.3	0.81	0.9	0.370	2	2	0.0	0.0	10.0	14.0	19.0	23.0	24.0	21.0	16.0	11.0	6.0	0.0	3,036	1%
C-2	13	1457	LW	SHRUB GC LW	DRIP LINE 12"	0.3	0.81	0.9	0.370	2	2	0.0	0.0	10.0	14.0	19.0	23.0	24.0	21.0	16.0	11.0	6.0	0.0	18,201	9%
C-3	11	1244	LW	SHRUB GC LW	DRIP LINE 12"	0.3	0.81	0.9	0.370	2	2	0.0	0.0	10.0	14.0	19.0	23.0	24.0	21.0	16.0	11.0	6.0	1.0	15,540	8%
C-4	15	2129	HW	TURF HW	ROTORS 360 MID	0.7	0.75	0.38	0.933	2	4	0.0	0.0	29.0	41.0	56.0	66.0	71.0	63.0	48.0	31.0	15.0	0.0	67,020	13%
C-5	23	2472	HW	TURF HW	ROTORS 360 MID	0.7	0.75	0.38	0.933	2	4	0.0	0.0	29.0	41.0	56.0	66.0	71.0	63.0	48.0	31.0	15.0	0.0	77,817	15%
C-6	14	2360	HW	TURF HW	ROTORS 360 MID	0.7	0.75	0.38	0.933	2	4	0.0	0.0	29.0	41.0	56.0	66.0	71.0	63.0	48.0	31.0	15.0	1.0	74,292	14%
C-7	10	1809	HW	TURF HW	ROTORS 180/90 MID	0.7	0.75	0.75	0.933	2	4	0.0	0.0	15.0	21.0	29.0	34.0	36.0	32.0	25.0	16.0	8.0	0.0	56,946	11%
C-8	8	789	MW	SHRUB GC MW	DRIP LINE 12"	0.4	0.81	0.9	0.494	2	3	0.0	0.0	9.0	13.0	17.0	20.0	22.0	19.0	15.0	10.0	5.0	0.0	13,141	5%
C-9	11	1141	LW	SHRUB GC LW	DRIP LINE 12"	0.3	0.81	0.9	0.370	2	2	0.0	0.0	10.0	14.0	19.0	23.0	24.0	21.0	16.0	11.0	6.0	0.0	14,253	7%
C-10	9	963	LW	SHRUB GC LW	DRIP LINE 12"	0.3	0.81	0.9	0.370	2	2	0.0	0.0	10.0	14.0	19.0	23.0	24.0	21.0	16.0	11.0	6.0	1.0	12,030	6%
C-11	10	1837	HW	TURF HW	ROTORS 180/90 MID	0.7	0.75	0.75	0.933	2	4	0.0	0.0	15.0	21.0	29.0	34.0	36.0	32.0	25.0	16.0	8.0	0.0	57,828	11%
	TOTAL	16,444																					TOTAL	410,103	100%

SPECIAL LANDSCAPE AREAS

HYDROZONE #	HYDROZONE NAME	AREA (sq.ft) (HA)	Percentage of Landscape
C-4,5,6,7	TURF	8770	477%

THE IRRIGATION VALVE SCHEDULE SHOWN ABOVE IS INTENDED TO BE USED AS A GUIDELINE ONLY AND INDICATES THE APPROXIMATE RUN TIMES IN MINUTES FOR EACH VALVE BASED ON ESTIMATED WEEKLY WATER REQUIREMENTS FOR ESTABLISHED PLANT MATERIAL. THE TIMES SHOWN ARE APPROXIMATE AND HAVE BEEN DEVELOPED FROM LOCAL AND CURRENT AVERAGES FOR EVAPOTRANSPIRATION, AND REFLECTTHE WATER REQUIREMENTS OF THE PLANT MATERIAL BASED ON PLANT TYPE AND THE APPROXIMATE PRECIPITATION OR APPLICATION RATES OF THE IRRIGATION SYSTEM TYPE. ACTUAL RUN TIMES MAY BE DIFFERENT DEPENDING ON A VARIETY OF FACTORS INCLUDING TOPOGRAPHY, SOIL STRUCTURE, SUN AND WIND EXPOSURE, WEATHER, ACTUAL PLANT WATER REQUIREMENTS, OVERALL PRECIPITATION RATE OF ZONE, ETC.

MAWA	GALLONS/YR	412,267
	ACRE FEET/YR	1.27
	HCF/YR	551.16

ETWU	GALLONS/YR	410,103
	ACRE FEET/YR	1.26
	HCF/YR	548.27

SITE IRRIGATION EFFICIENCY	SITE PLANT FACTOR	MAWA COMPLIANT
77.1%	0.56	YES

ETAF Calculations	
REGULAR LANDSCAPE AREAS	
TOTAL ETAF x AREA	12,159
TOTAL AREA	16,444
AVG. ETAF	73.94%

MAWA FORMULA

MAXIMUM APPLIED WATER ALLOWANCE (MAWA) GALLONS PER YEAR

MAWA = (ETo)(0.62)[(LA x 0.45) + (0.55 x SLA)]

ETo = REFERENCE EVAPOTRANSPIRATION

0.45= ET ADJUSTMENT FACTOR

LA=LANDSCAPED AREA (SQUARE FEET)

0.62 = CONVERSION FACTOR (GALLONS/SQ.FT/YR)

ETWU FORMULA

ESTIMATED TOTAL WATER USE (ETWU) GALLONS PER YEAR

ETWU= ((ETO)(.62)(ETAF x LA))

ETo = REFERENCE EVAPOTRANSPIRATION

PF = PLANT FACTOR FOR HYDROZONES

HA = HYDROZONE AREA (SQ.FT)

0.62 = CONVERSION FACTOR (GALLONS/SQ.FT/YR)

IE = IRRIGATION EFFICIENCY (0.81)-BUBBLER/DRIP

IE = IRRIGATION EFFICIENCY (0.75)-ROTORS/SPRAY

Irrigation Consultant:
Russell D. Mitchell Associates, Inc.
2760 Camino Diablo
Walnut Creek, CA 94597
tel 925.939.3985 ♦ fax 925.932.5671
www.rmairrigation.com

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — STATE OF CALIFORNIA — SIGNATURE 06/07/25 — 10/31/2026 RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

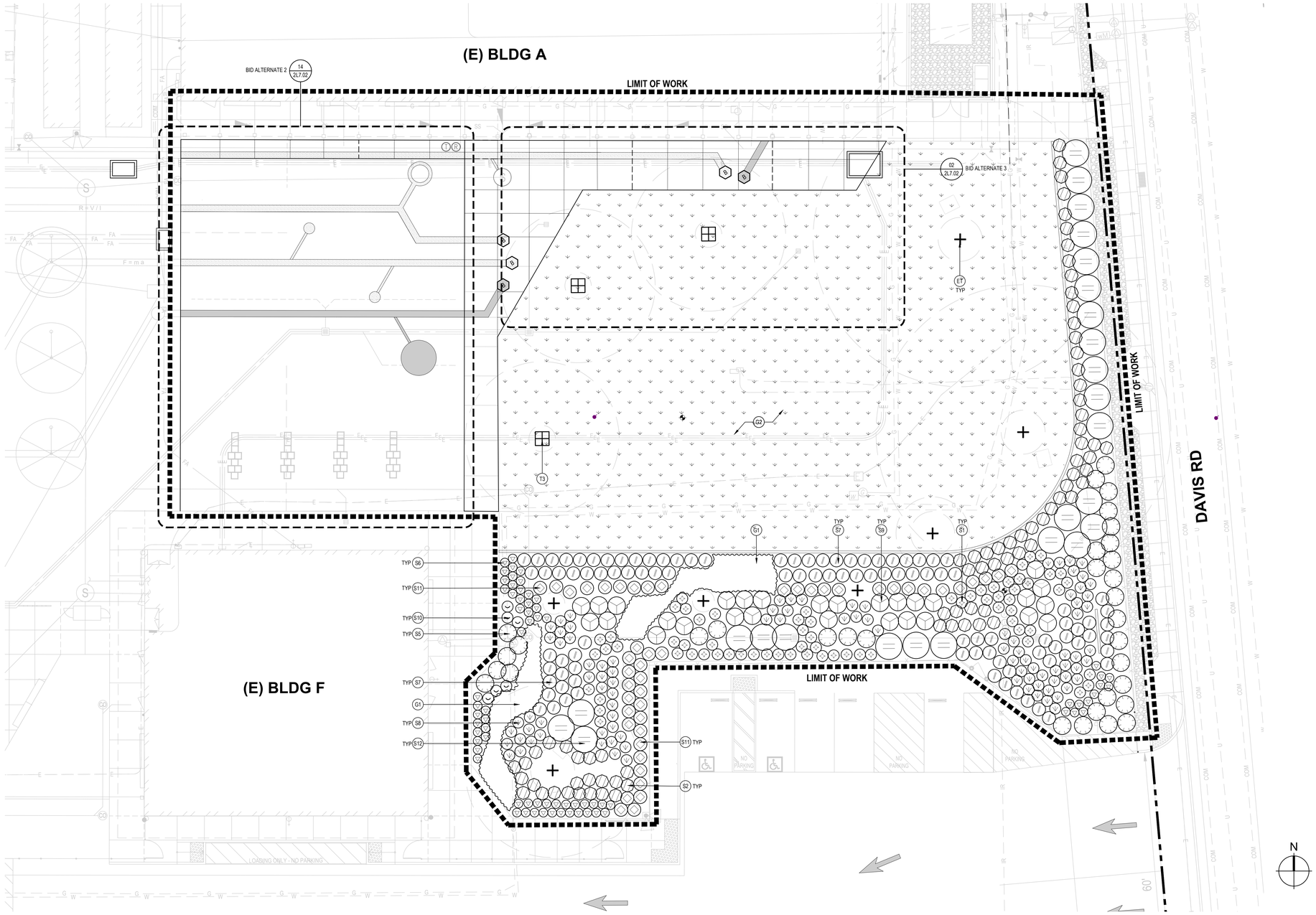
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	
Scale	AS NOTED

WATER USAGE CALCULATIONS

2L6.07

xref ..\Base\TB_dsa.dwg



PLANTING PLAN | 1" = 10'-0" | 02

GROUNDCOVER LIST

G1		AS REQ'D	ARCTOSTAPHYLOS 'EMERALD CARPET'/ EMERALD CARPET MANZANITA	L	1 GAL/ 42" O.C.	09/ 2L7.03

TURF LIST

G2		AS REQ'D	90/10 MIX BOLERO PLUS MIX BY DELTA BLUEGRASS	HIGH	SOD	SEE SPECS

MISCELLANEOUS SYMBOLS

	LINEAR ROOT BARRIER	03/ 2L7.03
	SOIL SAMPLE LOCATION (X TOTAL)	

SHADE CALCULATIONS (CGBC 5.106.12)

	REQUIRED SHADE	SHADE PROVIDED
LANDSCAPE AREA: 17,314 SQFT	20%	8,343 SQFT / 48%
HARDSCAPE AREA: 5,436 SQFT	20%	1,163 SQFT/ 21%

SHRUB / VINE LIST

S1		AS REQ'D	ASCLEPIAS CALIFORNICA/ CALIFORNIA MILKWEED	L	5 GAL/ 30" OC	09,10/ 2L7.03
S2		AS REQ'D	CAREX PRAEGRACILIS/ BERKELEY SEDGE	L	5 GAL/ 12" OC	09,10/ 2L7.03
S3		AS REQ'D	CHONDROPETALUM TECTORUM/ CAPE RUSH	L	5 GAL/ 36" OC	09,10/ 2L7.03
S4		AS REQ'D	JUNCUS PATENS 'ELK BLUE' ELK BLUE CALIFORNIA GRAY RUSH	L	1 GAL/ 24" OC	09,10/ 2L7.03
S5		AS REQ'D	LANTANA X 'NEW GOLD'/ NEW GOLD LANTANA	L	5 GAL/ 60" OC	09,10/ 2L7.03
S6		AS REQ'D	LAVANDLA ANGUSTIFOLIA/ ENGLISH LAVENDER	L	5 GAL/ 24" OC	09,10/ 2L7.03
S7		AS REQ'D	LOMANDRA LONGIFOLIA 'BREEZE'/ DWARF MAT RUSH	L	1 GAL/ 36" OC	09,10/ 2L7.03
S8		AS REQ'D	MUHLENBERGIA CAPILLARIS/ PINK MUHLY	L	5 GAL/ 30" OC	09,10/ 2L7.03
S9		AS REQ'D	MUHLENBERGIA RIGENS/ DEER GRASS	L	5 GAL/ 48" OC	09,10/ 2L7.03
S10		AS REQ'D	PENSTEMON H. 'MARGARITA BOP'/ MARGARITA BOP BEARDTONGUE	L	5 GAL/ 30" OC	09,10/ 2L7.03
S11		AS REQ'D	RHAPHIOLEPIS UMBELLATA 'MINOR'/ DWARF YEDDO HAWTHORN	L	5 GAL/ 36" OC	09,10/ 2L7.03
S12		AS REQ'D	RHAMNUS CALIFORNICA 'MOUND SAN BRUNO'/ MOUND SAN BRUNO COFFEEBERRY	L	15 GAL/ 60" OC	09,10/ 2L7.03

PLANTING LEGEND

TREE LIST — (NCN.)- NO COMMON NAME — (*)- UNLESS NOTED ON PLAN

REF.	SYM.	QTY.	BOTANICAL NAME/ COMMON NAME	WUCOLS	SIZE/ SPACING	COMMENTS/ DET
T1	△	0 (BASE BID) 1 (ALT 2) 0 (ALT 3)	CERCIS OCCIDENTALIS/ WESTERN REDBUD	L	24" BOX/ PER PLAN	STANDARD/ 01/2L7.03
T2	◑	0 (BASE BID) 1 (ALT 2) 1 (ALT 3)	QUERCUS AGROFOLIA/ COAST LIVE OAK	L	36" BOX/ PER PLAN	STANDARD/ 01/2L7.03
T3	⊞	3 (BASE BID) 0 (ALT 2) 2 (ALT 3)	ZELKOVA SERRATA/ JAPANESE ZELKOVA	M	36" BOX/ PER PLAN	STANDARD/ 01/2L7.03
ET	+		EXISTING TREE		PROTECT AND PRESERVE	

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — STATE OF CALIFORNIA

SIGNATURE
08/07/25
10/31/2026
RENEWAL DATE

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

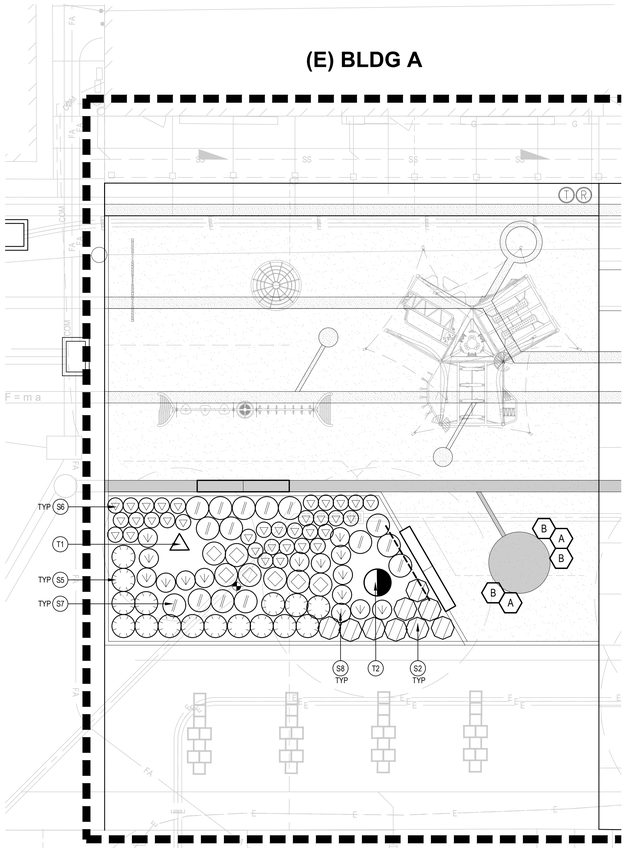
Date
Revision

Submittal — Date
100% SCHEMATIC DESIGN — 08/29/2025
100% DESIGN DEVELOPMENT — 01/09/2026
DSA SUBMITTAL — 04/24/2026

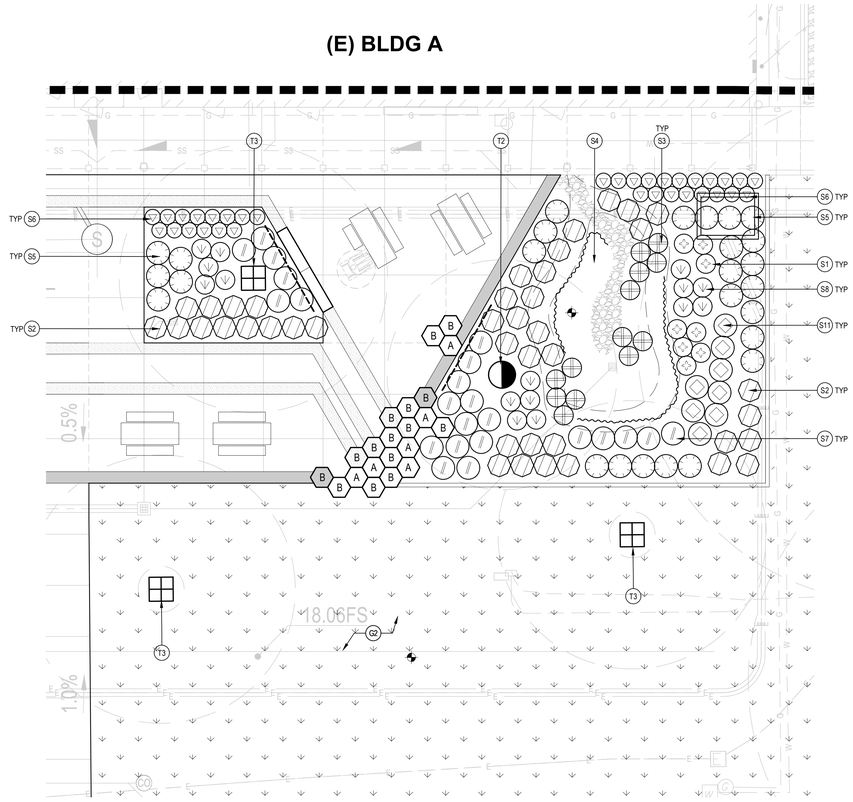
Job Number	31942
Checked By	EW
Scale	AS NOTED

PLANTING PLAN

2L7.01



PLANTING PLAN ENLARGEMENT - BID ALTERNATE 2 | 1/8" = 1'-0" | 14



PLANTING PLAN ENLARGEMENT - BID ALTERNATE 3 | 1/8" = 1'-0" | 02

GROUNDCOVER LIST

G1		AS REQ'D	ARCTOSTAPHYLOS 'EMERALD CARPET'/ EMERALD CARPET MANZANITA	L	1 GAL/ 42" O.C.	09/ 2L7.03

TURF LIST

G2		AS REQ'D	90/10 MIX BOLERO PLUS MIX BY DELTA BLUEGRASS	HIGH	SOD	SEE SPECS

MISCELLANEOUS SYMBOLS

	LINEAR ROOT BARRIER	03/ 2L7.03
	SOIL SAMPLE LOCATION (X TOTAL)	

SHRUB / VINE LIST

S1		AS REQ'D	ASCLEPIAS CALIFORNICA/ CALIFORNIA MILKWEED	L	5 GAL/ 30" OC	09,10/ 2L7.03
S2		AS REQ'D	CAREX PRAEGRACILIS/ BERKELEY SEDGE	L	5 GAL/ 12" OC	09,10/ 2L7.03
S3		AS REQ'D	CHONDROPETALUM TECTORUM/ CAPE RUSH	L	5 GAL/ 36" OC	09,10/ 2L7.03
S4		AS REQ'D	JUNCUS PATENS 'ELK BLUE' ELK BLUE CALIFORNIA GRAY RUSH	L	1 GAL/ 24" OC	09,10/ 2L7.03
S5		AS REQ'D	LANTANA X 'NEW GOLD'/ NEW GOLD LANTANA	L	5 GAL/ 60" OC	09,10/ 2L7.03
S6		AS REQ'D	LAVANDLA ANGUSTIFOLIA/ ENGLISH LAVENDER	L	5 GAL/ 24" OC	09,10/ 2L7.03
S7		AS REQ'D	LOMANDRA LONGIFOLIA 'BREEZE'/ DWARF MAT RUSH	L	1 GAL/ 36" OC	09,10/ 2L7.03
S8		AS REQ'D	MUHLENBERGIA CAPILLARIS/ PINK MUHLY	L	5 GAL/ 30" OC	09,10/ 2L7.03
S9		AS REQ'D	MUHLENBERGIA RIGENS/ DEER GRASS	L	5 GAL/ 48" OC	09,10/ 2L7.03
S10		AS REQ'D	PENSTEMON H. 'MARGARITA BOP'/ MARGARITA BOP BEARDTONGUE	L	5 GAL/ 30" OC	09,10/ 2L7.03
S11		AS REQ'D	RHAPHIOLEPIS UMBELLATA 'MINOR'/ DWARF YEDDO HAWTHORN	L	5 GAL/ 36" OC	09,10/ 2L7.03
S12		AS REQ'D	RHAMNUS CALIFORNICA 'MOUND SAN BRUNO'/ MOUND SAN BRUNO COFFEEBERRY	L	15 GAL/ 60" OC	09,10/ 2L7.03

PLANTING LEGEND

TREE LIST

(NCN.)- NO COMMON NAME (*)- UNLESS NOTED ON PLAN

REF.	SYM.	QTY.	BOTANICAL NAME/ COMMON NAME	WUCOLS	SIZE/ SPACING	COMMENTS/ DET
T1		0 (BASE BID) 1 (ALT 2) 0 (ALT 3)	CERCIS OCCIDENTALIS/ WESTERN REDBUD	L	24" BOX/ PER PLAN	STANDARD/ 01/2L7.03
T2		0 (BASE BID) 1 (ALT 2) 1 (ALT 3)	QUERCUS AGROFOLIA/ COAST LIVE OAK	L	36" BOX/ PER PLAN	STANDARD/ 01/2L7.03
T3		3 (BASE BID) 0 (ALT 2) 2 (ALT 3)	ZELKOVA SERRATA/ JAPANESE ZELKOVA	M	36" BOX/ PER PLAN	STANDARD/ 01/2L7.03
ET			EXISTING TREE		PROTECT AND PRESERVE	

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT
EDWARD WILLIAM RIBIMOTO
2965
STATE OF CALIFORNIA
SIGNATURE
08/07/25
RENEWAL DATE
10/31/2026

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

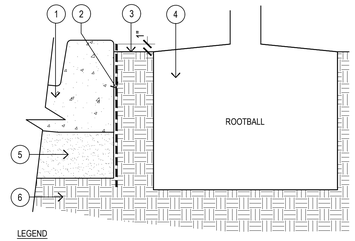
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

PLANTING PLAN

2L7.02

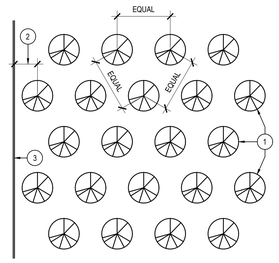


LEGEND

1. CONCRETE CURB, GUTTER, OR SIDEWALK.
2. LINEAR ROOT BARRIER BY 'DEEP ROOT'. SEE PLANTING PLAN. MODEL # UB24-2
3. FINISH GRADE.
4. ADJACENT ROOTBALL. VERIFY THE EXACT LOCATION AND PROTECT AT ALL TIMES.
5. BASE MATERIAL FROM ADJACENT HARDSCAPE.
6. COMPACTED SUBGRADE FROM ADJACENT HARDSCAPE.

NOTE:
A. VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION.

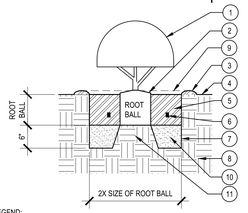
LINEAR ROOT BARRIER — 1 1/2"=1'-0" — 03



LEGEND:

1. LOCATE PLANTS WITH EQUAL SPACING AS INDICATED ON PLAN (TRIANGULAR SPACING).
2. 1/2 ON CENTER SPACING.
3. PAVING, BUILDING, OR HEADER SHOWING PLANTING AREA LIMIT.

TRIANGULAR SPACING — 1/4" = 1'-0" — 10

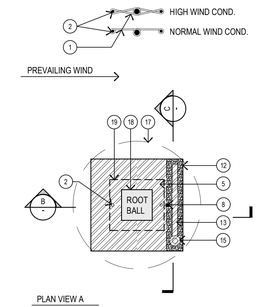


LEGEND:

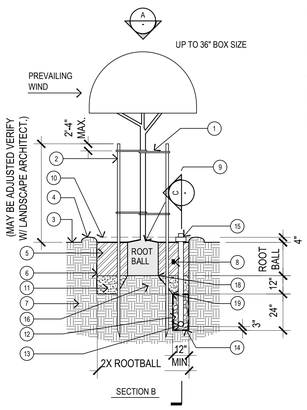
1. 1 TO 15 GALLON SHRUB; REFER TO PLANTING PLAN.
2. SET CROWN OF ROOTBALL 1" ABOVE FINISH GRADE AND SLOPE SOIL AWAY FROM ROOTBALL. ADJUST HEIGHT OF PLANTING TO ACCOMODATE SETTLING DUE TO SOIL TYPES.
3. WATER BASIN. 4" MIN. FOR 5 GAL. & LARGER. 2" MIN FOR 1 GAL.
4. FINISH GRADE
5. AMENDED BACKFILL; SEE SPECS FOR MIX.
6. PLANT TABLET; SEE SPECS.
7. SCARIFY SIDES AND BOTTOM OF PLANTING PIT.
8. EXISTING SOIL.
9. 3" MULCH, MAINTAIN CONSTANTLY. SEE SPECS.
10. COMPACTED BACKFILL; SEE SPECS. PUDDLE AND SETTLE PRIOR TO SETTING SHRUB.
11. UNDISTURBED EXISTING SOIL TO FORM PEDESTAL. REPLACE WITH COMPACTED NATURAL SOIL IF HARDPAN EXISTS.

NOTE:
A. FOR SHRUB SPACING SEE 10

SHRUB PLANTING DETAIL — 3/4" = 1'-0" — 09



PLAN VIEW A

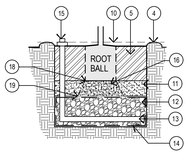


SECTION B

LEGEND

1. 32" BLACK VIT "CINCH TIES". ATTACH W/ TWO ROOFING NAILS. FOR 36" BOX AND LARGER, USE 36" BLACK VIT "TWIST BRACE". SEE PLAN VIEW. FOR HIGH WIND CONDITIONS: VIT TWIST BRACES ATTACH W/ TWO ROOFING NAILS. TYPICAL TWO EACH SIDE. SEE PLAN VIEW.
2. 2" DIA. X 12' LODGE POLE PINE STAKES. 3" DIA X 12' LODGE POLE PINE STAKES FOR 36" BOX AND LARGER TREES. (HEIGHT OF STAKE -8'-10'-12' SHOULD BE ADJUSTED BASED ON CONTAINER SIZE, HEIGHT OF TREE, AND GROWTH RATE) CUT STAKES TO MATCH HT. AS DIRECTED BY LANDSCAPE ARCHITECT.
3. FINISH GRADE
4. WATER BASIN. 4" MIN. DEPTH FOR 5 GAL. & LARGER IN LAWN AREAS AND AS DIRECTED BY LANDSCAPE ARCHITECT.
5. AMENDED BACKFILL. SEE SPECIFICATIONS FOR MIX AND PIT SIZE.
6. SCARIFY SIDES AND BOTTOM OF PLANTING PIT.
7. EXISTING SOIL.
8. PLANT TABLET. PER SPECS.
9. SET TOP OF ROOTBALL X" ABOVE SURROUNDING GRADE AND SLOPE FOR DRAINAGE. PROVIDE 2' DIA. MULCH RING AT TREES WITHIN TURF. ADJUST HEIGHT OF TREE PLANTING TO ACCOMMODATE SETTLING DUE TO SOIL TYPE.
10. 3" MULCH, MAINTAIN CONSTANTLY.
11. COMPACTED BACKFILL. PUDDLE AND SETTLE PRIOR TO SETTING TREE.
12. 12" WIDE TRENCH ALONG ONE SIDE. FILL WITH 3/4" DRAIN GRAVEL.
13. 4" PERFORATED DRAIN PIPE PLACED HORIZONTAL.
14. "MIRAFI" 140N FILTER FABRIC.
15. 4" NIBCO, BLACK - 'ABS' PLUG 4" NIBCO, BLACK - 'ABS' FEMALE RECIEVER NDS, WHITE 'PVC' ADAPTOR FOR CONNECTION FROM FEMALE RECIEVER TO PVC SOLID STAND PIPE
16. UNDISTURBED EXISTING SOIL TO FORM PEDESTAL AND PREVENT SETTLING. REPLACE WITH COMPACTED NATURAL SOIL IF HARDPAN EXISTS.
17. TREE CANOPY
18. BOTTOM OF ROOTBALL/ TOP OF PEDESTAL.
19. BASE OF PEDESTAL FOR TREE.

NOTE:
A. PROVIDE (2) 6" DIA. x 6' DEEP AUGER HOLES IF EXCAVATED HOLE DOES NOT DRAIN FASTER THAN 1" PER HOUR AS DETERMINED BY SOILS REPORT AND FIELD CONDITIONS.



SECTION C

TREE STAKING AND PLANTING DETAIL — 1/4"=1'-0" — 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED LANDSCAPE ARCHITECT — EDWARD WONG — 5495 — STATE OF CALIFORNIA
SIGNATURE
08/07/25
RENEWAL DATE
10/31/2026

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

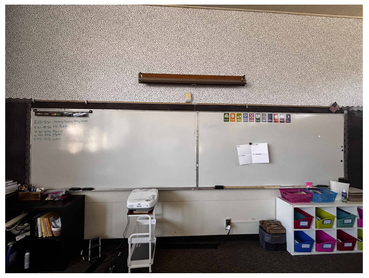
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	EW
Scale	AS NOTED

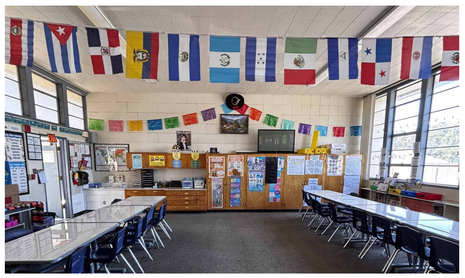
PLANTING DETAILS

2L7.03

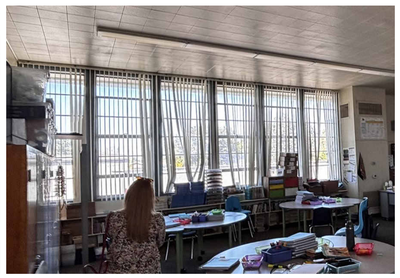
EXISTING CLASSROOM BOOKCASES



EXISTING CLASSROOM TEACHING WALL WITH WHITEBOARDS AND PROJECTOR



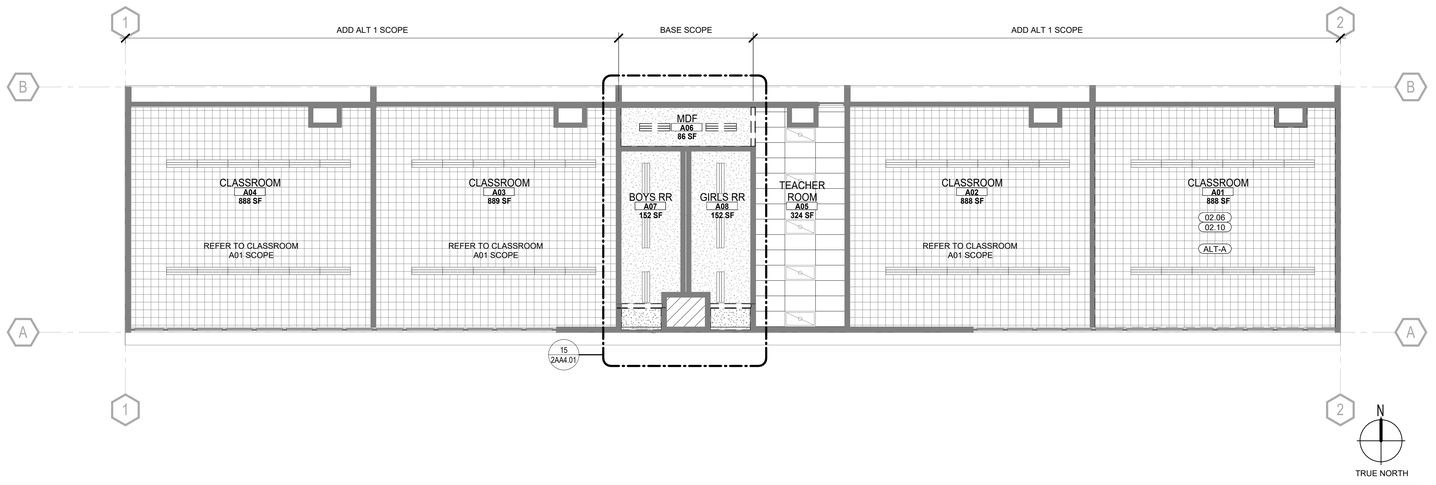
EXISTING CLASSROOM CASEWORK



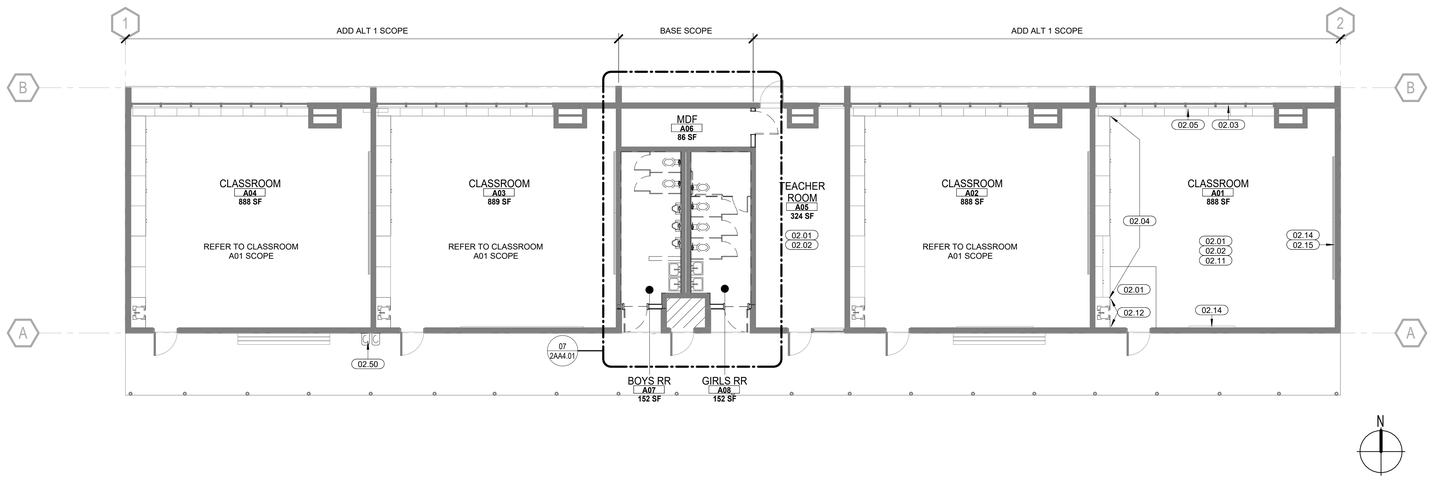
EXISTING WINDOW SHADES

EXISTING VINYL WALLCOVERING AND 1 X 1 TILE ON WALL

EXISTING PHOTOS | 12" = 1'-0" | 2A2.01 | 08



BUILDING A - DEMOLITION REFLECTED CEILING PLAN | 1/8" = 1'-0" | 2A2.01 | 07



BUILDING A - DEMOLITION FLOOR PLAN | 1/8" = 1'-0" | 2A2.01 | 06

KEYNOTES

02.01	DEMOLITION: REMOVE (E) FLOORING AND BASE THROUGHOUT. U.N.O. AT CARPET REMOVAL, MACHINE SCRAPE GLUE/ADHESIVE OFF FLOOR.
02.02	DEMOLITION: REMOVE (E) VINYL TACK PANELS THROUGHOUT.
02.03	DEMOLITION: REMOVE (E) WINDOW SHADES. PATCH AND REPAINT WHERE OLD SHADES REMOVED.
02.04	(CASEWORK): (E) CASEWORK TO REMAIN. PROTECT IN PLACE.
02.05	(CASEWORK): (E) BOOKCASES TO REMAIN. PROTECT IN PLACE.
02.06	EXISTING CEILING TILES TO REMAIN REMOVE ANY LOSE OR DAMAGED 1 X 1 CEILING TILES.
02.10	(E) LIGHTING TO REMAIN. REMOVE FOR ANY CEILING WORK AND REINSTALL IN PLACE.
02.11	(DEMOLITION): REMOVE ALL (E) 1" X 1" GLUE-ON TILES AND ADHESIVE ON ALL WALLS. PREPARE (E) GYP FOR NEW PAINT.
02.12	(DEMOLITION) CASEWORK: REMOVE (E) SINK CASEWORK AND SINK.
02.14	SALVAGE (E) PROJECTION SCREEN(S). REMOVE AND REINSTALL.
02.15	SALVAGE (E) WHITE BOARDS, REMOVE AND REINSTALL
02.50	DEMOLISH (E) DRINKING FOUNTAIN.

ALTERNATES

ALT-A	(ADD ALT) REMOVE (E) 12" X 12" CEILING TILES, TRIM AND ADHESIVE. PREPARE (E) GYP CEILING FOR NEW PAINT.

DEMOLITION RCP LEGEND

- (E) 1 X1 CEILING TILE TO REMAIN IN PLACE
- (E) GRID AND TILE TO REMAIN IN PLACE
- (E) GYP TO REMAIN IN PLACE
- NOT IN SCOPE OF WORK
- (E) 1 X 4 LIGHTING FIXTURE TO REMAIN, REMOVE FOR WORK AND REINSTALL IN PLACE
- (E) 2 X 4 LIGHTING FIXTURE TO REMAIN IN PLACE

DEMOLITION RCP GENERAL NOTES

1. THIS REFLECTIVE CEILING PLAN IS TO PROVIDE CEILING FINISH DEMOLITION SCOPE ONLY. FIXTURES SHOWN ARE FOR COORDINATION PURPOSES ONLY. SEE ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY DRAWINGS FOR MORE SPECIFIC INFORMATION ON DEMOLITION SCOPE RELATED TO THOSE DISCIPLINES.
2. EXISTING CEILING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT INCLUDING BUT NOT LIMITED TO ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY, SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES AT NO ADDITIONAL COST TO OWNER.
3. REFERENCE ELECTRICAL LIGHTING PLANS FOR SCOPE OF DEMOLITION OF LIGHTING.

DEMOLITION PLAN LEGEND

- NOT IN SCOPE OF WORK
- EXISTING WALL TO REMAIN
- EXISTING DOOR TO REMAIN
- DOOR TO BE DEMOLISHED

DEMOLITION GENERAL NOTES

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES TO THE ARCHITECT.
2. NO DEMOLITION TO BEGIN UNTIL PLANS INCLUDING DEMOLITION WORK HAVE BEEN APPROVED BY DSA.
3. EXISTING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES.
4. AT AREAS OF DEMOLITION, ALL FLOOR FINISHES (I.E. CARPET, SHEET VINYL, VCT, ETC.) SHALL BE REMOVED. FLOOR SURFACE SHALL BE STRIPPED AND LEFT CLEAN AND SMOOTH. DO NOT DISTURB (E) CONCRETE SLAB WHILE DEMOLISHING FLOORING, U.N.O.
5. PROTECT ALL AREAS NOT SCHEDULED FOR DEMOLITION/MODIFICATION.
6. WHERE DEMOLITION OCCURS, PATCH, SAND, PREP, TEXTURE, AND REPAIR REMAINING CONSTRUCTION TO MATCH EXISTING FINISH.
7. ALL SURFACES THAT ARE SCHEDULED TO RECEIVE NEW FINISHES SHALL BE CLEANED AND PREPARED ACCORDINGLY AND APPROPRIATELY.
8. ALL PHYSICAL STRUCTURES AND FEATURES OF THE BUILDING THAT ARE NOT ILLUSTRATED BY A 'DASHED' LINE OR OTHERWISE SPECIFICALLY DESIGNATED TO BE REMOVED, SHALL REMAIN 'AS IS'.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

DEMO FLOOR PLAN & DEMO RCP - BLDG A

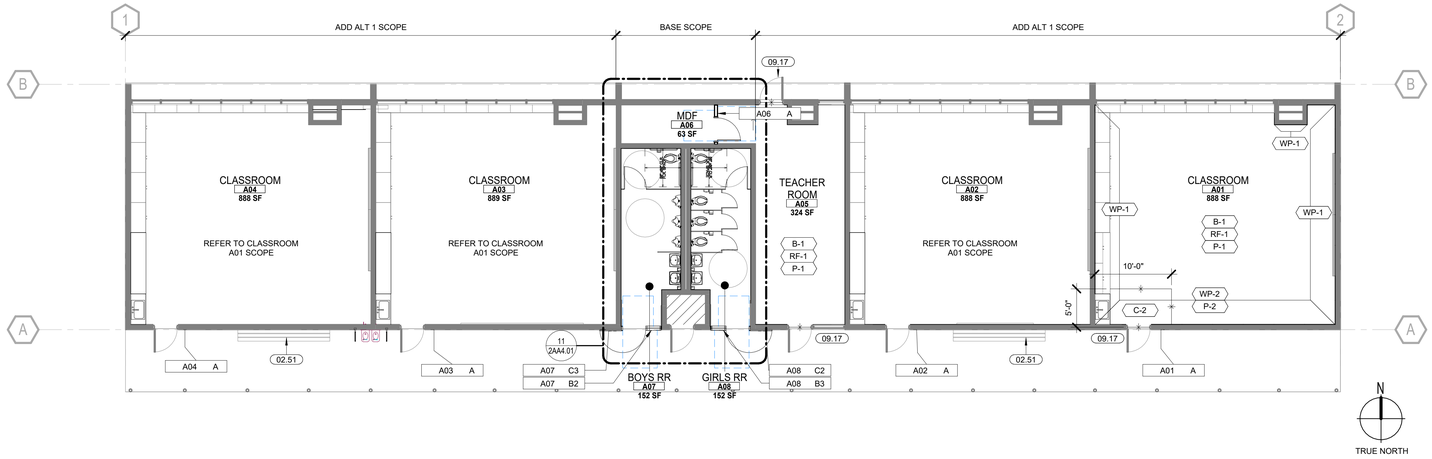
2A2.01

FINISH SCHEDULE

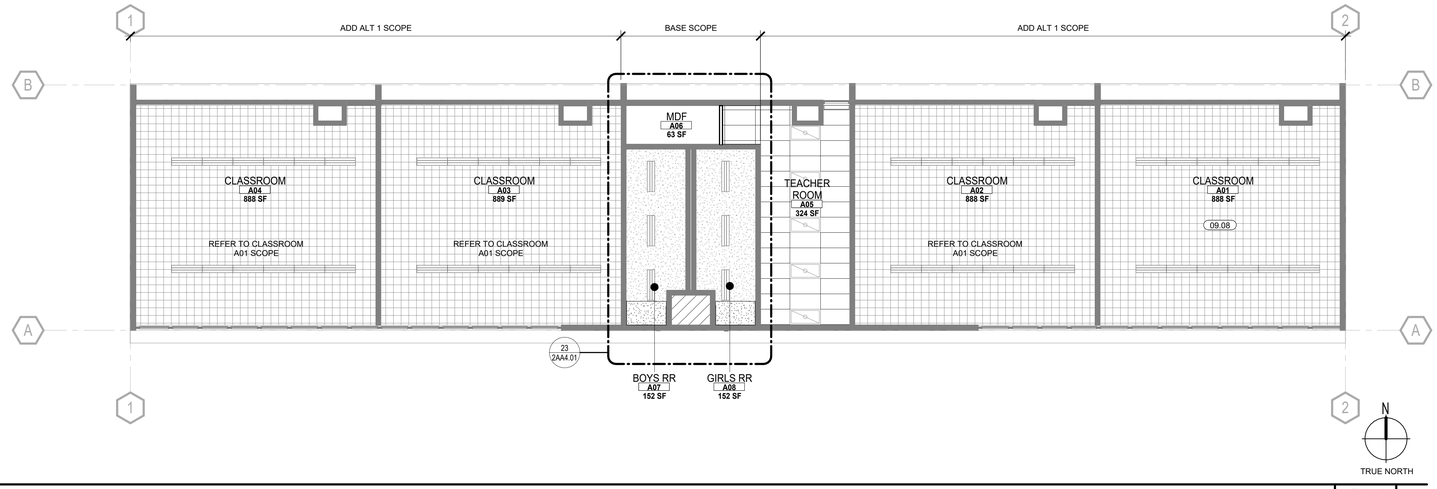
TAG	DESCRIPTION	SPECIFICATION
B-1	RUBBER BASE	MFR. BURKE OR JOHNSONITE STYLE: 6" STRAIGHT AT CARPET COLOR: BLACK NOTES:
C-1	CARPET TILE	MFR. MOHAWK COLLECTION: INCLUSION COLOR - I0553 GEMSCAPE COLOR: 00585 - MARBLE SIZE 24" X 24" INSTALLATION: TBD
C-2	WALK-OFF CARPET TILE	MFR. MOHAWK FIRST STEP II COLOR: 989 OBSIDIAN SIZE 24" X 24" INSTALLATION: TBD
EP-1	EPOXY FLOORING & WAINSCOT	MFR. DUR-A-FLEX INC. COLLECTION: DUR-A-QUARTZ COLOR: TBD FINISH: NON-GLOSS, SLIP RESISTANT NOTES: INTEGRAL COVE BASE
P-1	PAINT	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE BONE
P-2	ACCENT PAINT	MFR. SHERWIN WILLIAMS COLOR: FRANK BLUE SW 6967
P-3	PAINT DOORS & FRAMES	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE PEWTER CAST
PL-1	PLASTIC LAMINATE COUNTER	MFR. WILSONART COLLECTION: STANDARD LAMINATE COLOR: GRAY GLACE 4142-60 FINISH: MATTE FINISH
PL-2	PLASTIC LAMINATE COUNTER	MFR. WILSONART COLLECTION: STANDARD LAMINATE COLOR: NATURAL RIFT 7954-38 FINISH: FINE VELVET FINISH
RF-1	RESILIENT FLOORING	MFR. PATCRAFT COLLECTION: WOOD + WEALD COLOR CYPRESS V-2 00750 THICKNESS: 2.2 MM
VCT	VINYL COMPOSITION TILE	MFR. ARMSTRONG STYLE: CLOSEST MATCH TO EXISTING COLOR: TBD
WP-1	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: BONE 4251-17 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS.VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.
WP-2	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: ROYAL 4521-16 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS.VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.

SIGNAGE SCHEDULE BUILDING A

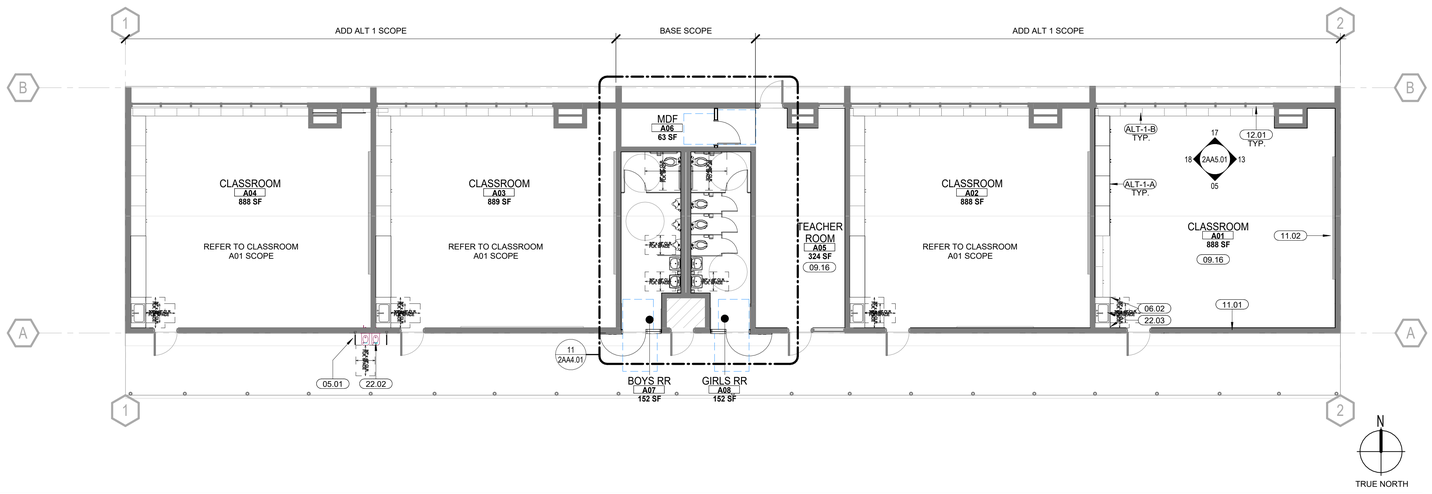
Room	Sign Type	Text	Detail Number	Mounting Location	Braille	Comments
A01	A	CLASSROOM A01	18/2A10.23	EXTERIOR WALL	Yes	
A02	A	CLASSROOM A02	18/2A10.23	EXTERIOR WALL	Yes	
A03	A	CLASSROOM A03	18/2A10.23	EXTERIOR WALL	Yes	
A04	A	CLASSROOM A04	18/2A10.23	EXTERIOR WALL	Yes	
A06	A	MDF ROOM	18/2A10.23	INTERIOR WALL	Yes	
A07	B2	RE: DETAIL	20/2A10.23	GLAZING	Yes	
A07	C3	RE: DETAIL	19/2A10.23	DOOR	No	
A08	B3	RE: DETAIL	20/2A10.23	GLAZING	Yes	
A08	C2	RE: DETAIL	19/2A10.23	DOOR	No	



BUILDING A - PROPOSED FINISH PLAN | 1/8" = 1'-0" | 2A2.02 | 07



BUILDING A - PROPOSED REFLECTED CEILING PLAN | 1/8" = 1'-0" | 2A2.02 | 06



BUILDING A - PROPOSED FLOOR PLAN | 1/8" = 1'-0" | 2A2.02 | 05

KEYNOTES

02.51	(E) BENCH TO REMAIN.
05.01	BASE SCOPE: NEW PIPE GUARDS. REF: 21/2G0.32
06.02	NEW COUNTER AND CASEWORK @ SINK LOCATION.
09.08	REPLACE MISSING OR REMOVED 12X12 CEILING TILES TO MATCH EXISTING.
09.16	PATCH AND REPAIR EXISTING GWB FOR NEW FINISH. PAINT P-1.
09.17	PAINT INTERIOR AND EXTERIOR OF (E) DOOR AND FRAME P-3, SEMI-GLOSS.
11.01	REINSTALL PROJECTOR SCREEN
11.02	REINSTALL WHITEBOARD RE: 18/2AF9.10 AND PROJECTOR SCREEN RE: 20/2AF9.10
12.01	NEW MANUAL WINDOW SHADES
22.02	BASE SCOPE: DRINKING FOUNTAIN - SEE PLUMBING DRAWINGS
22.03	NEW SINK - SEE PLUMBING DRAWINGS

ALTERNATES

ALT-1-A	(ADD ALT) CASEWORK: REFINISH EXISTING WOOD, STRIP, SAND AND VARNISH. REPLACE DAMAGED HARDWARE WITH LIKE IN KIND, TYP. ALONG WALL.
ALT-1-B	(ADD ALT) SAND AND PREPARE ALL BOOKCASES FOR NEW FINISH, P-1.

FINISH PLAN LEGEND

- NOT IN SCOPE OF WORK
- ? — FINISH TAG, SEE FNISH SCHEDULE - THIS SHEET
- FINISH CODE, SEE FINISH SCHEDULE - THIS SHEET
- FLOOR TRANSITION, SEE DETAIL 01/2AF9.10 FOR VARIOUS CONDITIONS AND SPECIFICATIONS
- FLOOR PATTERN DIRECTION
- ROOM NUMBER
- X## - X — SIGNAGE TAG
- SIGN TYPE

REFERENCE SHEET 2A10.31 FOR DETAILS AND ADDITIONAL SIGNAGE INFORMATION

FINISH PLAN GENERAL NOTES

1. REFER TO FINISH SCHEDULE FOR MORE INFORMATION.
2. REFER TO INTERIOR ELEVATIONS FOR MORE CLARIFICATIONS ON INTERIOR FINISHES.
3. ALL GYPSUM BOARD WALLS VISIBLE TO VIEW SHALL BE LEVEL #4 FINISH (SMOOTH), TYP.
4. PAINT ALL CLG./WALL ACCESS PANELS TO MATCH ADJACENT SURFACE.
5. SEE DOOR & FINISH SCHEDULE FOR DOOR, FRAME, & THRESHOLD FINISHES.
6. TYPICAL FLOOR TRANSITIONS ARE LOCATED AT THE CENTERLINE OF THE DOOR OR AT THE CENTERLINE IN THE OPENING WHERE NO DOOR IS PRESENT, U.N.O
7. CONTRACTOR TO PERFORM MOISTURE TESTING PRIOR TO THE ORDER OF THE MATERIALS FOR VERIFICATION OF COMPLIANCE WITH MANUFACTURERS WARRANTIES AND MAKE REQUIRED REMEDIATION TO MEET MANUFACTURES WARRANTIES. REFER TO SPECIFICATION 090561.

RCP LEGEND

- NOT IN SCOPE OF WORK
- NEW 2 X 4 ACT CLG TILES
- (E) FRAMED GYP BD CLG, PAINT P-1
- (E) 1 X 1 CEILING TILE
- 9'-0" — TYPICAL CEILING HEIGHT, U.N.O.
- XXX-1 — TYPICAL CEILING TYPE, U.N.O.
- CENTER DEVICES ON CEILING TILE - TYPICAL INCLUDED BUT NOT LIMITED TO THE FOLLOWING: SPRINKLER, FIRE STROBE, SPEAKERS, DAYLIGHT AND OCCUPANCY SENSORS.

RCP GENERAL NOTES

1. FOR ALL LIGHTING SPECIFICATIONS, REFER TO LIGHTING AND ELECTRICAL DRAWINGS
2. CONFIRM MOUNTING HEIGHTS WITH ARCHITECT IN FIELD PRIOR TO INSTALLATIONS FOR ALL NON -RECESSED FIXTURES
3. REFER TO MECHANICAL DRAWINGS FOR SUPPLY AND RETURN AIR SPECIFICATIONS
4. SEE AV AND SECURITY DRAWINGS FOR ADDITIONAL CEILING ELEMENTS

FLOOR PLAN LEGEND

- NOT IN SCOPE OF WORK
- EXISTING WALL TO REMAIN
- 101 — DOOR NUMBER TAG - SEE 2AF6.11 FOR DOOR SCHEDULE

FLOOR PLAN GENERAL NOTES

1. PROVIDE MOISTURE RESISTANT GYP BD IN ALL WET LOCATIONS, UNO.
2. REFER TO 2G0.31 AND 2G0.32 FOR TYP ACCESSIBILITY REQUIREMENTS.
3. LOCATE NEW DOOR FRAME 4" MIN FROM ADJACENT FACE OF STUD, TYP, U.N.O.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

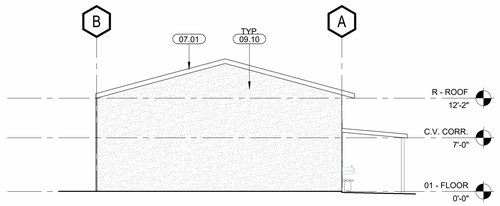
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CD	04/24/2026
DSA SUBMITTAL	04/24/2026

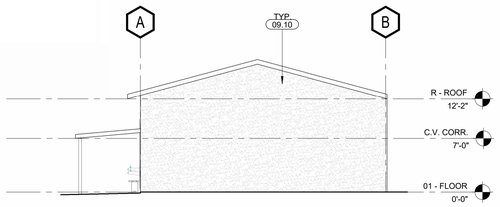
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

FLOOR PLAN, RCP, & FINISH PLAN - BLDG A

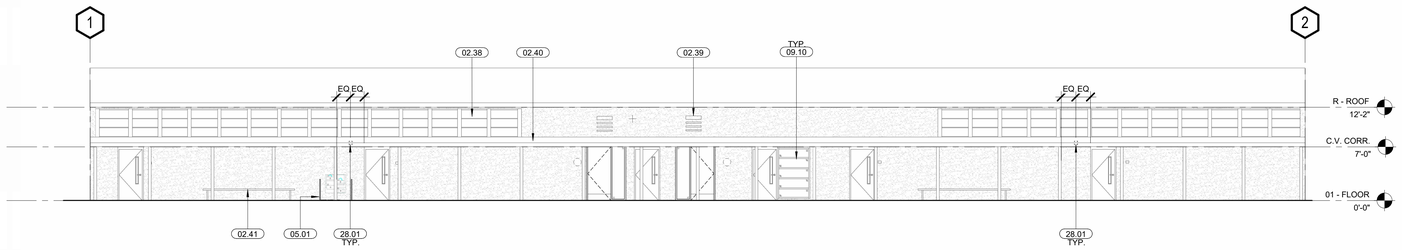
2A2.02



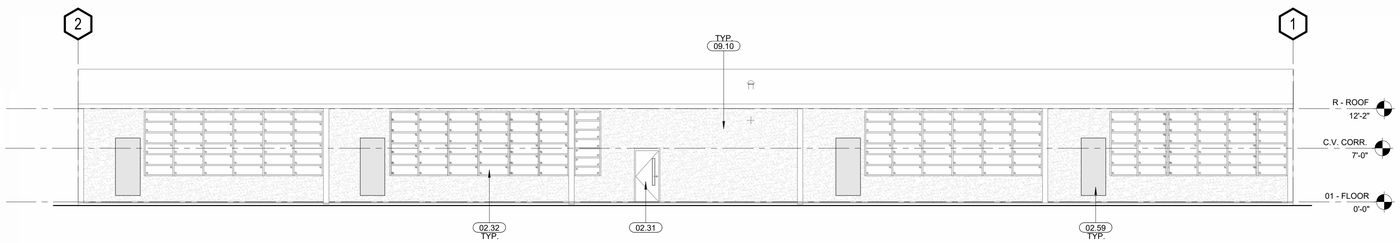
EXT ELEVATION - WEST | 1/8" = 1'-0" | 2AA3.01A | 08



EXT ELEVATION - EAST | 1/8" = 1'-0" | 2AA3.01A | 07



EXT ELEVATION - SOUTH | 1/8" = 1'-0" | 2AA3.01A | 06



EXT ELEVATION - NORTH | 1/8" = 1'-0" | 2AA3.01A | 05

KEYNOTES

02.31	(E) DOOR TO REMAIN
02.32	(E) WINDOW TO REMAIN
02.38	(E) COVERED CLERESTORY WINDOW TO REMAIN
02.39	(E) LOUVER TO REMAIN
02.40	(E) COVERED WALKWAY TO REMAIN
02.41	(E) BENCH TO REMAIN
02.59	(E) A/C UNIT TO REMAIN
05.01	BASE SCOPE: NEW PIPE GUARDS. REF: 21/2G0.32
07.01	(E) ROOF TO REMAIN
09.10	PAINT ALL (E) EXTERIOR BUILDING ELEMENTS, INCLUDING WALLS, DOORS, FRAMES, AND TRIMS. DO NOT PAINT (E) ALUMINUM WINDOW FRAMES
28.01	FIRE ALARM DEVICE BEYOND. CENTERED ON TRIM BETWEEN T.O. DOOR AND B.O. SOFFIT

LEGEND

EXISTING PLASTER TO REMAIN

EXISTING SIDING TO REMAIN

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

EXTERIOR ELEVATIONS
- BLDG A

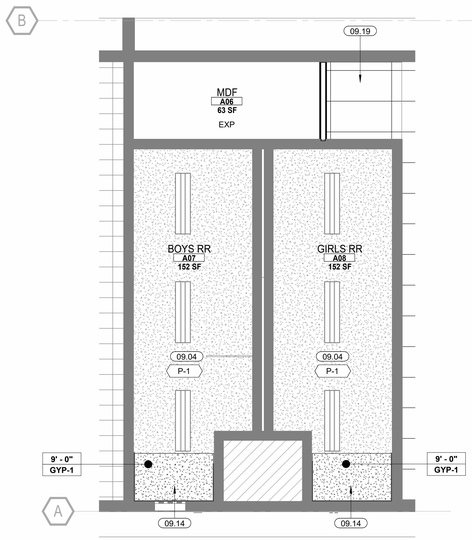
2AA3.01A

EXISTING BOY'S RESTROOM

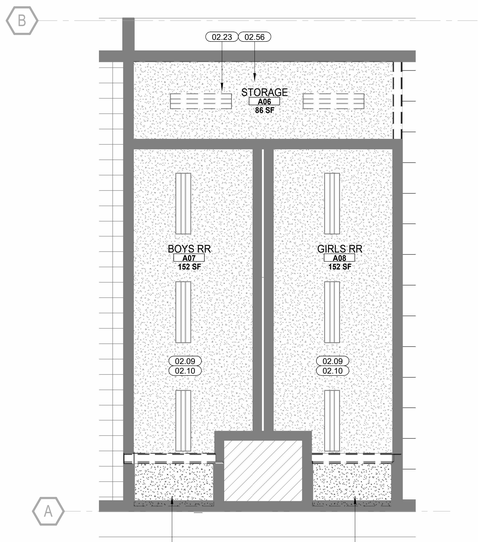
EXISTING URINALS

EXISTING GIRL'S RESTROOM

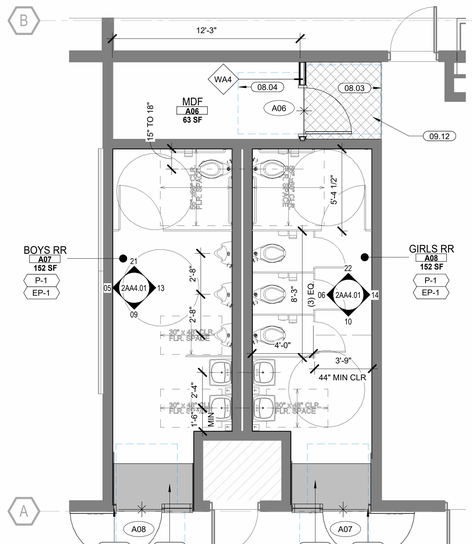
EXISTING PHOTOS | 12" = 1'-0" | 2AA4.01 | 16



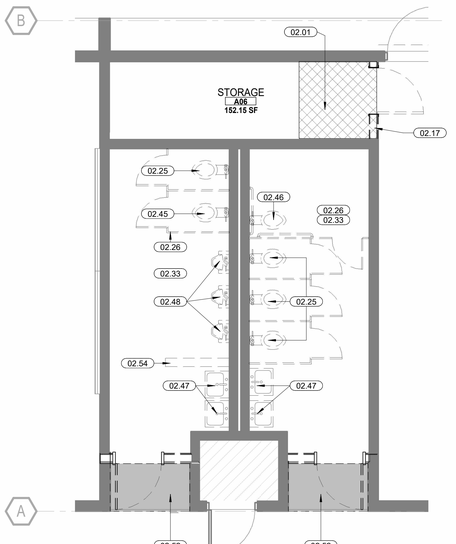
ENLARGED RESTROOM - PROPOSED RCP | 1/4" = 1'-0" | 2AA4.01 | 23



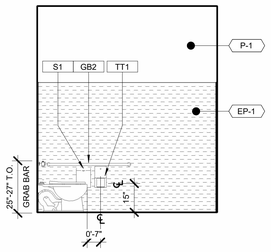
ENLARGED RESTROOM - DEMOLITION RCP | 1/4" = 1'-0" | 2AA4.01 | 15



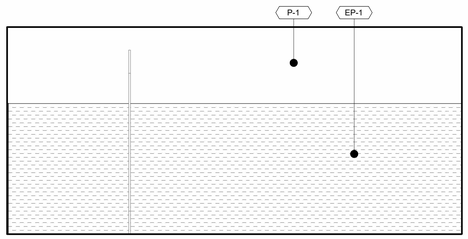
ENLARGED RESTROOM - PROPOSED FLOOR PLAN | 1/4" = 1'-0" | 2AA4.01 | 11



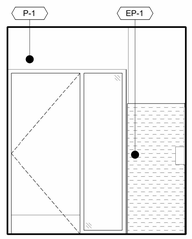
ENLARGED RESTROOM - DEMO PLAN | 1/4" = 1'-0" | 2AA4.01 | 07



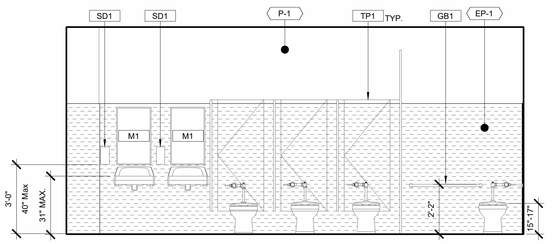
GIRL'S RESTROOM - NORTH | 3/8" = 1'-0" | 2AA4.01 | 22



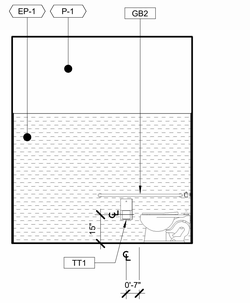
GIRL'S RESTROOM - EAST | 3/8" = 1'-0" | 2AA4.01 | 14



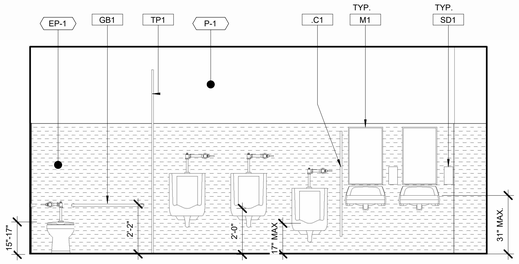
GIRL'S RESTROOM - SOUTH | 3/8" = 1'-0" | 2AA4.01 | 10



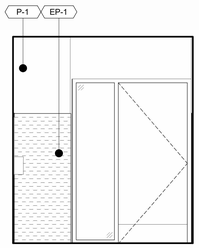
GIRL'S RESTROOM (AGES 9-12) - WEST | 3/8" = 1'-0" | 2AA4.01 | 06



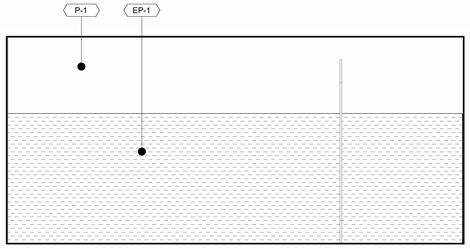
BOY'S RESTROOM - NORTH | 3/8" = 1'-0" | 2AA4.01 | 21



BOYS RESTROOM - EAST | 3/8" = 1'-0" | 2AA4.01 | 13



BOY'S RESTROOM - SOUTH | 3/8" = 1'-0" | 2AA4.01 | 09



BOY'S RESTROOM (AGES 9-12) - WEST | 3/8" = 1'-0" | 2AA4.01 | 05

KEYNOTES

02.01	DEMOLITION: REMOVE (E) FLOORING AND BASE THROUGHOUT, U.N.O. AT CARPET REMOVAL, MACHINE SCRAPE GLUE/ADHESIVE OFF FLOOR.
02.09	SAND AND PREPARE GWB CLG FOR NEW FINISH.
02.10	(E) LIGHTING TO REMAIN. REMOVE FOR ANY CEILING WORK AND REINSTALL IN PLACE.
02.17	DEMOLITION: EXISTING PARTITION EXTENTS AS SHOWN
02.23	DEMOLITION: REMOVE (E) LIGHTING
02.25	DEMOLITION: REMOVE (E) WATER CLOSET(S) AND ACCESSORIES. NEW TO BE INSTALLED IN SAME LOCATION.
02.26	REMOVE ALL (E) TOILET PARTITIONS.
02.33	SEMI-DEMOLITION OF (E) EPOXY FLOOR AND WALL FINISH TO PREPARE FOR NEW LAYER OF EPOXY. DIAMOND GRIND TO AGGRESSIVELY ABRADE. PATCH AND REPAIR WHERE TRENCHING OR CUTTING OR SURFACE DUE TO DEMOLITION AND INSTALLATION OF NEW PLUMBING FIXTURES.
02.45	DEMOLITION: REMOVE (E) WATER CLOSET(S) AND ACCESSORIES CAP PLUMBING BEHIND WALLS AND FLOOR, PATCH AND REPAIR WALL AND CONCRETE, NO NEW FIXTURE TO INSTALL.
02.46	DEMOLITION: REMOVE (E) WATER CLOSET(S) AND ACCESSORIES CAP PLUMBING BEHIND WALLS AND FLOOR, PATCH AND REPAIR WALL AND CONCRETE, NEW FIXTURE INSTALLED IN NEW LOCATION RE: FLOOR PLAN
02.47	DEMOLITION: REMOVE (E) LAVATORY, INSTALL NEW USING EXISTING INFRASTRUCTURE RE: PLUMBING DRAWINGS AND INTERIOR ELEVATIONS.
02.48	DEMOLITION: REMOVE (E) FLOOR HOSTED URINALS, CAP PLUMBING IN FLOOR. PATCH AND INFILL FLOORING. NEW WALL HOSTED URINAL INSTALLED RE: PLUMBING AND INTERIOR ELEVATIONS.
02.52	DEMOLISH CONCRETE IN ALCOVE
02.53	REMOVE STUCCO, WEATHER BARRIER, AND SHEATHING - TYPICAL AT ALCOVE.
02.54	DEMOLISH (E) HALF HEIGHT PARTITION
02.56	DEMOLITION; REMOVE EXISTING CEILING AND RELATED INFASTRUCUTRE.
03.01	CONCRETE SLAB - DOWEL INTO (E) SLAB. PREPARE FOR FLOORING. SEE DETAIL 17/2S6.01
08.01	PUNCH AND DIMPLE DOOR FRAME INSTALLATION
08.03	DOOR CLEARANCE 48" X DOOR + 12"
08.04	DOOR CLEARANCE 60 "X DOOR + 24"
09.04	PAINT EXISTING GYP CEILING P-1
09.12	NEW VCT FLOOR, WALL BASE AND PAINT TO INFILL WHERE DEMOLITION OCCURRED AND WALL WAS SHIFTED
09.14	NEW GYPSUM CEILING TO INFILL WHERE DOOR HAS BEEN RELOCATED - TO ALIGN WITH EXISTING GYP CEILING PATCH TRANSITION PAINT P-1
09.18	PATCH CEMENT PLASTER - MATCH (E) TEXTURE
09.19	NEW ACT CEILING, TO MATCH EXISTING TEACHER WORKROOM CEILING; INFILL WHERE EXISTING GYP CEILING HAS BEEN DEMOLISHED OUTSIDE OF THE NEW MDF ROOM.

LEGEND

- NOT IN SCOPE OF WORK
- NEW GWB CLG, PAINT P-1
- (E) CONC SLAB TO BE DEMO'D IN ALCOVE
- NEW CONC SLAB
- (E) WALL TO REMAIN
- EXISTING DOOR TO REMAIN
- DOOR TO BE DEMOLISHED
- ? FINISH TAG, SEE FINISH SCHEDULE ON SHEET 2A2.02
- ? TOILET ACCESSORY, RE: RESTROOM ACCESSORIES SCHEDULE

RESTROOM ACCESSORIES SCHEDULE

TAG #	MANUFACTURER	MODEL #	DESCRIPTION
.C1	Scranton	Hiney Hiders	WALL HUNG WATER AND FIRE RESISTANT, SOLID PLASTIC, HDPE URINAL, PARTITIONS, REF: 12/2-A9.41
GB1	Bobrick	B-6806-36	1 1/2" DIAMETER STAINLESS STEEL GRAB BAR
GB2	Bobrick	B-6806-48	1 1/2" DIAMETER STAINLESS STEEL GRAB BAR
M1	Bobrick	B-165 1830	MIRROR WITH STAINLESS STEEL CHANNEL FRAME
S1	Bobrick Washroom Equipment, Inc.	B-270	Bobrick B-270 Contura Series Surface Mounted Sanitary Napkin Disposal
SD1	SC JOHNSON	TPB1LDS	PROLINE 1L DISPENSER TRANSPARENT BLACK W/ CHROME, 1 LITER
TP1	Scranton	Hiney Hiders	WALL HUNG WATER AND FIRE RESISTANT, SOLID PLASTIC, HDPE URINAL, PARTITIONS, REF: 12/2-A9.41
TT1	Bobrick Washroom Equipment, Inc.	B-2888	Bobrick B-2888 Classic Series Surface Mounted Multi-roll Toilet Tissue Dispenser

GENERAL NOTES

1. REFER TO FINISH PLAN AND FINISH SCHEDULE 2A2.02 FOR MORE INFO.
2. LOCATE FLUSH VALVES AT WIDE SIDE OF STALL/SPACE.
3. INSTALL (1) COAT HOOK CENTERED ON THE BACK OF EACH PARTITION DOOR 40" A.F.F. AT ACCESSIBLE STALLS, 72" AT NON-ACCESSIBLE STALLS.
4. REFER TO 2G.031 FOR ALL CODE REQUIRED RESTROOM CLEARANCES.
5. REFERENCE PLUMBING FOR ADDITIONAL INFORMATION ON NEW FIXTURES AND INFRASTRUCUTRE CHANGES TO SUPPORT NEW FIXTURE TYPES AND LOCATIONS.

REQUIRED MOUNTING HEIGHTS

		ELEMENTARY 1 AGES 9-12 (INCHES)
A	TOILET CENTERING FROM WALL	15-18
B	TOILET/URINAL FLUSH HANDLE HEIGHT	44 MAX
C	TOILET PARTITION TOE CLEARANCE	AS SHOWN IN DETAIL 08/G0.31
D	TOILET SEAT HEIGHT / DIM. TO TOP OF SEAT	15-17
E	GRAB BAR HEIGHT	25-27
F	TISSUE DISPENSER HEIGHT	17-19
G	URINAL RIM HEIGHT	17 MAX
H	LAVATORY / SINK TOP HEIGHT	31 MAX
J	LAVATORY / SINK KNEE CLEARANCE	24 MIN
K	LAVATORY / SINK TOE CLEARANCE	9 MIN
L	DISPENSER/MIRROR HEIGHT	40 MAX*
	DRINKING FOUNTAIN BUBBLER HEIGHT	30 MAX
	DRINKING FOUNTAIN KNEE CLEARANCE	27 MIN
	DRINKING FOUNTAIN BUBBLER HEIGHT STANDING	38 - 42 A.F.F.

NOTES:
1 DIMMENSIONS BASED ON CBC TABLE 11B 604.9
* REFERENCE INTERIOR ELEVATIONS FOR MOUNTING LOCATION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	02/20/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

ENLARGED RESTROOM PLANS - BLDG A

2AA4.01

KEYNOTES

02.32	(E) WINDOW TO REMAIN
09.02	PAINT GYP WALL THROUGHOUT, P-1.
09.17	PAINT INTERIOR AND EXTERIOR OF (E) DOOR AND FRAME P-3, SEMI-GLOSS.
11.01	REINSTALL PROJECTOR SCREEN
11.02	REINSTALL WHITEBOARD RE: 18/2AF9.10 AND PROJECTOR SCREEN RE: 20/2AF9.10
12.01	NEW MANUAL WINDOW SHADES

ALTERNATES

ALT-1-A	(ADD ALT) CASEWORK: REFINISH EXISTING WOOD, STRIP, SAND AND VARNISH. REPLACE DAMAGED HARDWARE WITH LIKE IN KIND, TYP. ALONG WALL.
ALT-1-B	(ADD ALT) SAND AND PREPARE ALL BOOKCASES FOR NEW FINISH, P-1.

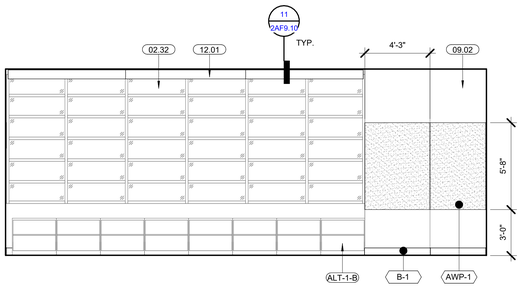
LEGEND

?
FINISH TAG
FINISH CODE, SEE SHEET 2A2.02 FOR FINISH SCHEDULE

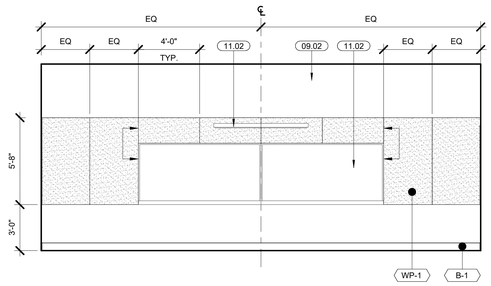
ALIGN FINISHES

GENERAL NOTES

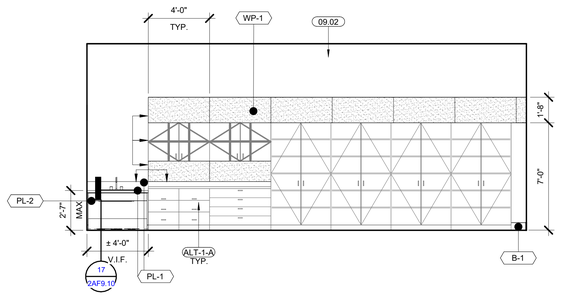
1. RE: SHEET 2A2.02 FOR FINISH SCHEDULE



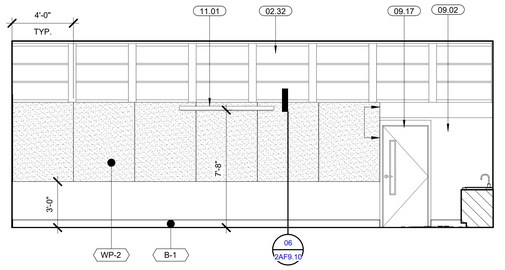
ADD ALT 1 - TYPICAL CLASSROOM - NORTH | 1/4" = 1'-0" | 2AA5.01 | 17



ADD ALT 1 - TYPICAL CLASSROOM - EAST | 1/4" = 1'-0" | 2AA5.01 | 13



ADD ALT 1 - TYPICAL CLASSROOM - WEST | 1/4" = 1'-0" | 2AA5.01 | 18



ADD ALT 1 - TYPICAL CLASSROOM - SOUTH | 1/4" = 1'-0" | 2AA5.01 | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2022
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

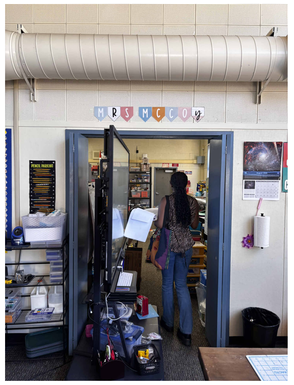
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
95% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

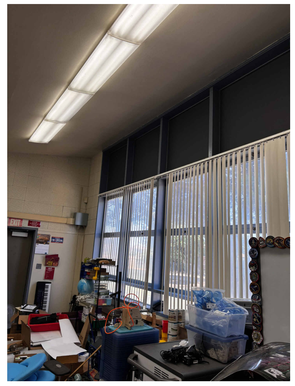
Job Number	31942
Checked By	Checker
Scale	As indicated

INTERIOR ELEVATIONS - BLDG A

2AA5.01

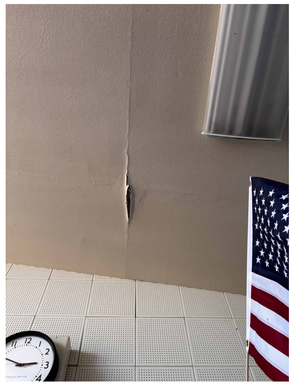


EXISTING DOOR BETWEEN CLASSROOMS

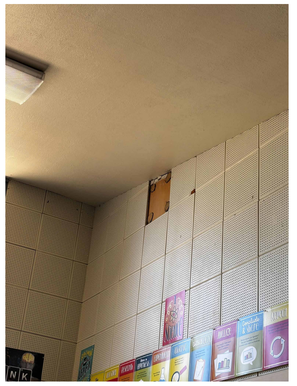


EXISTING WINDOW SHADES AND FILM

EXISTING CLASSROOM - OVERALL

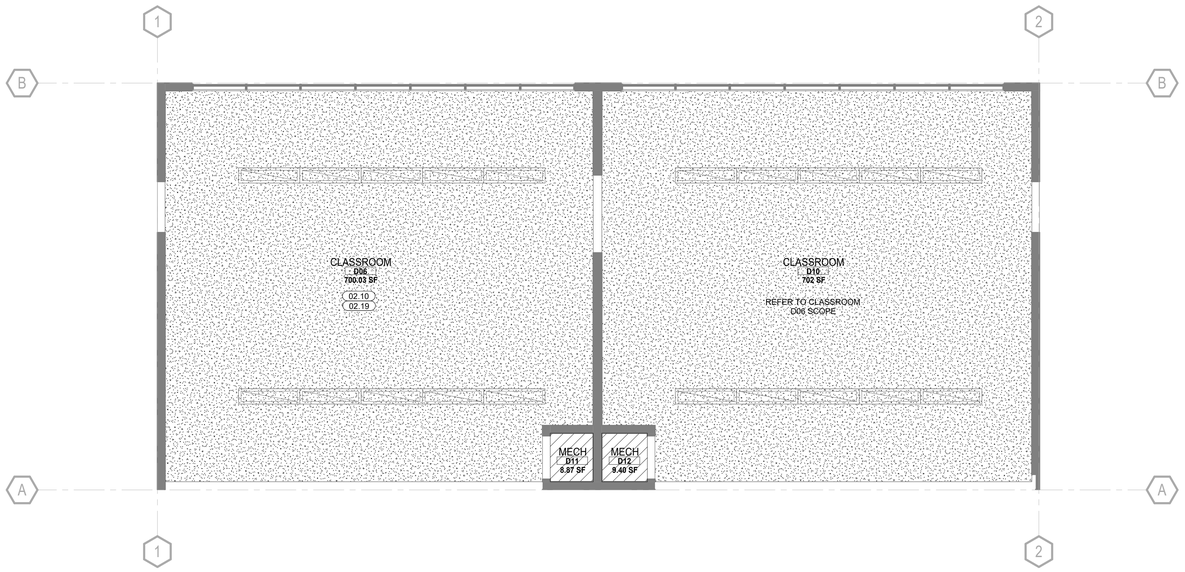


CEILING LEAK ISSUE

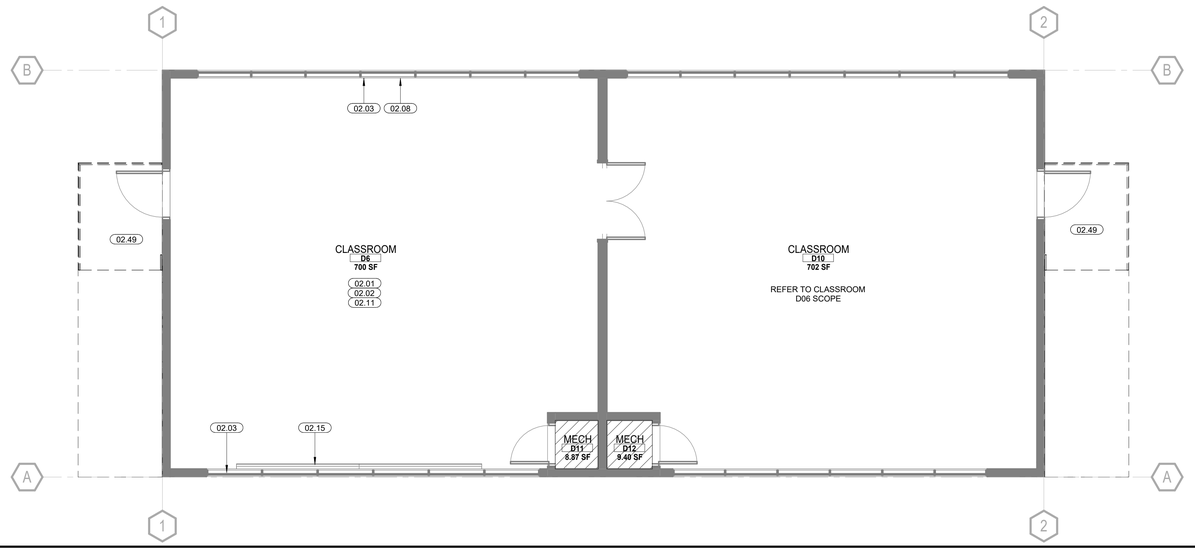


EXISTING 1X1 GLUE ON TILES

EXISTING PHOTOS | 12" = 1'-0" | 2AD2.01 | 08



ADD ALT 2 - BUILDING D - DEMOLITION REFLECTED CEILING PLAN | 1/4" = 1'-0" | 2AD2.01 | 07



ADD ALT 2 - BUILDING D - DEMOLITION PLAN | 1/4" = 1'-0" | 2AD2.01 | 05

KEYNOTES

02.01	DEMOLITION: REMOVE (E) FLOORING AND BASE THROUGHOUT, U.N.O. AT CARPET REMOVAL, MACHINE SCRAPE GLUE/ADHESIVE OFF FLOOR.
02.02	DEMOLITION: REMOVE (E) VINYL TACK PANELS THROUGHOUT.
02.03	DEMOLITION: REMOVE (E) WINDOW SHADES. PATCH AND REPAINT WHERE OLD SHADES REMOVED.
02.08	REMOVE (E) WINDOW FILM.
02.10	(E) LIGHTING TO REMAIN. REMOVE FOR ANY CEILING WORK AND REINSTALL IN PLACE.
02.11	(DEMOLITION): REMOVE ALL (E) 1" X 1" GLUE-ON TILES AND ADHESIVE ON ALL WALLS. PREPARE (E) GYP FOR NEW PAINT.
02.15	SALVAGE (E) WHITE BOARDS, REMOVE AND REINSTALL
02.19	(E) GWB CEILING TO REMAIN, PROTECT IN PLACE. PATCH AND REPAIR AS NEEDED.
02.49	(E) RAMP AND GUARDRAIL TO BE DEMOLISHED. SEE INCREMENT 1 CIVIL & LANDSCAPE DRAWINGS.

DEMOLITION RCP LEGEND

(E) GYP TO REMAIN IN PLACE

NOT IN SCOPE OF WORK

(E) 1 X 4 LIGHTING FIXTURE TO REMAIN IN PLACE

DEMOLITION RCP GENERAL NOTES

1. THIS REFLECTIVE CEILING PLAN IS TO PROVIDE CEILING FINISH DEMOLITION SCOPE ONLY. FIXTURES SHOWN ARE FOR COORDINATION PURPOSES ONLY. SEE ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY DRAWINGS FOR MORE SPECIFIC INFORMATION ON DEMOLITION SCOPE RELATED TO THOSE DICIPLINES.
2. EXISTING CEILING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT INCLUDING BUT NOT LIMITED TO ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY, SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES AT NO ADDITIONAL COST TO OWNER.

DEMOLITION PLAN LEGEND

NOT IN SCOPE OF WORK

EXISTING WALL TO REMAIN

EXISTING DOOR TO REMAIN

FLOOR PLAN GENERAL NOTES

1. REFER TO 2G0.31 AND 2G0.32 FOR TYP ACCESSIBILITY REQUIREMENTS.
2. FOR TYP SWITCH & DEVICE ALIGNMENTS, REFER TO 18/2G0.32

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

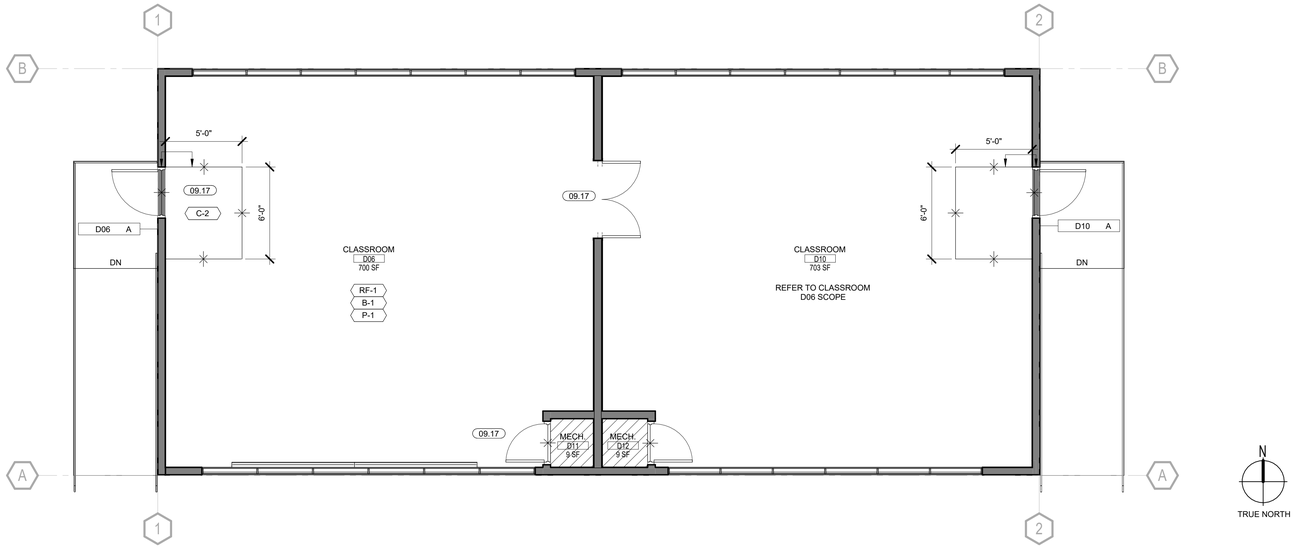
Job Number	31942
Checked By	Checker
Scale	As indicated

DEMOLITION FLOOR PLAN & RCP - BLDG D - ADD ALT SCOPE

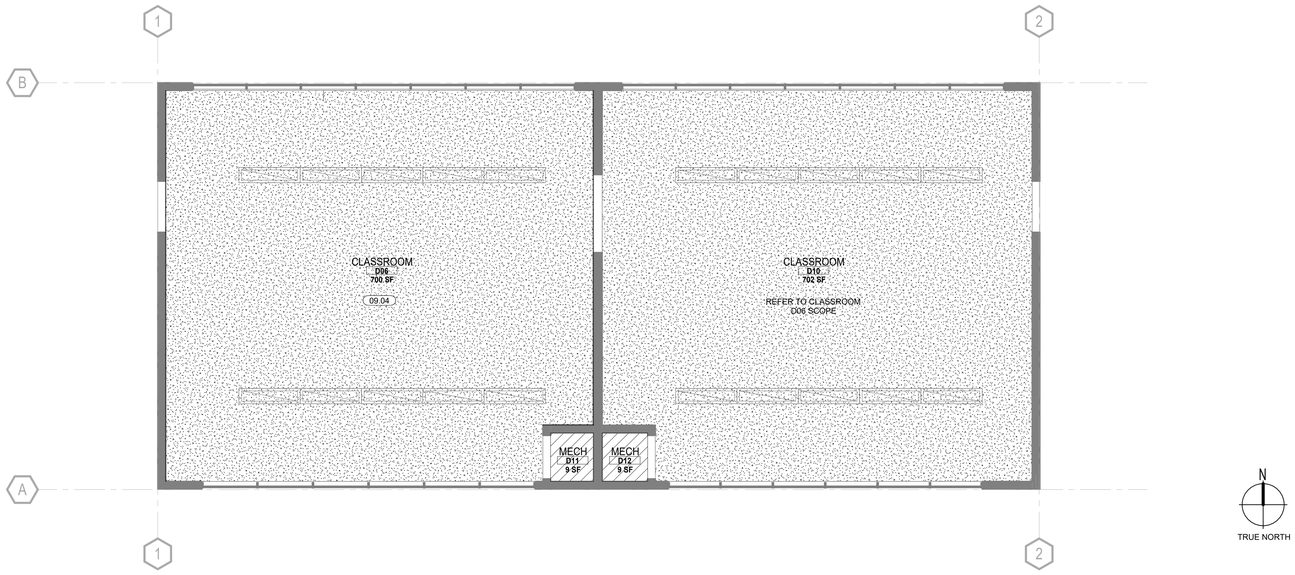
2AD2.01

FINISH SCHEDULE		
TAG	**DESCRIPTION**	**SPECIFICATION**
B-1	RUBBER BASE	MFR. BURKE OR JOHNSONITE STYLE: 6" STRAIGHT AT CARPET COLOR: BLACK NOTES:
C-1	CARPET TILE	MFR. MOHAWK COLLECTION: INCLUSION COLOR - I0553 GEMSCAPE COLOR: 00585 - MARBLE SIZE 24" X 24" INSTALLATION: TBD
C-2	WALK-OFF CARPET TILE	MFR. MOHAWK FIRST STEP II COLOR: 989 OBSIDIAN SIZE: 24" X 24" INSTALLATION: TBD
EP-1	EPOXY FLOORING & WAINSCOT	MFR. DUR-A-FLEX INC. COLLECTION: DUR-A-QUARTZ COLOR: TBD FINISH: NON-GLOSS, SLIP RESISTANT NOTES: INTEGRAL COVE BASE
P-1	PAINT	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE BONE
P-2	ACCENT PAINT	MFR. SHERWIN WILLIAMS COLOR: FRANK BLUE SW 6967
P-3	PAINT DOORS & FRAMES	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE PEWTER CAST
PL-1	PLASTIC LAMINATE COUNTER	MFR. WILSONART COLLECTION: STANDARD LAMINATE COLOR: GRAY GLACE 4142-60 FINISH: MATTE FINISH
RF-1	RESILIENT FLOORING	MFR. PATCRAFT COLLECTION: WOOD + WEALD COLOR CYPRESS V-2 00750 THICKNESS: 2.2 MM
VCT	VINYL COMPOSITION TILE	MFR. ARMSTRONG STYLE: CLOSEST MATCH TO EXISTING COLOR: TBD
WP-1	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: BONE 4251-17 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS,VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.
WP-2	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: ROYAL 4521-16 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS,VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.

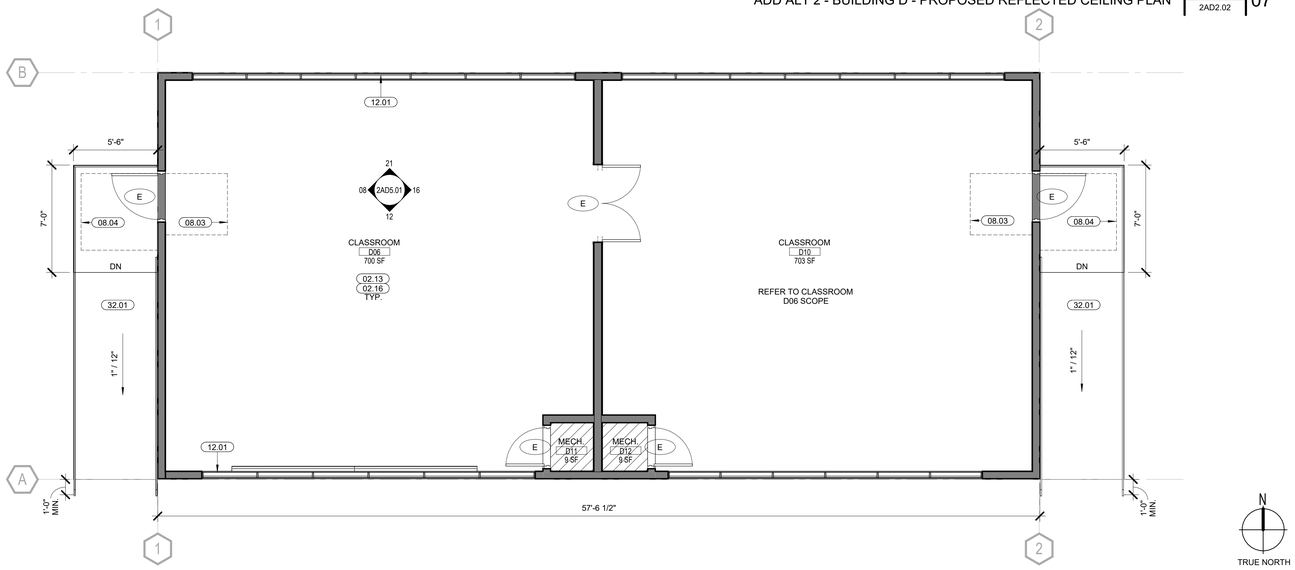
SIGNAGE SCHEDULE BUILDING D						
Room	**Sign Type**	**Text**	**Detail Number**	**Mounting Location**	**Braille**	**Comments**
D06	A	CLASSROOM D01	18/2A10.23	EXTERIOR WALL	Yes	
D10	A	CLASSROOM D02	18/2A10.23	EXTERIOR WALL	Yes	



ADD ALT 2 - BUILDING D - PROPOSED FINISH FLOOR PLAN | 1/4" = 1'-0" | 2AD2.02 | 08



ADD ALT 2 - BUILDING D - PROPOSED REFLECTED CEILING PLAN | 1/4" = 1'-0" | 2AD2.02 | 07



ADD ALT 2 - BUILDING D - PROPOSED FLOOR PLAN | 1/4" = 1'-0" | 2AD2.02 | 05

KEYNOTES

02.13	(WALL): INSTALL NEW 1-1/2" FABRIC WRAPPED PANELS.
02.16	REPAINT (E) GYP WALL THROUGHOUT, P-1.
08.03	DOOR CLEARANCE 48" X DOOR + 12"
08.04	DOOR CLEARANCE 60 "X DOOR + 24"
09.04	PAINT EXISTING GYP CEILING P-1
09.17	PAINT INTERIOR AND EXTERIOR OF (E) DOOR AND FRAME P-3, SEMI-GLOSS.
12.01	NEW MANUAL WINDOW SHADES
32.01	NEW RAMP AND GUARDRAILS, SEE INC 1 CIVIL AND LANDSCAPE DRAWINGS

FINISH LEGEND

NOT IN SCOPE OF WORK

? — FINISH TAG, SEE FINISH SCHEDULE 2AD2.02
FINISH CODE, SEE FINISH SCHEDULE 2AD2.02

FLOOR TRANSITION, SEE DETAIL 01/2AF9.10 FOR VARIOUS CONDITIONS AND SPECIFICATIONS

FINISH GENERAL NOTES

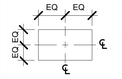
1. REFER TO FINISH SCHEDULE FOR MORE INFORMATION.
2. REFER TO INTERIOR ELEVATIONS FOR MORE CLARIFICATIONS ON INTERIOR FINISHES.
3. ALL GYPSUM BOARD WALLS VISIBLE TO VIEW SHALL BE LEVEL #4 FINISH (SMOOTH), TYP.
4. PAINT ALL CLG./WALL ACCESS PANELS TO MATCH ADJACENT SURFACE.
5. SEE DOOR & FINISH SCHEDULE FOR DOOR, FRAME, & THRESHOLD FINISHES
6. TYPICAL FLOOR TRANSITIONS ARE LOCATED AT THE CENTERLINE OF THE DOOR OR AT THE CENTERLINE IN THE OPENING WHERE NO DOOR IS PRESENT, U.N.O
7. CONTRACTOR TO PERFORM MOISTURE TESTING PRIOR TO THE ORDER OF THE MATERIALS FOR VERIFICATION OF COMPLIANCE WITH MANUFACTURERS WARRANTIES AND MAKE REQUIRED REMEDIATION TO MEET MANUFACTURES WARRANTIES. REFER TO SPECIFICATION 090561

RCP LEGEND

NOT IN SCOPE OF WORK

(E) FRAMED GYP BD CLG, PAINT P-1

9'-0" — TYPICAL CEILING HEIGHT, U.N.O.
XXX-1 — TYPICAL CEILING TYPE, U.N.O.



CENTER DEVICES ON CEILING TILE - TYPICAL INCLUDED BUT NOT LIMITED TO THE FOLLOWING: SPRINKLER, FIRE STROBE, SPEAKERS, DAYLIGHT AND OCCUPANCY SENSORS.

RCP GENERAL NOTES

1. FOR ALL LIGHTING SPECIFICATIONS, REFER TO LIGHTING AND ELECTRICAL DRAWINGS
2. REFER TO MECHANICAL DRAWINGS FOR SUPPLY AND RETURN AIR SPECIFICATIONS
3. SEE AV AND SECURITY DRAWINGS FOR ADDITIONAL CEILING ELEMENTS

FLOOR PLAN LEGEND

NOT IN SCOPE OF WORK

EXISTING WALL TO REMAIN

EXISTING DOOR TO REMAIN

FLOOR PLAN GENERAL NOTES

1. REFER TO 2G0.31 AND 2G0.32 FOR TYP ACCESSIBILITY REQUIREMENTS.
2. FOR TYP SWITCH & DEVICE ALIGNMENTS, REFER TO 18/2G0.32

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
12/DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

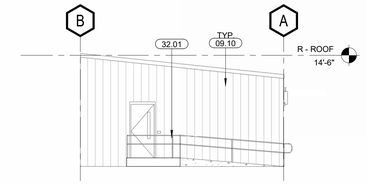
Job Number	31942
Checked By	Checker
Scale	As indicated

FLOOR PLAN, RCP, & FINISH PLAN - BLDG D - ADD ALT SCOPE

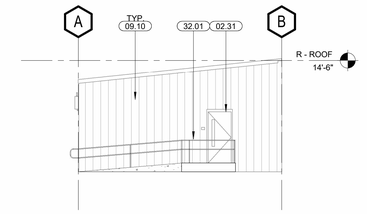
2AD2.02

KEYNOTES

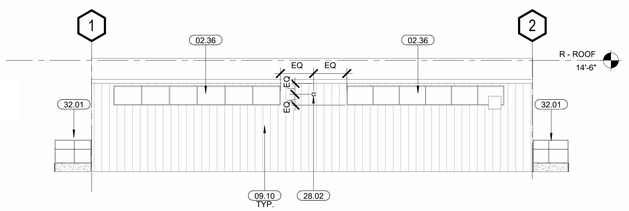
02.31	(E) DOOR TO REMAIN
02.32	(E) WINDOW TO REMAIN
02.36	(E) CLERESTORY TO REMAIN
09.10	PAINT ALL (E) EXTERIOR BUILDING ELEMENTS, INCLUDING WALLS, DOORS, FRAMES, AND TRIMS. DO NOT PAINT (E) ALUMINUM WINDOW FRAMES
28.02	FIRE ALARM DEVICE
32.01	NEW RAMP AND GUARDRAILS, SEE INC 1 CIVIL AND LANDSCAPE DRAWINGS



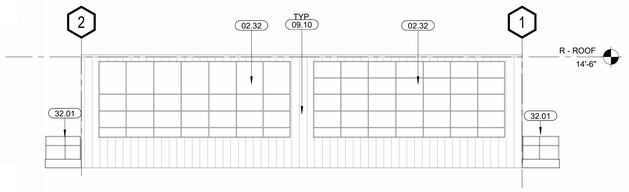
EXT ELEVATION - WEST | 1/8" = 1'-0" | 2AD3.01 | 08



EXT ELEVATION - EAST | 1/8" = 1'-0" | 2AD3.01 | 07



EXT ELEVATION - SOUTH | 1/8" = 1'-0" | 2AD3.01 | 06



EXT ELEVATION - NORTH | 1/8" = 1'-0" | 2AD3.01 | 05

LEGEND

POLYMER MODIFIED FIBERGLASS REINFORCED PLASTER (PL-1); PAINTED

EXISTING PANEL SIDING

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMEMTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

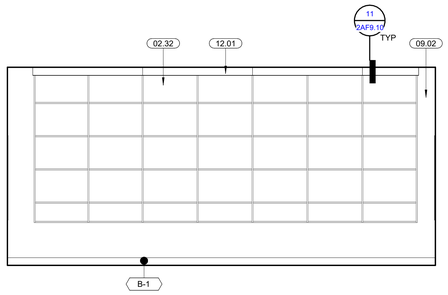
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD'S	03/20/2026
DSA SUBMITTAL	04/24/2026

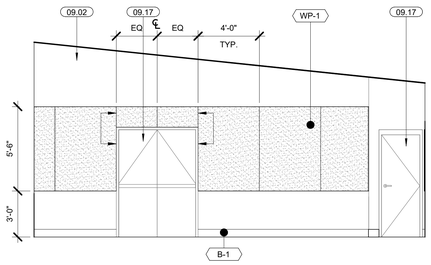
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

EXTERIOR ELEVATIONS
- BLDG D

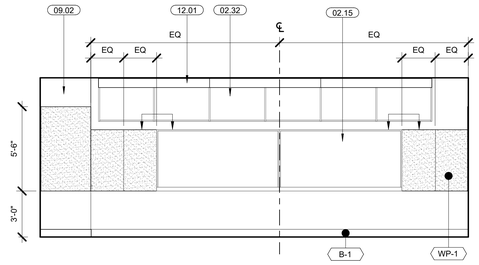
2AD3.01



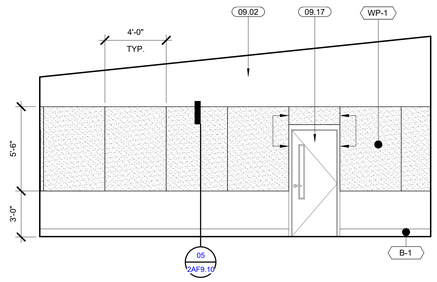
ADD ALT 2 - CLASSROOM #6 - NORTH | 1/4" = 1'-0" | 2AD5.01 | 21



ADD ALT 2 - CLASSROOM #6 - EAST | 1/4" = 1'-0" | 2AD5.01 | 16



ADD ALT 2 - CLASSROOM #6 - SOUTH | 1/4" = 1'-0" | 2AD5.01 | 12



ADD ALT 2 - CLASSROOM #6 - WEST | 1/4" = 1'-0" | 2AD5.01 | 08

KEYNOTES

02.15	SALVAGE (E) WHITE BOARDS, REMOVE AND REINSTALL
02.32	(E) WINDOW TO REMAIN
09.02	PAINT GYP WALL THROUGHOUT, P-1.
09.17	PAINT INTERIOR AND EXTERIOR OF (E) DOOR AND FRAME P-3, SEMI-GLOSS.
12.01	NEW MANUAL WINDOW SHADES

FINISH LEGEND

NOT IN SCOPE OF WORK

? — FINISH TAG, SEE FINISH SCHEDULE 2AD2.02

FINISH CODE, SEE FINISH SCHEDULE 2AD2.02

FLOOR TRANSITION, SEE DETAIL 01/2AF9.10 FOR VARIOUS CONDITIONS AND SPECIFICATIONS

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMEMTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

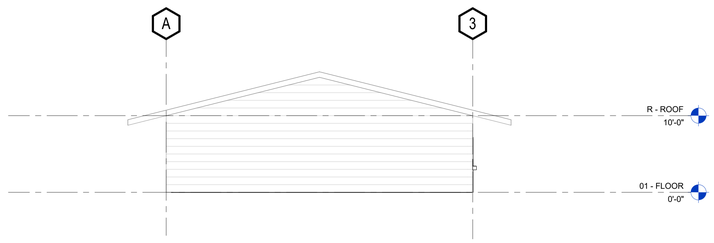
Job Number	31942
Checked By	Checker
Scale	As indicated

INTERIOR ELEVATIONS

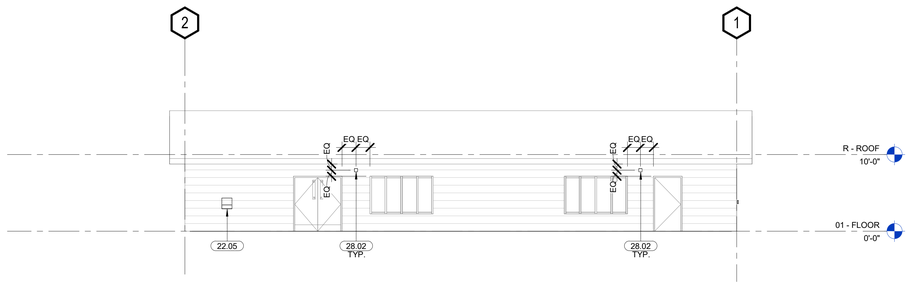
2AD5.01

EXT ELEVATION - WEST | 1/8" = 1'-0" | 2AE3.01 | 08

EXT ELEVATION - SOUTH | 1/8" = 1'-0" | 2AE3.01 | 07



EXT ELEVATION - EAST | 1/8" = 1'-0" | 2AE3.01 | 06



EXT ELEVATION - NORTH | 1/8" = 1'-0" | 2AE3.01 | 05

KEYNOTES

22.05	EXISTING DRINKING FOUNTAIN TO REMAIN, NOT IN SCOPE
28.02	FIRE ALARM DEVICE

LEGEND

EXISTING PLASTER TO REMAIN

EXISTING SIDING TO REMAIN

GENERAL NOTES

1. ROOF ASSEMBLY TO BE MIN R-11.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2022
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

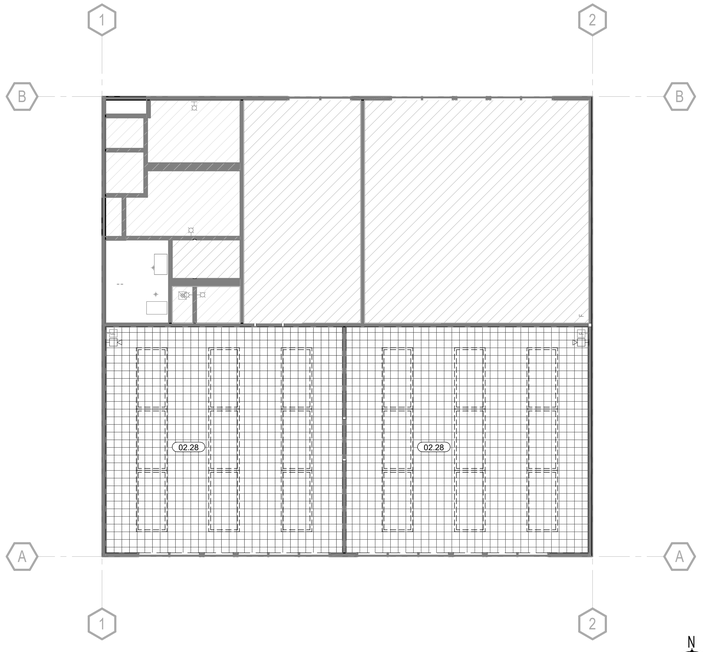
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

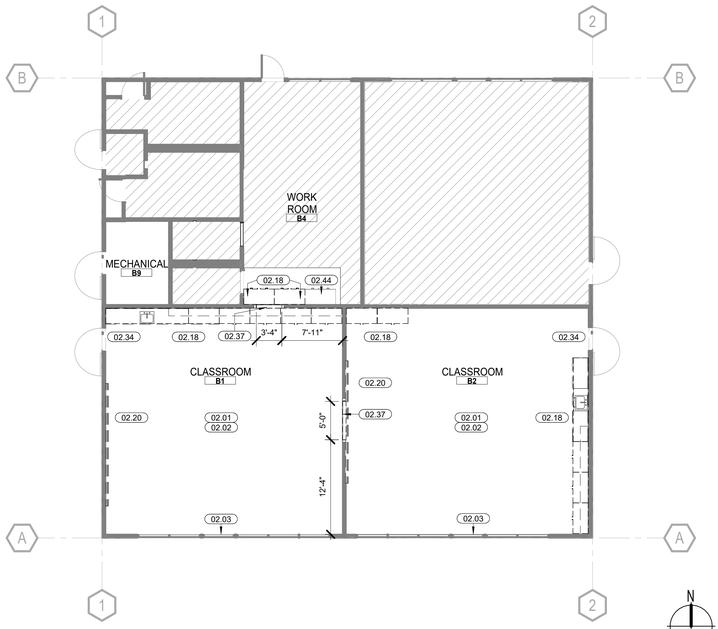
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

EXTERIOR ELEVATIONS
- BLDG E

2AE3.01



BUILDING F - DEMOLITION REFLECTED CEILING PLAN | 1/8" = 1'-0" | 2AF2.01 | 07



BUILDING F - DEMOLITION FLOOR PLAN | 1/8" = 1'-0" | 2AF2.01 | 05

KEYNOTES

02.01	DEMOLITION: REMOVE (E) FLOORING AND BASE THROUGHOUT. U.N.O. AT CARPET REMOVAL, MACHINE SCRAPE GLUE/ADHESIVE OFF FLOOR.
02.02	DEMOLITION: REMOVE (E) VINYL TACK PANELS THROUGHOUT.
02.03	DEMOLITION: REMOVE (E) WINDOW SHADES. PATCH AND REPAINT WHERE OLD SHADES REMOVED.
02.18	DEMOLITION: REMOVE (E) CASEWORK IN ITS ENTIRETY.
02.20	REMOVE (E) WHITE BOARDS. SALVAGE AND RETURN TO DISTRICT.
02.28	DEMOLISH AND REMOVE ALL EXISTING GLUE ON CEILING TILE, ASSOCIATED ATTACHED GYP CEILING, AND LIGHTING THROUGHOUT
02.34	REMOVE (E) EXTERIOR DOOR THRESHOLDS - TYP AT BLDG F
02.37	DEMOLISH PORTION OF (E) WALL TO CREATE NEW OPENING.
02.44	(E) CASEWORK TO REMAIN. PROTECT IN PLACE.

DEMOLITION RCP LEGEND

- NOT IN SCOPE OF WORK
- DEMOLISH DIRECT GLUE ACT CLG, PREPARE FOR NEW CEILING
- (E) GYP TO REMAIN IN PLACE
- DEMOLISH EXISTING LIGHT FIXTURES

DEMOLITION RCP GENERAL NOTES

1. THIS REFLECTIVE CEILING PLAN IS TO PROVIDE CEILING FINISH DEMOLITION SCOPE ONLY. FIXTURES SHOWN ARE FOR COORDINATION PURPOSES ONLY. SEE ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY DRAWINGS FOR MORE SPECIFIC INFORMATION ON DEMOLITION SCOPE RELATED TO THOSE DICIPLINES.
2. EXISTING CEILING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT INCLUDING BUT NOT LIMITED TO ELECTRICAL, MECHANICAL, TECHNOLOGY AND SECURITY, SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES AT NO ADDITIONAL COST TO OWNER.
3. REFERENCE ELECTRICAL LIGHTING PLANS FOR SCOPE OF DEMOLITION OF LIGHTING.

DEMOLITION PLAN LEGEND

- NOT IN SCOPE OF WORK
- EXISTING WALL TO BE DEMOLISHED
- EXISTING WALL TO REMAIN
- EXISTING DOOR TO REMAIN
- DOOR TO BE DEMOLISHED
- MILLWORK TO BE DEMOLISHED

DEMOLOTION PLAN GENERAL NOTES

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES TO THE ARCHITECT.
2. NO DEMOLITION TO BEGIN UNTIL PLANS INCLUDING DEMOLITION WORK HAVE BEEN APPROVED BY DSA.
3. EXISTING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES.
4. AT AREAS OF DEMOLITION, ALL FLOOR FINISHES (I.E. CARPET, SHEET VINYL, VCT, ETC.) SHALL BE REMOVED. FLOOR SURFACE SHALL BE STRIPPED AND LEFT CLEAN AND SMOOTH. DO NOT DISTURN (E) CONCRETE SLAB WHILE EMOLISHING FLOORING, U.N.O.
5. PROTECT ALL AREAS NOT SCHEDULES FOR DEMOLITION/MODIFICATION.
6. WHERE DEMOLITION OCCURS, PATCH, SAND, PREP, TEXTURE, AND REPAIR REMAINING CONSTRUCTION TO MATCH EXISTING FINISH.
7. ALL SURFACES THAT ARE SCHEDULED TO RECEIVE NEW FINISHES SHALL BE CLEANED AND PREPARED ACCORDINGLY AND APPROPRIATELY.
8. ALL PHYSICAL STRUCTURES AND FEATURES OF THE BUILDING THAT ARE NOT ILLUSTRATED BY A 'DASHED' LINE OR OTHERWISE SPECIFICALLY DESIGNATED TO BE REMOVED, SHALL REMAIN 'AS IS'.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	02/20/2026
DSA SUBMITTAL	04/24/2026

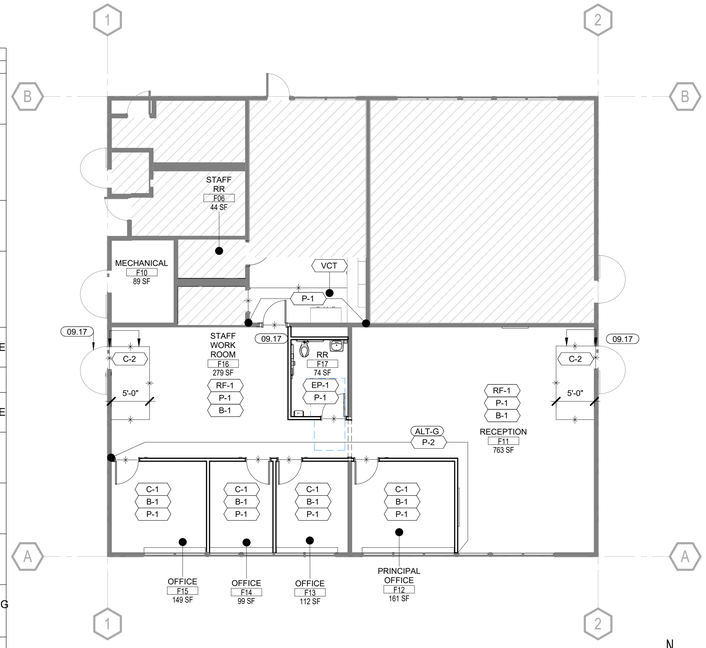
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

DEMO FLOOR PLAN & DEMO RCP - BLDG F

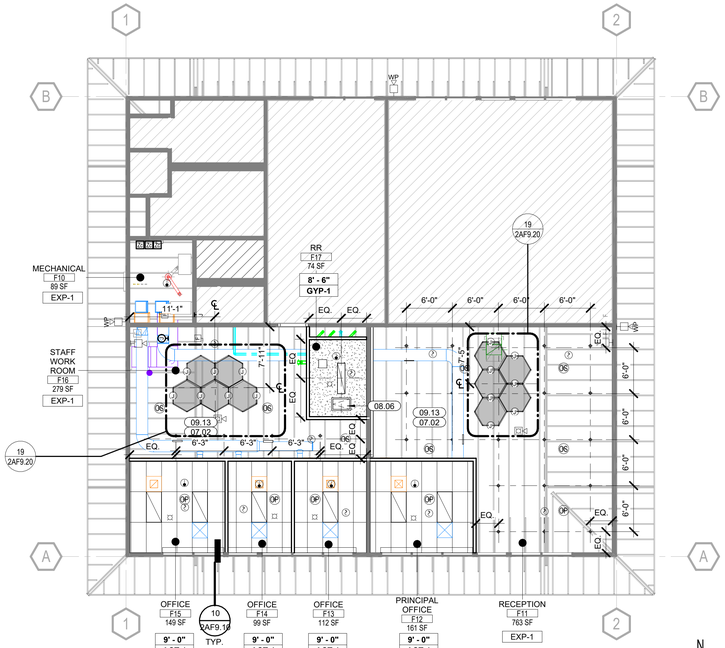
2AF2.01

FINISH SCHEDULE

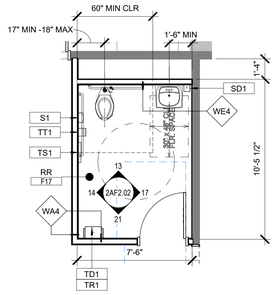
TAG	DESCRIPTION	SPECIFICATION
B-1	RUBBER BASE	MFR. BURKE OR JOHNSONITE STYLE: 6" STRAIGHT AT CARPET COLOR: BLACK NOTES:
C-1	CARPET TILE	MFR. MOHAWK COLLECTION: INCLUSION COLOR - I0553 GEMSCAPE COLOR: 00585 - MARBLE SIZE 24" X 24" INSTALLATION: TBD
C-2	WALK-OFF CARPET TILE	MFR. MOHAWK FIRST STEP II COLOR: 989 OBSIDIAN SIZE 24" X 24" INSTALLATION: TBD
EP-1	EPOXY FLOORING & WAINSCOT	MFR. DUR-A-FLEX INC. COLLECTION: DUR-A-QUARTZ COLOR: TBD FINISH: NON-GLOSS, SLIP RESISTANT NOTES: INTEGRAL COVE BASE
P-1	PAINT	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE BONE
P-2	ACCENT PAINT	MFR. SHERWIN WILLIAMS COLOR: FRANK BLUE SW 6967
P-3	PAINT DOORS & FRAMES	MFR. SHERWIN WILLIAMS COLOR: COLOR MATCH KELLY MOORE PEWTER CAST
PL-1	PLASTIC LAMINATE COUNTER	MFR. WILSONART COLLECTION: STANDARD LAMINATE COLOR: GRAY GLACE 4142-60 FINISH: MATTE FINISH
PL-2	PLASTIC LAMINATE COUNTER	MFR. WILSONART COLLECTION: STANDARD LAMINATE COLOR: NATURAL RIFT 7954-38 FINISH: FINE VELVET FINISH
RF-1	RESILIENT FLOORING	MFR. PATCRAFT COLLECTION: WOOD + WEALD COLOR CYPRESS V-2 00750 THICKNESS: 2.2 MM
VCT	VINYL COMPOSITION TILE	MFR. ARMSTRONG STYLE: CLOSEST MATCH TO EXISTING COLOR: TBD
WP-1	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: BONE 4251-17 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS.VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.
WP-2	WALL PANEL FABRIC WRAPPED TACKABLE ACOUSTICAL	MFR. KOROSEAL STYLE: LINDEN II COLOR: ROYAL 4521-16 NOTES: KOROSEAL SOUND DESIGNS™ CORE 1" THICK ON Z CLIPS.VINYL TO BE MICROPERFORATED FOR ACOUSTIC TRANSPARENCY.



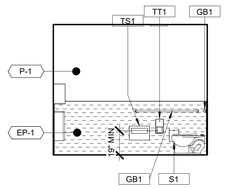
BUILDING F - FINISH PLAN | 1/8" = 1'-0" | 2AF2.02 | 15



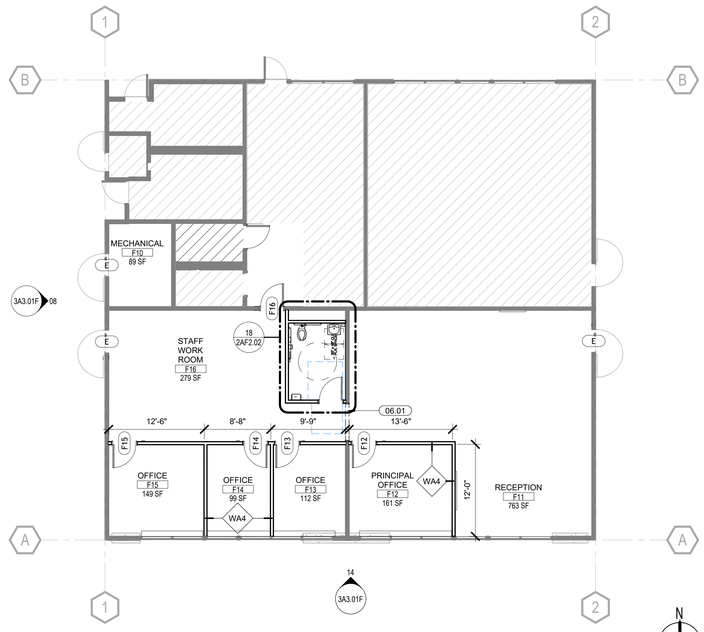
BUILDING F - REFLECTED CEILING PLAN | 1/8" = 1'-0" | 2AF2.02 | 07



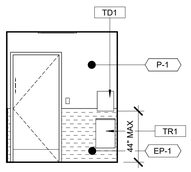
ENLARGED FLOOR PLAN - RR F17 | 1/4" = 1'-0" | 2AF2.02 | 18



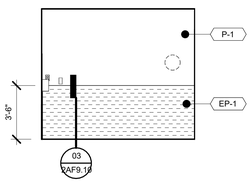
STAFF RR - WEST | 1/4" = 1'-0" | 2AF2.02 | 14



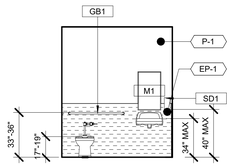
BUILDING F - FLOOR PLAN | 1/8" = 1'-0" | 2AF2.02 | 05



STAFF RR - SOUTH | 1/4" = 1'-0" | 2AF2.02 | 21



STAFF RR - EAST | 1/4" = 1'-0" | 2AF2.02 | 17



STAFF RR - NORTH | 1/4" = 1'-0" | 2AF2.02 | 13

RESTROOM ACCESSORIES SCHEDULE

TAG #	MANUFACTURER	MODEL #	DESCRIPTION
GB1	Bobrick	B-6806-36	1 1/2" DIAMETER STAINLESS STEEL GRAB BAR, REF: 13/2AF9.10
GB2	Bobrick	B-6806-48	1 1/2" DIAMETER STAINLESS STEEL GRAB BAR, REF: 13/2AF9.10
M1	Bobrick	B-165 1830	MIRROR WITH STAINLESS STEEL CHANNEL FRAME
S1	Bobrick Washroom Equipment, Inc.	B-270	Bobrick B-270 Contura Series Surface Mounted Sanitary Napkin Disposal
SD1	SC JOHNSON	TPB1LDS	PROLINE 1L DISPENSER TRANSPARENT BLACK W/ CHROME, 1 LITER
TD1	TORK	84TR	PAPER HAND TOWEL ROLL DISPENSER WITH MANUAL ARMLEVER
TR1	Bobrick Washroom Equipment, Inc.	B-277	Bobrick B-277 Contura Series Surface Mounted Waste Receptacle
TS1	Bobrick Washroom Equipment, Inc.	B-221	Bobrick B-221 Classic Series Surface Mounted Seat Cover Dispenser
TT1	Bobrick Washroom Equipment, Inc.	B-2888	Bobrick B-2888 Classic Series Surface Mounted Multi-roll Toilet Tissue Dispenser

KEYNOTES

06.01	NEW FRAMED OPENING, 5'-0" W X 9'-0" H
07.02	BATT INSULATION BETWEEN EXISTING JOISTS - R-30 MIN. COVER WITH WHITE ACOUSTIC SCRIM.
08.06	NEW 20 X 30 ACCESS PANEL
09.13	PAINT ALL STRUCTURAL ELEMENTS AND INFRASTRUCTURE BUT NOT LIMITED TO CONDUIT, MECHANICAL EQUIPMENT, AND PLUMBING, P-1.
09.17	PAINT INTERIOR AND EXTERIOR OF (E) DOOR AND FRAME P-3, SEMI-GLOSS.

ALTERNATES

ALT-G	(ADD ALT) WALLCOVERING, KOROSEAL - XAVIER, COLOR: MIST

FINISH PLAN LEGEND

- NOT IN SCOPE OF WORK
- FINISH TAG, SEE FINISH SCHEDULE - THIS SHEET
- FINISH CODE, SEE FINISH SCHEDULE - THIS SHEET
- FLOOR TRANSITION, SEE DETAIL 01 / 2AF9.10 FOR VARIOUS CONDITIONS AND SPECIFICATIONS
- FLOOR PATTERN DIRECTION

FINISH PLAN GENERAL NOTES

1. REFER TO FINISH SCHEDULE FOR MORE INFORMATION.
2. REFER TO INTERIOR ELEVATIONS FOR MORE CLARIFICATIONS ON INTERIOR FINISHES.
3. ALL GYPSUM BOARD WALLS VISIBLE TO VIEW SHALL BE LEVEL #4 FINISH (SMOOTH), TYP.
4. PAINT ALL CLG./WALL ACCESS PANELS TO MATCH ADJACENT SURFACE.
5. SEE DOOR & FINISH SCHEDULE FOR DOOR, FRAME, & THRESHOLD FINISHES.
6. TYPICAL FLOOR TRANSITIONS ARE LOCATED AT THE CENTERLINE OF THE DOOR OR AT THE CENTERLINE IN THE OPENING WHERE NO DOOR IS PRESENT, U.N.O
7. CONTRACTOR TO PERFORM MOISTURE TESTING PRIOR TO THE ORDER OF THE MATERIALS FOR VERIFICATION OF COMPLIANCE WITH MANUFACTURERS WARRANTIES AND MAKE REQUIRED REMEDIATION TO MEET MANUFACTURES WARRANTIES. REFER TO SPECIFICATION 090561.

RCP LEGEND

- NOT IN SCOPE OF WORK
- 2 X 4 ACT CLG
- FRAMED GYP BD CLG, PAINT P-1
- EXP-1: EXPOSED FRAMING
- 9'-0" — TYP CLG HEIGHT, UNO
- XXX-1 — TYP CLG TYPE, UNO
- CENTER DEVICES ON CLG TILE - TYP INCLUDED BUT NOT LIMITED TO THE FOLLOWING: SPRINKLER, FIRE STROBE, SPEAKERS, DAYLIGHT & OCCUPANCY SENSORS.
- EXP-1 — EXPOSED CEILING, COLORED INSULATION, PAINTED BEAMS AND PAINTED INFASTRUCUTRE P-1
- 2X4 LAY IN LED LIGHT FIXTURE
- 1 X 4 LIGHT FIXTURE
- CYLINDER PENDANT
- WALL MOUNTED LINEAR LIGHT FIXTURE
- PENDANT LIGHT FIXTURE

RCP GENERAL NOTES

1. FOR ALL LIGHTING SPECIFICATIONS, REFER TO LIGHTING AND ELECTRICAL DRAWINGS
2. CONFIRM MOUNTING HEIGHTS WITH ARCHITECT IN FIELD PRIOR TO INSTALLATIONS FOR ALL NON -RECESSED FIXTURES
3. REFER TO MECHANICAL DRAWINGS FOR SUPPLY AND RETURN AIR SPECIFICATIONS
4. SEE AV AND SECURITY DRAWINGS FOR ADDITIONAL CEILING ELEMENTS
5. NEW AND EXISTING GYP CEILING TO BE PAINTED P-1, U.N.O.

FLOOR PLAN LEGEND

- WA4 — **WALL TYPE.** LETTER INDICATES WALL TYPE. REFER TO SHEET 2AF9.01 FOR PARITION TYPES
- **STUD SIZE.** NUMBER INDICATES STUD SIZE. REFER TO SHEET 2AF9.01 FOR PARTITION TYPES
- NOT IN SCOPE OF WORK
- DENOTES MILLWORK - REFER TO INTERIOR ELEVATIONS
- EXISTING WALL TO REMAIN
- 101 — DOOR NUMBER TAG - SEE 2AF6.11 FOR DOOR SCHEDULE

FLOOR PLAN GENERAL NOTES

1. PROVIDE MOISTURE RESISTANT GYP BD IN ALL WET LOCATIONS, UNO.
2. REFER TO 2G0.31 AND G0.32 FOR TYP ACCESSIBILITY REQUIREMENTS.
3. FOR TYP SWITCH & DEVICE ALIGNMENTS, REFER TO 18/G0.32.
4. LOCATE NEW DOOR FRAME 4" MIN FROM ADJACENT FACE OF STUD, TYP, U.N.O.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

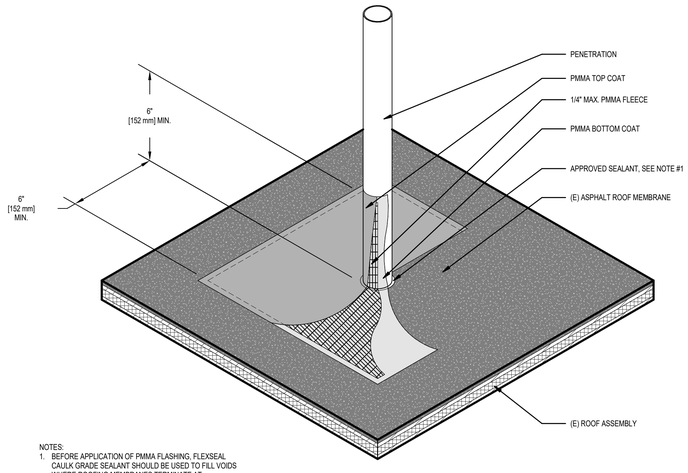
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/06/2026
DSA SUBMITTAL	04/24/2026

Revision	Date

Job Number	31942
Checked By	Checker
Scale	As indicated

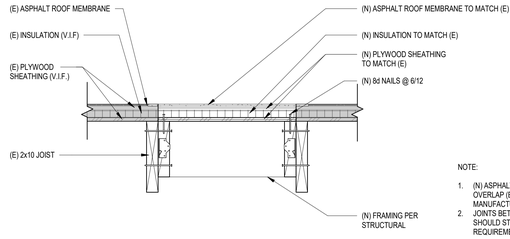
FLOOR PLAN, RCP, AND FINISH PLAN - BLDG F

2AF2.02



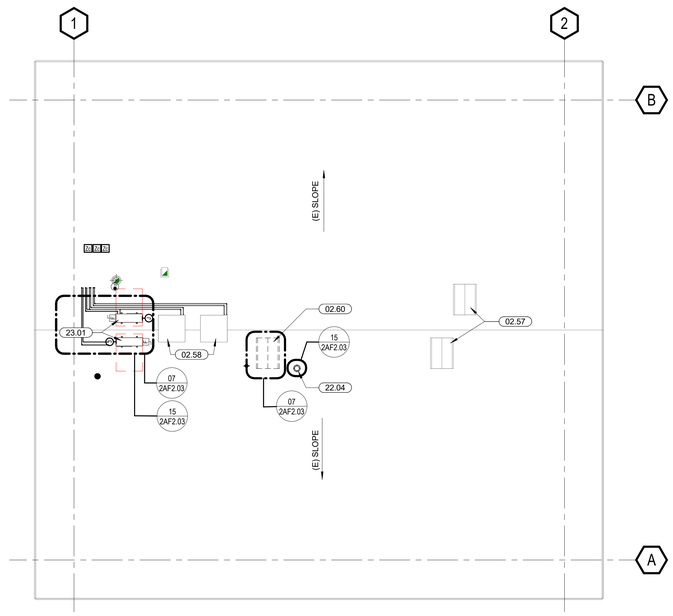
NOTES:
1. BEFORE APPLICATION OF PMMA FLASHING, FLEXSEAL CAULK GRADE SEALANT SHOULD BE USED TO FILL VOIDS WHERE ROOFING MEMBRANES TERMINATE AT PENETRATIONS.

ROOF PENETRATION FLASHING | 1 1/2" = 1'-0" | 15



NOTE:
1. (N) ASPHALT ROOF MEMBRANCE SHOULD OVERLAP (E) ASPHALT ROOF MEMBRANE PER MANUFACTURER REQUIREMENTS
2. JOINTS BETWEEN (N) AND (E) INSULATION SHOULD STAGGER TO MAINTAIN CODE REQUIREMENTS

ROOF INFILL | 1 1/2" = 1'-0" | 07



BUILDING F - ROOF PLAN | 1/8" = 1'-0" | 2AF2.03 | 05

KEYNOTES

02.57	(E) GRAVITY VENTILATORS, SEE MECHANICAL DRAWINGS
02.58	(E) VERTICAL FAN COILS, SEE MECHANICAL DRAWINGS
02.60	(E) GRAVITY RELIEF HOOD TO BE DEMOLISHED AND (E) ROOF TO BE INFILLED PER DETAIL 07/2AF2.03
22.04	NEW DUCT THRU ROOF - SEE PLUMBING DRAWINGS
23.01	NEW VERTICAL FAN COIL, SEE MECHANICAL DRAWINGS

GENERAL NOTES

1. BACKGROUND DRAWINGS ARE BASED ON ORIGINAL CONSTRUCTION DOCUMENTS, NOT AS-BUILT DRAWINGS. PLEASE VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT AN DISCREPANCIES TO THE ARCHITECT.
2. EXISTING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT SURFACES.
3. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES TO THE ARCHITECT.
4. PATCH AND REPAIR EXISTING ROOF AS REQUIRED.
5. ROOF ASSEMBLY TO BE MINIMUM R-11.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

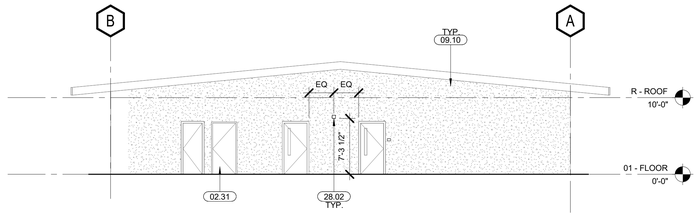
Job Number	31942
Checked By	Checker
Scale	As indicated

ROOF PLAN - BLDG F

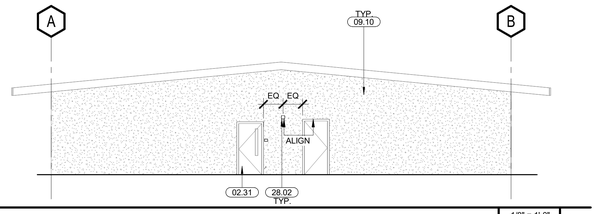
2AF2.03

KEYNOTES

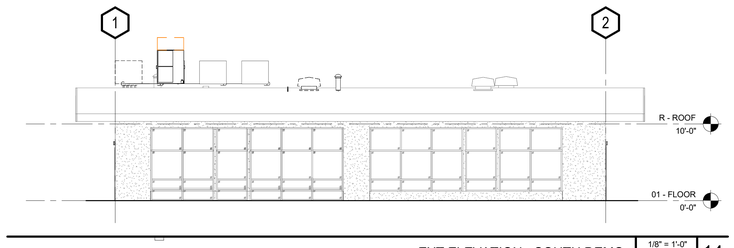
02.31	(E) DOOR TO REMAIN
02.32	(E) WINDOW TO REMAIN
09.10	PAINT ALL (E) EXTERIOR BUILDING ELEMENTS, INCLUDING WALLS, DOORS, FRAMES, AND TRIMS. DO NOT PAINT (E) ALUMINUM WINDOW FRAMES
28.02	FIRE ALARM DEVICE



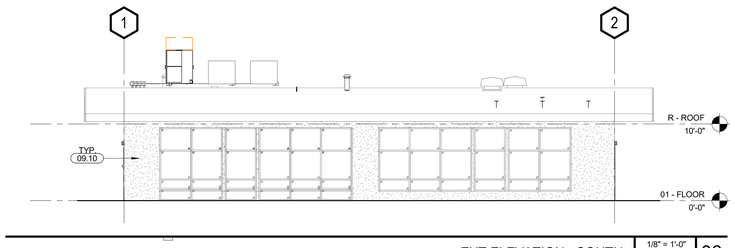
EXT ELEVATION - WEST | 1/8" = 1'-0" | 2AF3.01 | 08



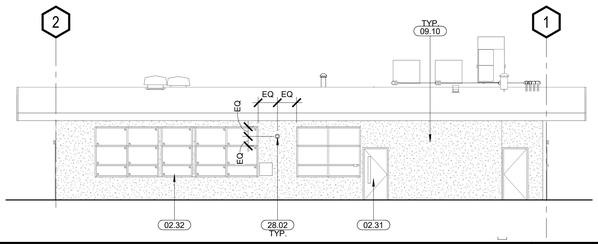
EXT ELEVATION - EAST | 1/8" = 1'-0" | 2AF3.01 | 07



EXT ELEVATION - SOUTH DEMO | 1/8" = 1'-0" | 2AF3.01 | 14



EXT ELEVATION - SOUTH | 1/8" = 1'-0" | 2AF3.01 | 06



EXT ELEVATION - NORTH | 1/8" = 1'-0" | 2AF3.01 | 05

LEGEND

- EXISTING PLASTER TO REMAIN
- EXISTING SIDING TO REMAIN
- EXISTING PLASTER TO BE DEMOLISHED
- STOREFRONT TO BE DEMOLISHED

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

EXTERIOR ELEVATIONS
- BLDG F

2AF3.01

DOOR HARDWARE SCHEDULE

	TYPE	GROUP	FUNCTION	CLOSER	DESCRIPTION	HINGES / PIVOTS	STOPS	ADDITIONAL HARDWARE
INTERIOR	SINGLE	A	PASSAGE LATCHSET	NORTON 7500	SCHLAGE 'ND' SERIES LATCHSET (ND10 SPARTA-626)	(2)PR. HAGER 1279 (4 1/2" X 4 1/2") 626	HAGER 242F (26D)	
		B	PRIVACY LOCKSET W/ INDICATOR & SURFACE CLOSER	NORTON 8501 BF ALUMINUM	SCHLAGE 'ND' SERIES LATCHSET - MECHANICAL NON-KEYED BATH PRIVACY LOCK (ND40 SPARTA-626)	(2)PR. HAGER 1279 (4 1/2" X 4 1/2") 626	HAGER 242F (26D)	SCHLANGE HAT AND COAT HOOK, DAX1291SSS
		C	ENTRANCE/OFFICE LOCKSET		SCHLAGE 'ND' SERIES CYLINDRICAL LOCKSET - MECHANICAL KEYED ENTRANCE/OFFICE LOCK (ND50 SPARTA-626)	(2)PR. HAGER 1279 (4 1/2" X 4 1/2") 626	HAGER 242F (26D)	SCHLANGE HAT AND COAT HOOK, DAX1291SSS
		D	STORAGE LOCKSET	NORTON 8501 BF ALUMINUM	SCHLAGE 'ND' SERIES CYLINDRICAL LOCKSET - MECHANICAL KEYED STORAGEROOM LOCK (ND80 SPARTA-626)	(2)PR. HAGER 1279 (4 1/2" X 4 1/2") 626	HAGER 242F (26D)	
		F	STORAGE PANIC LOCKSET	NORTON 8501 BF ALUMINUM	SCHLAGE 'ND' SERIES CYLINDRICAL LOCKSET - MECHANICAL KEYED STORAGEROOM LOCK (ND80 SPARTA-626)	(2)PR. HAGER 1279 (4 1/2" X 4 1/2") 626	HAGER 242F (26D)	PANIC HARDWARE 5BB1HW 4.5X4.5 NPR, IVE
	EXISTING	E	EXISTING TO REMAIN					

NOTES

* ALL ELECTRIFIED HINGES, HARDWARE, AND CARD READERS TO BE PROVIDED BY G.C. TO PREP ANY DOORS REQUIRING CARD READER WITH CONDUIT // BOXES.

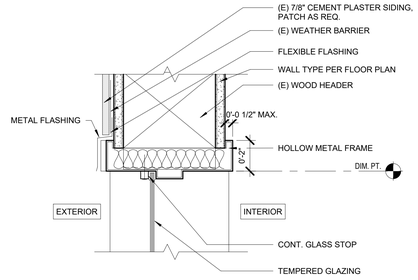
* ALL DOORS WITH SECURITY ACCESS NEED TO BE IDENTIFIED BY DISTRICT & HARDWARE REQUIREMENTS COORDINATED WITH G.C.

* TENANT APPROVAL OF SECURITY DEVICE TYPE AND COLOR BY DISTRICT IS REQUIRED PRIOR TO INSTALLATION. DISTRICTIS RESPONSIBLE FOR PROVIDING INFORMATION TO LPA FOR SUBMITTAL.

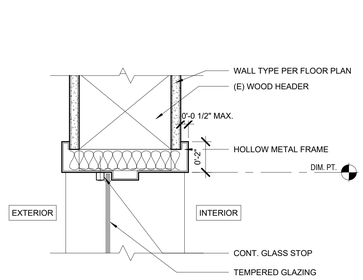
* ALL SPACES IN INC 02 SCOPE OF WORK WITH OCCUPANT LOAD OF 5 OR MORE HAVE DOOR HARDWARE THAT HAS AN INTERIOR LOCK, PER EDC SECTION 17586. INTERIOR LOCK ARE TO BE REPLACED WITH APPROPRIATE DISTRICT STANDARD LOCKSET.

DOOR SCHEDULE

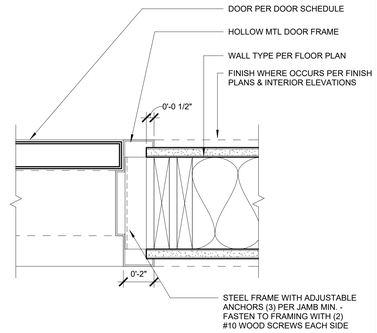
DOOR NUMBER	DOOR TYPE	LOCATION ROOM	FIRE RATING	DETAILS HEAD	DETAILS JAMB	DETAILS THRESHOLD	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR PANEL THICKNESS	DOOR PANEL CORE	DOOR PANEL MATERIAL	DOOR PANEL FINISH	DOOR FRAME MATERIAL	DOOR FRAME FINISH	HARDWARE GROUP	REMARKS
01 - FLOOR																
F12	A	F12	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	C	DOOR TO HAVE 12"X24" LOUVER FOR AIRFLOW
F13	A	F13	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	C	
F14	A	F14	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	C	
F15	A	F15	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	C	
F16	A	F16	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	A	
F17	B	F17	NR	02/2AF6.11	03/AF6.11	01/2AF9.10	3'-0"	7'-0"	0'-1 3/4"	SC	WD	PT	HM	PT	B	



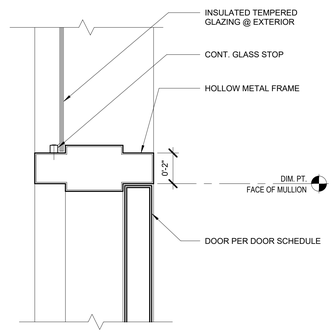
SIDELITE HEAD - HOLLOW METAL (EXT) | 3" = 1'-0" | 2AF6.11 | 11



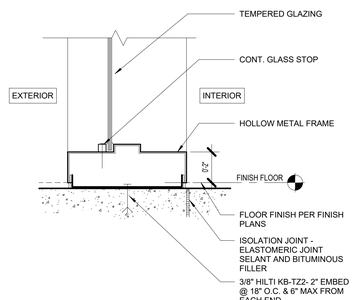
SIDELITE HEAD - HOLLOW METAL (INT) | 3" = 1'-0" | 2AF6.11 | 07



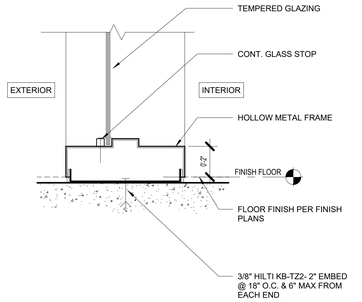
HOLLOW METAL JAMB @ WOOD STUD WALL | 3" = 1'-0" | 03



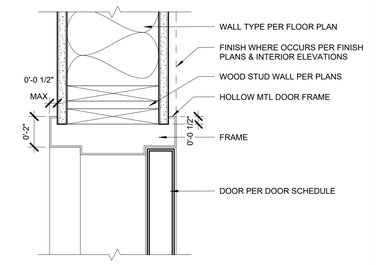
HOLLOW METAL JAMB @ SIDELITE | 3" = 1'-0" | 2AF6.11 | 14



HOLLOW METAL SIDELITE SILL (EXT) | 3" = 1'-0" | 2AF6.11 | 10

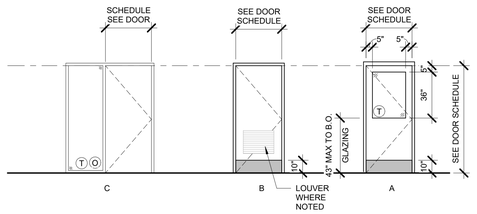


HOLLOW METAL SIDELITE SILL (INT) | 3" = 1'-0" | 2AF6.11 | 06



HOLLOW METAL HEAD @ WOOD STUD WALL | 3" = 1'-0" | 2AF6.11 | 02

DOOR TYPES



DOOR GENERAL NOTES

1. PROVIDE DOOR HARDWARE FOR ALL PROPOSED DOORS.
2. ALL GLAZING IN DOORS TO BE TEMPERED, TYPICAL.
3. SEE DETAILS FOR MINIMUM DOOR CLEARANCES AND SWITCH LOCATIONS ON SHEET 18/ 2G0.32
4. WEATHER-STRIP ALL EXTERIOR DOORS.
5. UNDERCUT CUSTODIAL AND STROAGE ROOM DOORS 3/4" A.F.F.
6. SAFETY GLAZING TO HAVE PERMANENT IDENTIFICATION LABELLING PER CBC 2406.3

ABBREVIATIONS

CORE
GL = GLASS (T = TEMPERED)
HC = HOLLOW CORE

DOOR PANEL MATERIAL
HM = HOLLOW METAL

DOOR PANEL FINISH
PT = PAINT (SEMI-GLOSS)

DOOR FRAME MATERIAL
HM = HOLLOW METAL

DOOR FRAME FINISH
PT = PAINT

GLASS FINISH
FM = FILM ON SIDELIGHT GLAZING
O = OPAQUE

CLOSER
OH = OVERHEAD
FLR = FLOOR
C-OH = CONCEALED OVERHEAD

REMARKS
PH = PANIC HARDWARE
HO = HOLD OPEN
CR = CARD READER
BG = BULLET-RESISTANT GLASS

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

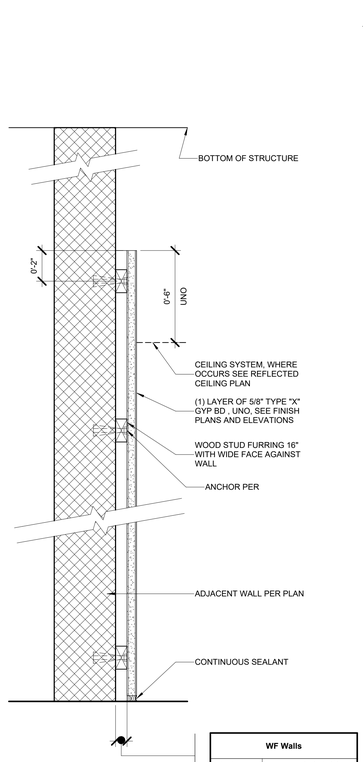
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENTS	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

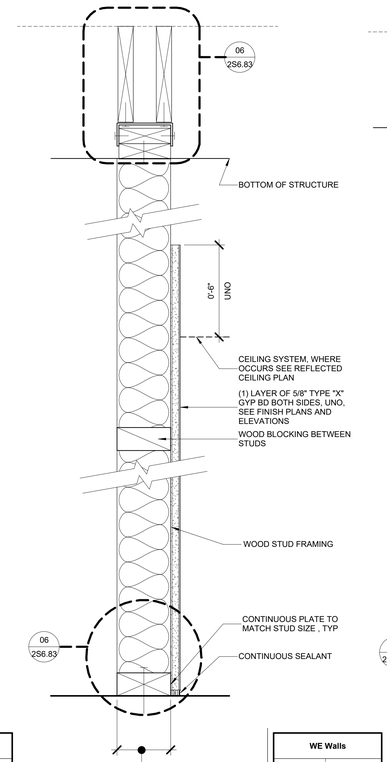
DOOR SCHEDULES & TYPES

2AF6.11



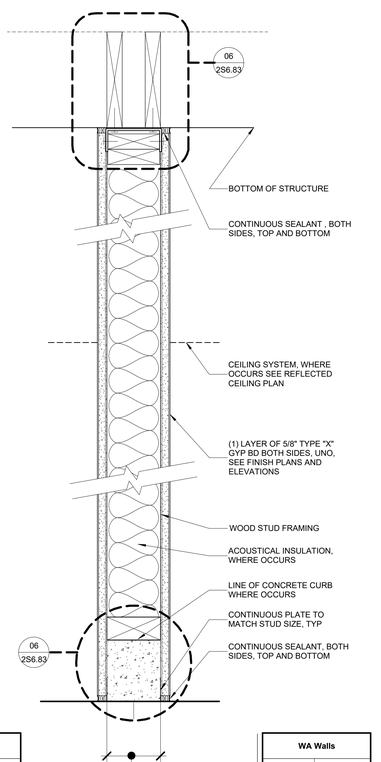
WF Walls	
WALL TYPE	FURRING SIZE

PARTITION TYPE "WF" (FURRED PARTITION) 3" = 1'-0" 2AF9.01 09



WE Walls	
WALL TYPE	STUD SIZE
WE4	4" STUDS

PARTITION TYPE "WE" 3" = 1'-0" 2AF9.01 05



WA Walls	
WALL TYPE	STUD SIZE
WA4	4" STUDS

PARTITION TYPE "WA" 3" = 1'-0" 2AF9.01 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2022
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

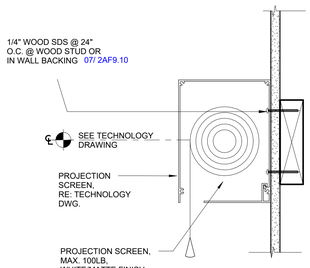
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/20/2026
DSA SUBMITTAL	04/24/2026

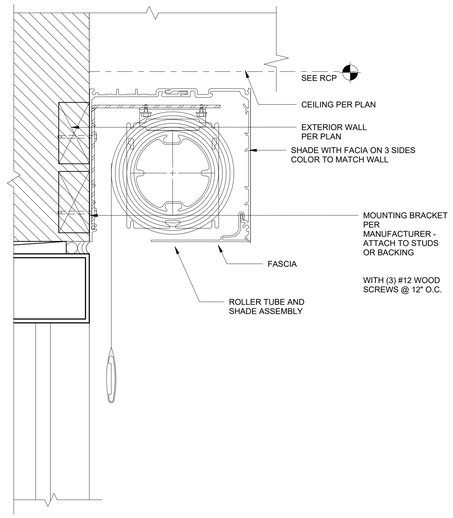
Job Number	31942
Checked By	Checker
Scale	As indicated

PARTITION TYPES

2AF9.01



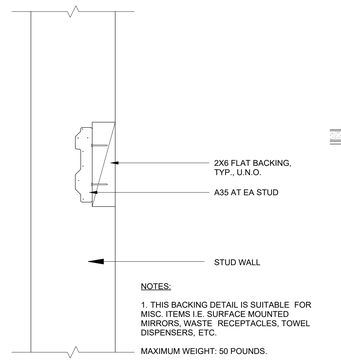
WALL MOUNT PROJECTOR SCREEN | 3" = 1'-0" | 20



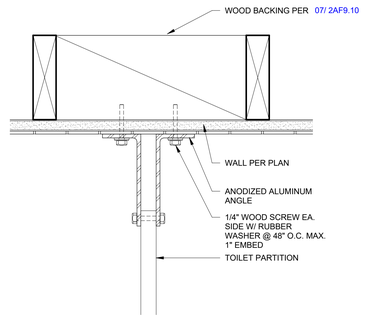
NOTE:

1. FOR TYP. ROLLER SHADE CONFIGURATION, SEE: 09/ 2AF9.10
2. MANUAL SHADES OPERABLE CONTROLS TO COMPLY WITH 11B309.4 AND 11B-308

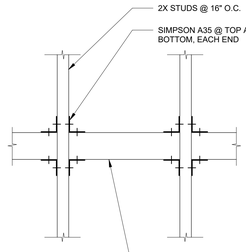
MANUAL SHADE @ MULLION | 6" = 1'-0" | 11



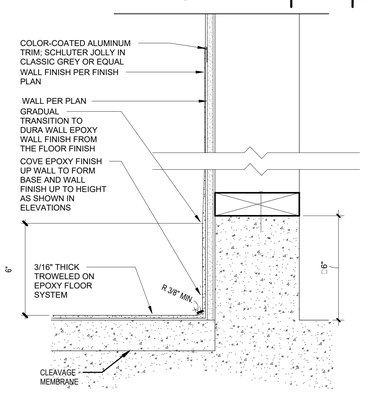
WOOD BACKING | 08



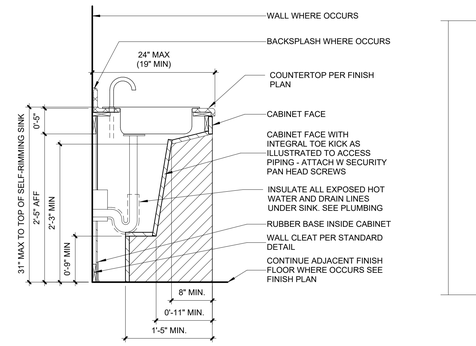
PARTITION DETAIL @ WOOD STUD | 3" = 1'-0" | 04



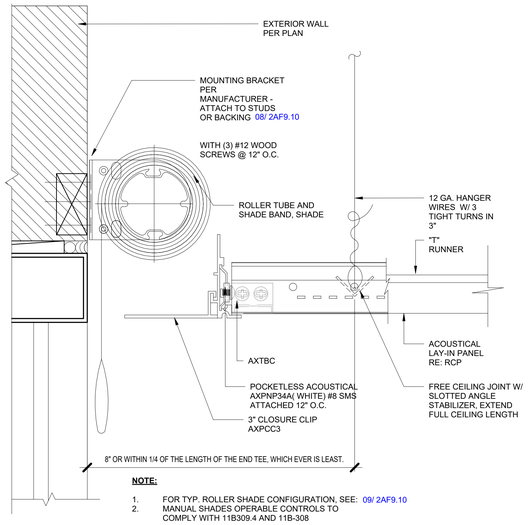
TYPICAL WOOD STUD BACKING | 07



EPOXY FLOORING / BASE | 03



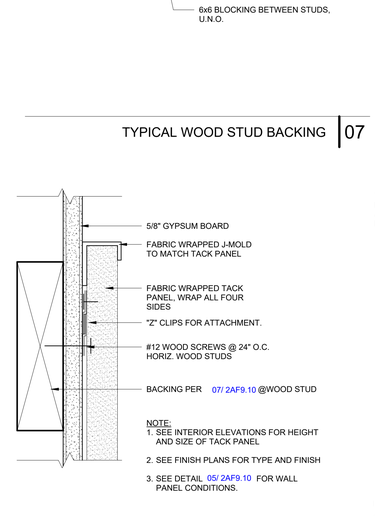
LOWER CABINET WITH SINK SKIRT @ ACCESSIBLE SINKS | 1" = 1'-0" | 2AF9.10 | 17



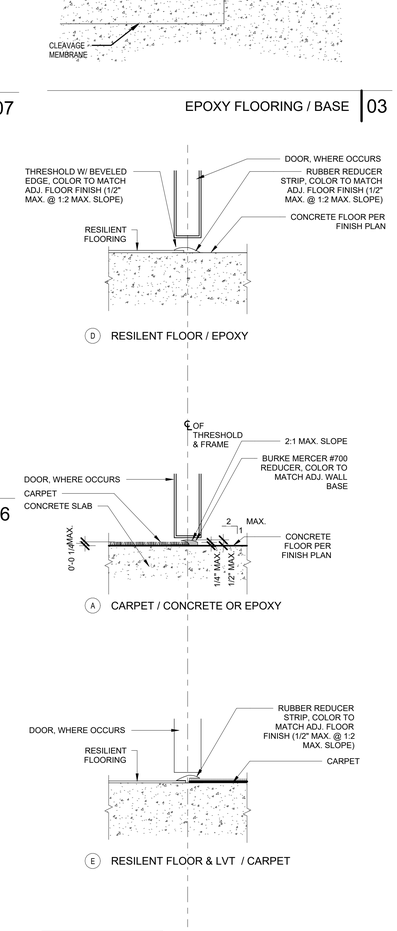
NOTE:

1. FOR TYP. ROLLER SHADE CONFIGURATION, SEE: 09/ 2AF9.10
2. MANUAL SHADES OPERABLE CONTROLS TO COMPLY WITH 11B309.4 AND 11B-308

MANUAL SHADE @ CEILING | 6" = 1'-0" | 10

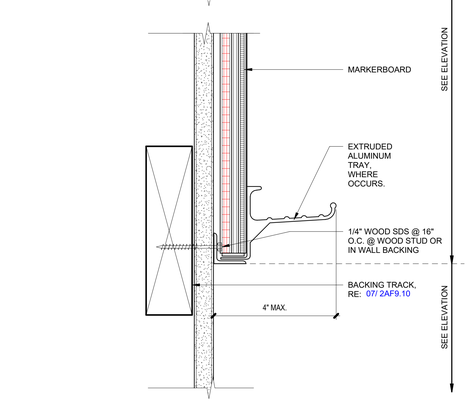


FABRIC WRAPPED TACK PANEL | 06

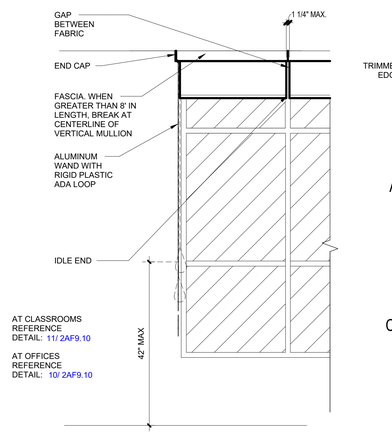


NOTE:
UNDERCUT ALL DOORS TO
CLEAR FLOOR FINISH BY 1/4"
EXCEPT AT RATED DOORS.

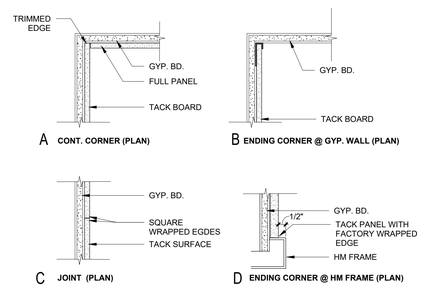
INTERIOR FLOOR TRANSITIONS | 3" = 1'-0" | 01



GRAB BAR AND SUPPORT | 3" = 1'-0" | 2AF9.10 | 13



TYPICAL ROLLER SHADE CONFIGURATION | 1/2" = 1'-0" | 09



NOTE: TACK PANEL JOINT LAYOUT PER INTERIOR ELEVATIONS TYPICAL. ALIGN PANEL JOINTS TO EDGE OF WINDOW, DOOR FRAME, CASEWORK, OR OTHER OBSTRUCTION WHERE OCCURS, U.N.O. IN ROOMS LESS THAN 200 SQUARE FEET WITHOUT OTHER ELEMENTS, START WITH A FULL PANEL AT ONE CORNER TO MINIMIZE CUT & WRAPPED EDGES.

TACK PANEL EDGE DETAILS | 3" = 1'-0" | 05

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17/DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

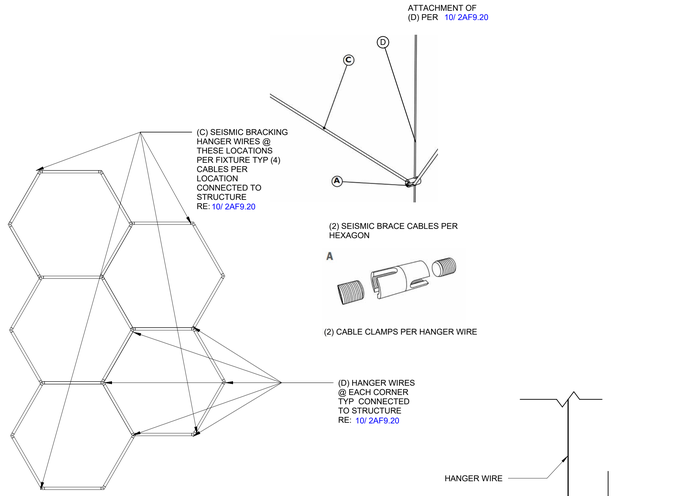
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/27/2026
DSA SUBMITTAL	04/24/2026

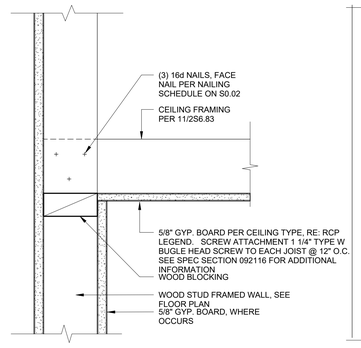
Job Number	31942
Checked By	Checker
Scale	As indicated

INTERIOR DETAILS

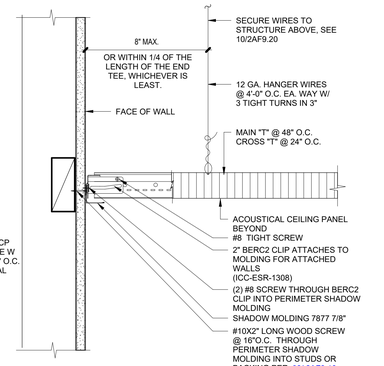
2AF9.10



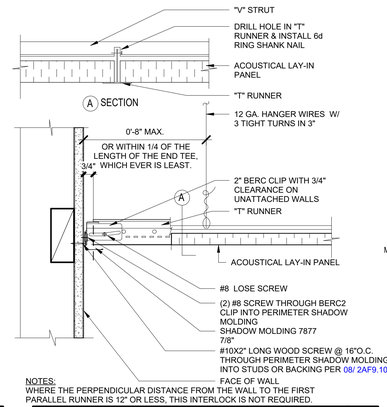
ACOUSTICAL PENDANT LIGHT | 3" = 1'-0" | 19



GYPSUM BOARD CEILING | 3" = 1'-0" | 2AF9.20 | 20

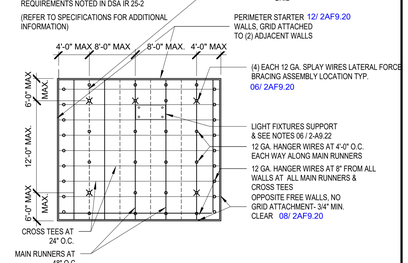


PERIMETER STARTER WALL - FIXED END | 3" = 1'-0" | 2AF9.20 | 12



NOTES:
WHERE THE PERPENDICULAR DISTANCE FROM THE WALL TO THE FIRST PARALLEL RUNNER IS 12" OR LESS, THIS INTERLOCK IS NOT REQUIRED.

OPP. WALL OF STARTER WALL - FREE END | 3" = 1'-0" | 2AF9.20 | 08



NOTES:
1. THESE PLANS AND SPECIFICATIONS ARE FOR FLAT AND LEVEL CEILING SYSTEMS WHOSE TOTAL WEIGHT, INCLUDING CEILING MOUNTED AIR TERMINALS, SERVICES AND LIGHT FIXTURES, DO NOT EXCEED FOUR (4) P.S.F. HEAVIER SYSTEMS, SYSTEMS THAT ARE NOT FLAT AND LEVEL, AND THOSE SUPPORTING LATERAL LOADS FROM PARTITIONS WILL REQUIRE SPECIAL DESIGN DETAILS.

2.1 CLASSIFICATION OF CEILING GRID IS: HEAVY DUTY (PER ASTM C635).

TYPICAL ACOUSTICAL CEILING / GRID SYSTEM:
SEE REFLECTED CEILING PLAN & SPECIFICATIONS FOR MANUFACTURER, CEILING TILE, GRID SYSTEM & WALL ANGLE INFORMATION.

1. CEILING SYSTEM GENERAL NOTES:
1.01 CEILING SYSTEM COMPONENTS SHALL COMPLY WITH ASTM C635 AND SECTION 5.1 OF ASTM E580.
1.02 THE CEILING GRID SYSTEM MUST BE RATED HEAVY DUTY AS DEFINED BY ASTM C635
1.03 CEILING SYSTEMS. THE FOLLOWING CEILING SYSTEM(S) IS/ARE PART OF THE SCOPE OF THIS PROJECT:
MANUFACTURER: ARMSTRONG WORLD INDUSTRIES
PRODUCT NAME: **PRELUDE XL 15/16"**
EVALUATION REPORT TYPE AND NUMBER: ESR 1308
MAIN RUNNER PART, MODEL OR CATALOG NUMBER:
MAIN RUNNER: 7301
1.04 SEISMIC WALL CLIP:
MANUFACTURER'S MODEL: ARMSTRONG BERC2 CLIP
1.05 CEILING PANELS SHALL NOT SUPPORT ANY LIGHT FIXTURES, AIR TERMINALS OR DEVICES.
1.06 FOR CEILING INSTALLATIONS UTILIZING ACOUSTICAL TILE PANELS OF MINERAL OR GLASS FIBER, IT IS NOT MANDATORY TO PROVIDE 3/4" CLEARANCE BETWEEN THE ACOUSTICAL TILE PANELS AND THE WALL ON THE SIDES OF THE CEILING WHICH ARE FREE TO SLIP. FOR ALL OTHER CEILING PANEL TYPES, PROVIDE 3/4" CLEARANCE BETWEEN THE CEILING PANEL AND THE WALL ON THE SIDES OF THE CEILING FREE TO SLIP.

2. MATERIALS:
2.01 CEILING WIRE SHALL BE CLASS 1 ZINC COATED (GALVANIZED) CARBON STEEL CONFORMING TO ASTM A641. WIRE SHALL BE #12 GAGE (0.106" DIAMETER) WITH SOFT TEMPER AND MINIMUM TENSILE STRENGTH = 70 KSI.
2.02 GALVANIZED SHEET STEEL (INCLUDING THAT USED FOR METAL STUD AND TRACK COMPRESSION STRUTS/POSTS) SHALL CONFORM TO ASTM A653, OR OTHER EQUIVALENT SHEET STEEL LISTED IN SECTION A3.1 OF THE NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS (AISI S100). MATERIAL 43 MIL (18 GAGE) AND LIGHTER SHALL HAVE MINIMUM YIELD STRENGTH OF 33 KSI. MATERIAL 54 MIL (16 GAGE) AND HEAVIER SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI.
2.03 ELECTRICAL METALLIC TUBE (EMT) SHALL BE ANSI C80.3/UL 797 CARBON STEEL WITH G90 GALVANIZING. EMT SHALL HAVE MINIMUM YIELD STRENGTH (Fy) OF 30 KSI AND MINIMUM ULTIMATE STRENGTH (Fu) OF 48 KSI.

3. ATTACHMENT OF HANGER AND BRACING WIRES:
3.01 SEPARATE ALL CEILING HANGER AND BRACING WIRES AT LEAST SIX (6) INCHES FROM ALL UNBRACED DUCTS, PIPES, CONDUIT, ETC.
3.02 HANGER AND BRACING WIRES SHALL NOT ATTACH TO OR BEND AROUND OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO: PIPING, DUCTWORK, CONDUIT AND EQUIPMENT.
3.03 HANGER WIRES THAT ARE MORE THAN ONE (HORIZONTAL) IN SIX (VERTICAL) OUT OF PLUMB SHALL HAVE COUNTER-SLOPING WIRES.
3.04 SLACK SAFETY WIRES SHALL BE CONSIDERED HANGER WIRES FOR INSTALLATION AND TESTING REQUIREMENTS.
3.05 HANGER AND BRACING WIRE ANCHORAGE TO THE STRUCTURE SHALL BE INSTALLED IN SUCH A MANNER THAT THE DIRECTION OF THE ANCHORAGE ALIGNS CLOSELY WITH THE DIRECTION OF THE WIRE BRACING WIRE CEILING CLIPS SHALL BE BENT AS SHOWN IN THE DETAILS AND ROTATED AS REQUIRED TO ALIGN CLOSELY WITH THE DIRECTION OF THE WIRE. SCREW EYES IN WOOD MUST BE INSTALLED SO THEY ALIGN CLOSELY WITH THE DIRECTION OF THE WIRE.

4. FASTENERS AND WELDING:
4.01 SHEET METAL SCREWS SHALL COMPLY WITH ASTM C1513 AND ASME B18.6.3. PENETRATION OF SCREWS THROUGH JOINED MATERIAL SHALL NOT BE LESS THAN THREE EXPOSED THREADS.
4.02 EXPANSION ANCHORS SHALL BE:Hilti KB-TZ2 (ICC ESR-4266)
4.03 POWER-ACTUATED FASTENERS SHALL BE: Hilti X-U (ICC ESR-2269)
4.04 IF NOT OTHERWISE SPECIFIED IN THE EVALUATION REPORT, POWER-ACTUATED FASTENERS INSTALLED IN STEEL SHALL BE INSTALLED SO THE ENTIRE POINTED END OF THE FASTENER IS DRIVEN THROUGH THE STEEL MEMBER.
4.05 POWER-ACTUATED FASTENERS IN CONCRETE ARE NOT PERMITTED FOR BRACING WIRES.
4.06 CONCRETE REINFORCEMENT AND PRESTRESSING TENDONS SHALL BE LOCATED BY NON-DESTRUCTIVE MEANS PRIOR TO INSTALLING POST-INSTALLED ANCHOR.
4.07 WELDING SHALL BE IN ACCORDANCE WITH AWS D1.3 USING E60XX SERIES ELECTRODES.

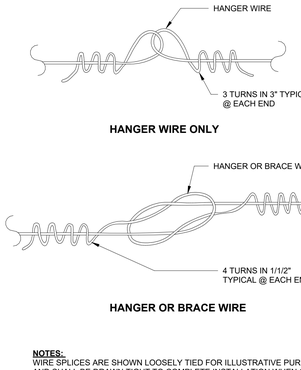
5. TESTING: ALL FIELD TESTING MUST BE PERFORMED IN THE PRESENCE OF THE PROJECT INSPECTOR.
5.01 POST-INSTALLED ANCHORS IN CONCRETE USED TO SUPPORT HANGER WIRES SHALL BE TESTED AT A FREQUENCY OF 10 PERCENT. POWER ACTUATED FASTENERS IN CONCRETE SHALL BE FIELD TESTED FOR 200 LBS. IN TENSION. ALL OTHER POST-INSTALLED ANCHORS IN CONCRETE SHALL BE TESTED IN ACCORDANCE WITH CBC SECTION 1910A.5.
5.02 POST-INSTALLED ANCHORS IN CONCRETE USED TO ATTACH BRACING WIRES SHALL BE TESTED AT A FREQUENCY OF 50 PERCENT IN ACCORDANCE WITH CBC SECTION 1910A.5.

6. LIGHT FIXTURES:
6.01 ALL LIGHT FIXTURES SHALL BE POSITIVELY ATTACHED TO THE CEILING SUSPENSION SYSTEMS BY MECHANICAL MEANS TO RESIST A HORIZONTAL FORCE EQUAL TO THE WEIGHT OF THE FIXTURE. A MINIMUM OF TWO SCREWS OR APPROVED FASTENERS ARE REQUIRED AT EACH LIGHT FIXTURE. PER ASTM E580, SECTION 5.3.1
6.02 SURFACE-MOUNTED LIGHT FIXTURES SHALL BE ATTACHED TO THE MAIN RUNNER WITH AT LEAST TWO POSITIVE CLAMPING DEVICES. THE CLAMPING DEVICE SHALL COMPLETELY SURROUND THE SUPPORTING CEILING RUNNER AND BE MADE OF STEEL WITH A MINIMUM THICKNESS OF #14 GAGE. ROTATIONAL SPRING CATCHES DO NOT COMPLY. A #12 GAGE SLACK SAFETY WIRE SHALL BE CONNECTED FROM EACH CLAMPING DEVICE TO THE STRUCTURE ABOVE. PROVIDE ADDITIONAL SUPPORTS WHEN LIGHT FIXTURES ARE EIGHT (8) FEET OR LONGER OR EXCEED 56 LB. MAXIMUM SPACING BETWEEN SUPPORTS SHALL NOT EXCEED EIGHT (8) FEET.
6.03 LIGHT FIXTURES WEIGHING LESS THAN OR EQUAL TO 10 LB. SHALL HAVE A MINIMUM OF ONE (1) #12 GAGE SLACK SAFETY WIRE CONNECTED FROM THE FIXTURE HOUSING TO THE STRUCTURE ABOVE.
6.04 LIGHT FIXTURES WEIGHING GREATER THAN 10 LB. BUT LESS THAN OR EQUAL TO 56 LBS. MAY BE SUPPORTED DIRECTLY ON THE CEILING RUNNERS, BUT THEY SHALL HAVE A MINIMUM OF TWO (2) #12 GAGE SLACK SAFETY WIRES CONNECTED FROM THE FIXTURe HOUSING AT DIAGONAL CORNERS TO THE STRUCTURE ABOVE.
EXCEPTION: ALL LIGHT FIXTURES GREATER THAN TWO BY FOUR FEET WEIGHING LESS THAN 56 LBS. SHALL HAVE A #12 GAGE SLACK SAFETY WIRE AT EACH CORNER.
6.05 ALL LUMINAIRES WEIGHING GREATER THAN 56 POUNDS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE ABOVE. SEE SUPPORT DETAILS ON THESE DRAWINGS FOR MORE INFORMATION.

7. SERVICES WITHIN THE CEILING:
7.01 ALL FLEXIBLE SPRINKLER HOSE FITTING MOUNTING BRACKETS, CEILING-MOUNTED AIR TERMINALS, OR OTHER SERVICES SHALL BE POSITIVELY ATTACHED TO THE CEILING SUSPENSION SYSTEMS BY MECHANICAL MEANS. SCREWS OR OTHER FASTENERS SPECIFIED ON THE DRAWINGS ARE REQUIRED. A MINIMUM OF TWO ATTACHMENTS ARE REQUIRED AT EACH COMPONENT.
7.02 CEILING-MOUNTED SERVICES WEIGHING LESS THAN OR EQUAL TO 20 POUNDS SHALL HAVE ONE #12 GAUGE SLACK SAFETY WIRE ATTACHED FROM THE TERMINAL OR SERVICE TO THE STRUCTURE ABOVE.
7.03 CEILING-MOUNTED SERVICES WEIGHING MORE THAN 20 POUNDS BUT LESS THAN OR EQUAL TO 56 POUNDS SHALL HAVE TWO #12 GAUGE SLACK SAFETY WIRES (AT DIAGONAL CORNERS CONNECTED FROM THE TERMINAL OR SERVICE TO THE STRUCTURE ABOVE.
7.04 CEILING-MOUNTED SERVICES WEIGHING MORE THAN 56 POUNDS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE ABOVE. SEE SUPPORT DETAILS ON THESE DRAWINGS FOR MORE INFORMATION.

8. OTHER DEVICES WITHIN THE CEILING:
8.01 ALL LIGHTWEIGHT MISCELLANEOUS DEVICES, SUCH AS STROBE LIGHTS, OCCUPANCY SENSORS, SPEAKERS, EXIT SIGNS, ETC., SHALL BE ATTACHED TO THE CEILING GRID. IN ADDITION, DEVICES WEIGHING MORE THAN 10 LBS. SHALL HAVE A #12 GAGE SLACK SAFETY WIRE ANCHORED TO THE STRUCTURE ABOVE. DEVICES WEIGHING MORE THAN 20 LB. SHALL BE SUPPORTED INDEPENDENTLY FROM THE STRUCTURE ABOVE.

LIGHT FIXTURE IN SUSPENDED CEILING | 1 1/2" = 1'-0" | 2AF9.20 | 15

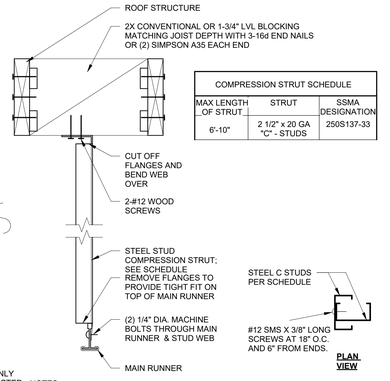


HANGER WIRE ONLY

HANGER OR BRACE WIRE

NOTES:
WIRE SPLICES ARE SHOWN LOOSELY TIED FOR ILLUSTRATIVE PURPOSES ONLY AND SHALL BE DRAWN TIGHT TO COMPLETE INSTALLATION WHEN CONSTRUCTED.

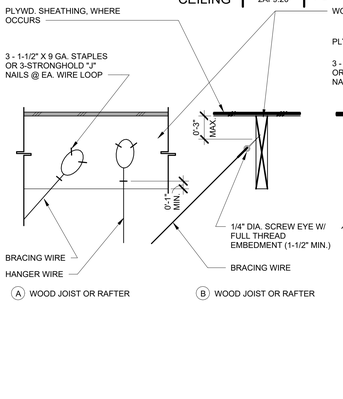
HANGER OR BRACE WIRE | 1/2" = 1'-0" | 2AF9.20 | 11



COMPRESSION STRUT SCHEDULE		
MAX LENGTH OF STRUT	STRUT	SSMA DESIGNATION
6'-10"	2 1/2" x 20 GA "C" - STUDS	250S137-33

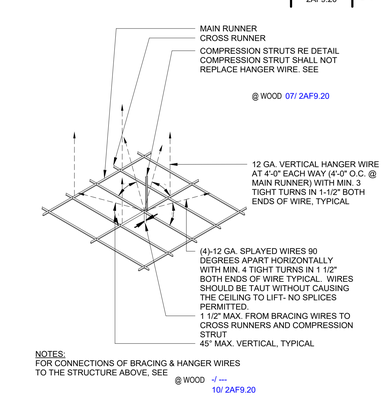
NOTES:
1. COMPRESSION STRUTS SHALL NOT REPLACE HANGER WIRE.
2. CEILING TILE NOT SHOWN FOR CLARITY.

COMPRESSION STRUT | 1/2" = 1'-0" | 2AF9.20 | 07



NOTE: THIS DETAIL IS FOR HANGER WIRE CONNECTIONS TO LUMBER JOIST ONLY.

HANGER WIRE CONNECTIONS TO LUMBER JOIST | 1 1/2" = 1'-0" | 2AF9.20 | 10



NOTES:
FOR CONNECTIONS OF BRACING & HANGER WIRES TO THE STRUCTURE ABOVE, SEE

SPLAY BRACING DETAIL | 3" = 1'-0" | 2AF9.20 | 06

LAY-IN CEILING REQUIREMENTS | 6" = 1'-0" | 2AF9.20 | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
12/DEC 2027
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

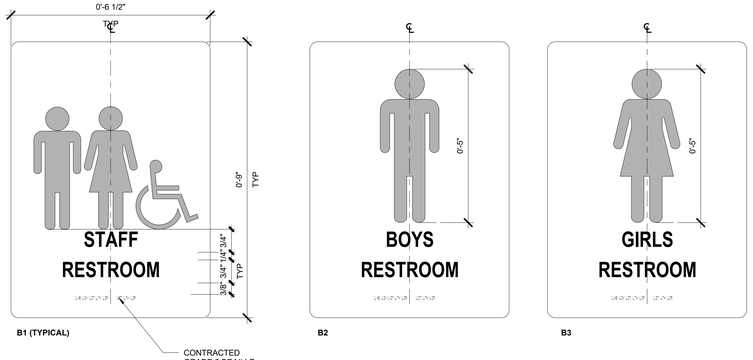
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CD	03/06/2026
DSA SUBMITTAL	04/24/2026

Revision	Date

Job Number	31942
Checked By	Checker
Scale	

CEILING DETAILS

2AF9.20



B1 (TYPICAL)

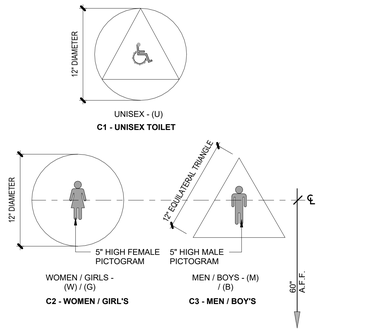
CONTRACTED GRADE 2 BRAILLE, SEE 21/ 2A10.31

B2

B3

NOTE:
- FOR GENERAL REQUIREMENTS REFER TO 01/ 2A10.31
- FOR MOUNTING LOCATION AND REQUIREMENTS REFER TO 13/ 2A10.31

SIGN TYPE B - RESTROOM ID | 6" = 1'-0" | 2A10.31 | 20



NOTES:
1. SIGN SHALL BE 1 / 4" THICK SUB-SURFACE NON-GLARE ACRYLIC
2. SIGNS SHALL COMPLY W/ CBC 11B-703.7.2.6
3. ALL SIGNS VERTICES SHALL BE 1/8"-1/4" RADIUS PER CBC 11B-703.7.2.6.4.
4. FOR MOUNTING LOCATION AND GENERAL REQUIREMENTS REFER TO 01/ 2A10.31

SIGN TYPE C - RESTROOM DOOR | 1 1/2" = 1'-0" | 2A10.31 | 19

1. CHARACTER TYPE: CHARACTERS ON SIGNS SHALL BE RAISED 1/32 INCH (0.79MM) MINIMUM AND SHALL BE SANS SERIF UPPERCASE CHARACTERS ACCOMPANIED BY GRADE 2 BRAILLE COMPLYING WITH 1117B.5.6 (SEE NOTE 5 BELOW)

2. CHARACTER SIZE: RAISED CHARACTERS SHALL BE A MINIMUM OF 5/8 INCH (15.9MM) AND A MAXIMUM OF 2 INCHES (51MM) HIGH.

3. FINISH AND CONTRAST: CONTRAST BETWEEN CHARACTERS, SYMBOLS AND THEIR BACKGROUND MUST BE 70% MINIMUM AND HAVE A NON-GLARE FINISH. CBC 1117B.5.2.

4. PROPORTIONS: CHARACTERS ON SIGNS SHALL HAVE A WIDTH-TO-HEIGHT RATIO OF BETWEEN 3:5 AND 1:1 AND A STROKE WIDTH-TO-HEIGHT RATIO OF BETWEEN 1:5 AND 1:10. CBC 1117B.5.3

5. BRAILLE: CALIFORNIA CONTRACTED GRADE 2 BRAILLE SHALL BE USED WHENEVER BRAILLE IS REQUIRED IN OTHER PORTIONS OF THESE STANDARDS. DOTS SHALL BE 1/10 INCH (2.54MM) ON CENTER IN EACH CELL, WITH 2/10 INCH (5.08MM) SPACE BETWEEN CELLS, MEASURED FROM THE SECOND COLUMN OF DOTS IN THE FIRST CELL TO THE FIRST COLUMN OF DOTS IN THE SECOND CELL. DOTS SHALL BE RAISED A MINIMUM OF 1/40 INCH (0.635MM) ABOVE BACKGROUND. DOTS SHALL BE ROUNDED OR DOMED CALIFORNIA BRAILLE DOTS, EACH DISTINCT AND SEPARATE. CBC 1117B.5.6

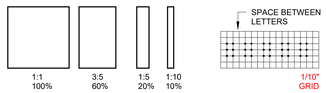
6. ALL LETTERS MEASURED MUST BE UPPERCASE. AFTER CHOOSING A TYPESTYLE TO TEST, BEGIN BY PRINTING THE LETTERS "I", "X", AND "O" AT 1 INCH HEIGHT. PLACE THE TEMPLATE'S 1:1 SQUARE OVER THE "X" OR "O", WHICHEVER IS NARROWER. IF THE CHARACTER IS NOT WIDER THAN 1 INCH, NOR NARROWER THAN THE 3:5 RECTANGLE, THE PROPORTIONS ARE CORRECT. USE THE 1:5 RECTANGLE TO DETERMINE IF THE STROKE OF THE "I" IS TOO BROAD, AND THE 1:10 RECTANGLE TO SEE IF IT IS TOO NARROW. IF ALL THE TESTS ARE PASSED, THE TYPESTYLE IS COMPLIANT WITH PROPORTION CODES.

7. THE BRAILLE MEASUREMENT TEMPLATE IS USED BY PLACING THE GRID OVER A SECTION OF DOTS TO CHECK DISTANCE BETWEEN BRAILLE CELLS AS INDICATED BY THE ARCH. EACH BOX IS 1/10 INCH IN HEIGHT AND WIDTH.

8. ALL SIGNAGE SHALL CONFORM TO CBC SECTIONS 1117B.5. TACTILE EXIT SIGNAGE SHALL BE PROVIDED PER 17/-.

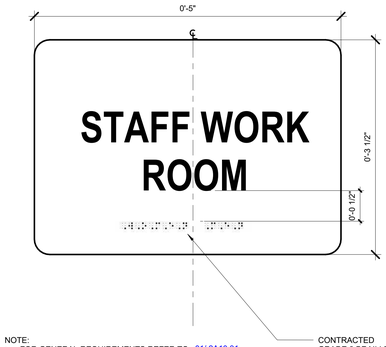
9. EASE ALL EDGES AND CORNERS OF SIGNS. SIGNS MOUNTED ON POSTS TO HAVE RADIUS CORNERS.

TEMPLATE FOR CHECKING CHARACTER AND STROKE WIDTH TO HEIGHT PROPORTIONS



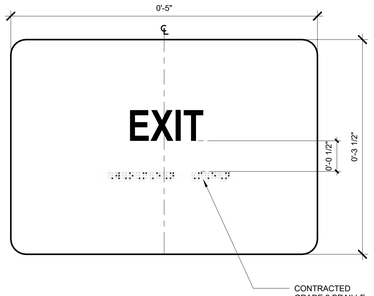
TITLE 24 BRAILLE SPACING TEMPLATE

SG40 - SIGNAGE - CHARACTER AND BRAILLE NOTES | NTS | 2A10.31 | 21



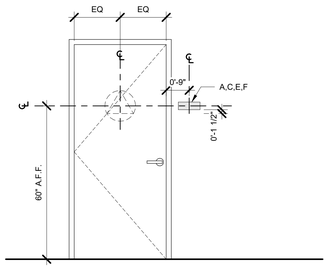
NOTE:
- FOR GENERAL REQUIREMENTS REFER TO 01/ 2A10.31
- FOR MOUNTING LOCATION AND REQUIREMENTS REFER TO 13/ 2A10.31

SIGN TYPE A - ROOM ID | 12" = 1'-0" | 2A10.31 | 18



NOTE:
- FOR GENERAL REQUIREMENTS REFER TO 01/ 2A10.31
- FOR MOUNTING LOCATION AND REQUIREMENTS REFER TO 13/ 2A10.31

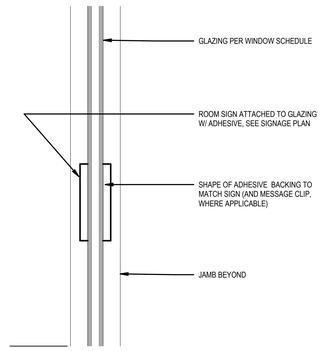
SIGN TYPE D - EXIT | 12" = 1'-0" | 2A10.31 | 17



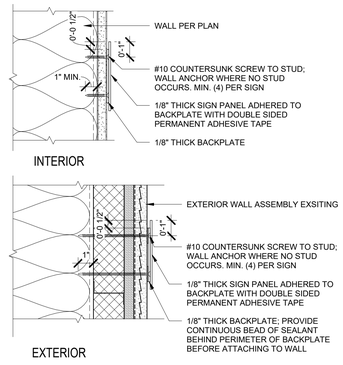
NOTES:
1. LOCATE SIGN OUTSIDE OF DOOR ENTERING ROOM THAT IS CALLED OUT ON SIGN.
2. ALIGN SIGNAGE WITH ELECTRICAL SWITCHING WHERE OCCURS.
3. WHERE APPICABLE, SIGNS MOUNTED ON SIDELIGHTS SHALL HAVE AN LTV VINYL BACKER, CUT TO SAME SIZE AS SIGN, MOUNTED TO OPPOSITE SIDE OF GLASS TO OBSCURE BACK SIDE OF SIGN. COLOR TO MATCH SIGN.
4. EXIT SIGNS SHALL BE MOUNTED BACK TO BACK AT SIDELIGHT CONDITIONS, TO CONCEAL VHB TAPE AND SILICONE MOUNTING.

SG40 - SIGNAGE - MOUNTING HEIGHTS | 1/2" = 1'-0" | 2A10.31 | 13

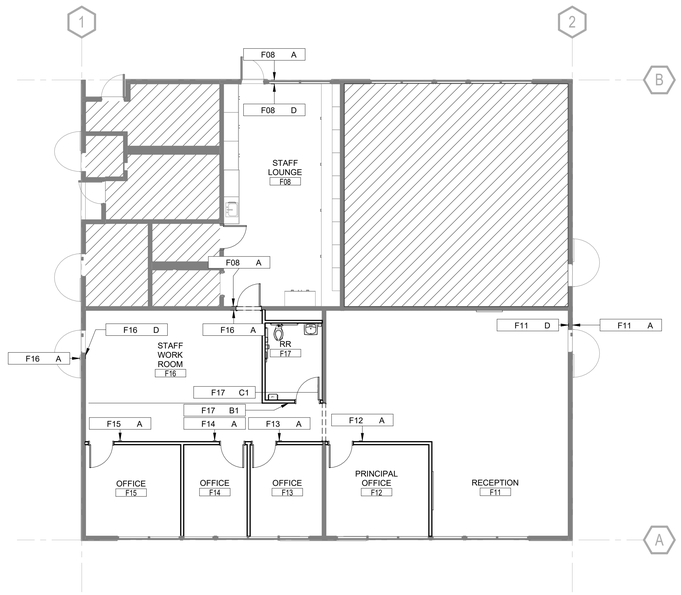
NOTE:
PROVIDE A BLANK MATCHING PANEL ON REVERSE SIDE WHERE THERE ARE NO BACK TO BACK SIGNAGE



SIGN ATTACHMENT @ GLAZING | 3" = 1'-0" | 2A10.31 | 09



SIGN ATTACHMENT AT WALL | 3" = 1'-0" | 2A10.31 | 05



01 - BUILDING F SIGNAGE PLAN | 1/8" = 1'-0" | 2A10.31 | 07

SIGNAGE SCHEDULE BUILDING F

Room	Sign Type	Text	Detail Number	Mounting Location	Braille	Comments
F08	A	STAFF WORK ROOM	18/2A10.23	INTERIOR WALL	Yes	2 LINES
F08	D	RE DETAIL	17/2A10.23	GLAZING	Yes	BACK TO BACK WITH ROOM SIGN
F08	A	STAFF LOUNGE	18/2A10.23	GLAZING	Yes	2 LINES, BACK TO BACK WITH EXIT SIGN
F11	A	ADMINISTRATION	18/2A10.23	EXTERIOR WALL	Yes	
F11	D	RE: DETAIL	17/2A10.23	INTERIOR WALL	Yes	
F12	A	PRINCIPAL'S OFFICE	18/2A10.23	INTERIOR WALL	Yes	2 LINES
F13	A	OFFICE	18/2A10.23	INTERIOR WALL	Yes	
F14	A	OFFICE	18/2A10.23	INTERIOR WALL	Yes	
F15	A	OFFICE	18/2A10.23	INTERIOR WALL	Yes	
F16	A	ADMINISTRATION	18/2A10.23	EXTERIOR WALL	Yes	
F16	A	STAFF LOUNGE	18/2A10.23	INTERIOR WALL	Yes	2 LINES
F16	D	RE: DETAIL	17/2A10.23	INTERIOR WALL	Yes	
F17	B1	RE: DETAIL	20/2A10.23	INTERIOR WALL	Yes	
F17	C1	RE: DETAIL	19/2A10.23	DOOR	No	

KEYNOTES

LEGEND

SIGNAGE FLOOR PLAN GENERAL NOTES

1. FOR SIGNAGE DETAILS, ACCESSIBILITY SIGNAGE NOTES, AND SIGNAGE MOUNTING CRITERIA, SEE DETAILS THIS SHEET.
2. FOR SIGN MATERIAL COLOR, LETTERING, AND TYPEFACE, REFER TO SPECIFICATION SECTION 101400.

GENERAL NOTES:

1. CHARACTER TYPE AND SIZE: CHARACTERS ON SIGNS SHALL BE RAISED, UPPER CASE, "FUTURIST" TYPE AND SHALL BE ACCOMPANIED WITH CALIFORNIA GRADE II BRAILLE. RAISED CHARACTERS SHALL BE AT LEAST 5/8" HIGH, BUT NO HIGHER THAN 2".
2. BRAILLE STANDARD DIMENSIONS: CALIFORNIA GRADE II BRAILLE SHALL BE USED WHEREVER BRAILLE IS REQUIRED. INDIVIDUAL BRAILLE DOTS SHALL EACH BE DISTINCT AND SEPARATE. EACH DOT SHALL BE ROUNDED OR DOMED IN LIEU OR SQUARE AND FLAT TOPPED. DOTS SHALL BE RAISED A MINIMUM OF 1/40" ABOVE THE BACKGROUND.

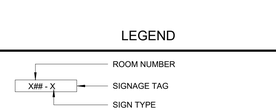
2/10" SPACE BETWEEN CELLS (LETTERS)

1/10" x 1/10" GRID

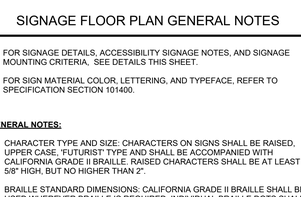
3. FINISH AND CONTRAST: CHARACTERS, SYMBOLS AND THEIR BACKGROUNDS SHALL HAVE A NON-GLARE FINISH AND CONTRAST 70% MIN. WITH THEIR BACKGROUNDS. CHARACTERS & SYMBOLS - COLOR BLACK, ALUMINUM BACKGROUND AND PANEL - 1/4" THICK ACRYLIC PANEL WITH PHOTO POLYMER RAISED TACTILE COPY SUB-SURFACE SYMBOL (U.N.O.)
4. PROPORTIONS: CHARACTERS AND SYMBOLS SHALL HAVE A WIDTH-TO-HEIGHT RATIO OF BETWEEN 3:5 AND 1:1 AND A STROKE WIDTH-TO-HEIGHT RATIO OF BETWEEN 1:5 AND 1:10, 703.5.4.
5. EXTERIOR SIGNS SHALL BE METAL COMPONENTS SUITABLE TO EXTERIOR USE AND SIMILAR TO INTERIOR SIGNS FOR SHAPE AND FORM.
6. CONTRACTOR TO SUBMIT A SCHEDULE TO VERIFY ALL PERMANENT NUMBERS AND TEXT PRIOR TO FABRICATION.
7. SIGNAGE SHALL COMPLY WITH CBC SECTION 11B-703

CROSS SECTION VISUAL/TACTILE CHARACTERS

CHARACTER SPACING

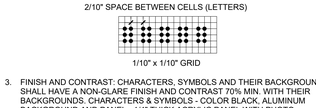


FONT RATIO



CONTRAST

MINIMUM 70% CONTRAST DIFFERENCE BETWEEN CHARACTERS/GRAPHICS AND BACKGROUND



0% WHITE ON 100% BACK-GROUND | 0% WHITE ON 70% BACK-GROUND | 30% TEXT CONTRAST ON 100% BACK-GROUND | 15% TEXT CONTRAST ON 100% BACK-GROUND

STATE FIRE MARSHAL NOTES:

CALIFORNIA FIRE CODE, SECTION 1011.3 TACTILE EXIT SIGNAGE

TACTILE EXIT SIGNS SHALL BE REQUIRED AT THE FOLLOWING LOCATIONS:

1. "EXIT" SIGN @ EACH GRADE LEVEL EXTERIOR EXIT DOOR.
2. "EXIT ROUTE" SIGN @ EACH EXIT DOOR THAT LEADS DIRECTLY TO A GRADE LEVEL EXTERIOR EXIT BY MEANS OF AN EXIT ENCLOSURE OR AN EXIT PASSAGEWAY.
3. "EXIT ROUTE" SIGN @ EACH EXIT ACCESS DOOR FROM AN INTERIOR ROOM OR AREA TO A CORRIDOR OR HALLWAY THAT IS REQUIRED TO HAVE VISUAL EXIT SIGNS.
4. "TO EXIT" SIGN @ EACH EXIT ACCESS DOOR THROUGH A HORIZONTAL EXIT.

NOTE:
* SIGNAGE SHALL COMPLY WITH CBC SECTION 11B-703
* SIGNAGE SHALL COMPLY WITH CFC SECTION 1011.3

SIGNAGE GENERAL NOTES | 12" = 1'-0" | 2A10.31 | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LICENSED ARCHITECT
JULIAN WATT
C-40596
17 DEC 2022
RENEWAL DATE
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA	03/20/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

SIGNAGE FLOOR PLAN

2A10.31

STRUCTURAL STEEL

1. Provide readily identifiable structural steel compliant with Applicable Code Section 2202A.1.

2. Structural Steel: Furnish structural steel complying with the following ASTM standard specifications unless noted otherwise:

Use/Shape	Type/Grade	GWP Limit (unfabricated) (MT CO_2e/MT)	Notes
Wide Flanges and Channels	ASTM A992, Grade 50	1.01	
Angles	ASTM A572, Grade 50	1.01	
Plates	ASTM A572, Grade 50	1.49	
Hollow Structural Sections (rectangular and round)	ASTM A500, Grade C (50 ksi)	1.71	
Pipes:	ASTM A53, Grade B (35 ksi)		
Anchor Rods:	ASTM F1554, Grade 55		Weldable All Threaded
Headed Anchor Bolts	ASTM F1554, Grade 55		Weldable

3. Holes for Bolted Connections and Anchor Rods: AISC "standard" holes, unless noted otherwise. See note below for oversized holes for anchor rods in non-frame base plates.

4. High Strength Bolts, Nuts and Washers: AISC "Specification for Structural Joints Using High-Strength Bolts."
   A. Hardened Washers: ASTM F436, under nuts, except where plate washers are used. Provide beveled washers where joint face slope is greater than 1:20.
   B. Tightening: Snug tight for all high-strength bolts except tighten A325-SC and A490-SC bolts to at least the minimum proper tension according to the AISC Specification.
   C. Provide Class A Faying Surface or better at bolted connections indicated with "SC" type bolts.
   D. All bolts that are part of the "Seismic Force Resisting System" shall be "SC" type bolts.

5. Welding:
   A. Applicable Welding Standard: Applicable Code and latest adopted edition of AWS D1.1 and D1.8.
   B. Pre-qualified and Non-Pre-qualified Welds: Welds shall be pre-qualified in compliance with Applicable Welding Standard. Where non-pre-qualified welds are to be used, qualify by test and procedure qualification test record complying with Applicable Welding Standard.
   C. Work performed by Welders and Inspectors: Adhere to approved Welding Procedure Specification (WPS). Each welder and inspector shall retain a copy of WPS.
   D. Pre-construction Meeting: Conduct to include Architect (Structural Engineer), fabricator, erector, Contractor and inspectors to discuss Welding Procedure Specification (WPS).
   E. Welding Procedure Specification (WPS): The fabricator/erector shall develop a WPS in compliance with the Applicable Welding Standard. Submit the WPS to the Architect (Structural Engineer) for record before fabrication.. Procedures submitted shall result in completed connections that comply with the design intent of structural drawings. No deviation from structural drawings is permitted unless otherwise accepted by Architect (Structural Engineer) and approved by Governing Code Authority.
   F. Welding Electrode (Filler Metal): E70xx (70 ksi), UNO. Use low hydrogen electrodes only.
      a. Provide filler metal with Charpy V-notch toughness of 20 ft/lbs at or lower than 0°F as determined by the appropriate AWS classification test method. See REINFORCING STEEL for electrodes at reinforcing bar to reinforcing bar, UNO.
      b. Complete penetration welds: provide filler metal with Charpy V-notch toughness of 20 ft/lbs at -20°F.
      c. Welds indicated as "Demand Critical" (DC) shall comply with AISC 341 sections A3.4b and I2.3. These welded connections shall be made with a filler metal achieving a minimum Charpy V-notch toughness of 20ft/lbs at or lower than 0°F and 40ft/lbs at or lower than +70°F.
   G. Welding Toughness Requirements: Certify conformance to Charpy V-notch toughness requirements with tests by an independent testing laboratory for each AWS classification, manufacturer and trade name. Testing procedures shall be in accordance to Applicable Welding Standard and AWS D1.8.
   H. Fabricators: Perform shop welds by fabricators approved by LA City or AISC.
      a. Welder Qualification: Welders, regardless if Work is performed in shop or in field, shall be qualified for the Work they will be doing and shall have certifications current and acceptable to Governing Code Authority.
      b. Special inspection shall be required for all welding, as required by governing code authority.
   I. Welds Exposed to View:
      a. Faces of fillet welds exposed to view shall have as-welded surfaces that are reasonably smooth and uniform. No finishing or grinding shall be required, except where clearances or fit of other items may so necessitate.
      b. Partial and full penetration welds exposed to view shall be ground smooth and flush with finish surface of steel. Remove backup bars and weld tabs. Fill holes with weld metal or body solder and smooth by grinding or filing.
   J. Groove Preparation: Clean groove preparation thermal cuts by grinding.
   K. Termination of Welds: Terminate at joint ends in a manner that ensures sound welds. Use extension bars and run-off tabs whenever necessary.
   L. Hand-held Calibrated Amp and Volt Meters: To be used by fabricator, erector and inspectors to assure proper amperage and voltage of welding process. Measure amperage and voltage at arc. Verify travel speed and electrode stick-out in compliance with electrode manufacturer's recommendations and with approved WPS.
   M. Storage of Electrodes: Adhere to Section 5.3 of AWS D1.1.
   N. Weld each flange of moment frame beam to column connections in one continuous process without cooling below pre-heat temperature.
   O. Welding of ASTM A913 Materials: Perform according to requirements of latest edition of AWS standard, structural drawings and specifications, whichever is more stringent.
   P. Minimum Fillet Weld Size: Where minimum fillet weld size, as stipulated by AISC Section J2 and Table J2.4, exceeds fillet weld size indicated on structural drawings, use AISC stipulated size.
   Q. Minimum Groove or Butt Weld Size: Provide complete penetration unless indicated otherwise.
   R. Minimum Flare Bevel Weld Size: Provide weld flush to outside face of surface unless indicated otherwise.
   S. Weld Length: Length of welds shown are net effective lengths. Where length of weld is not indicated, provide weld full length of joint.
   T. Welding at Galvanized Steel: Galvanization shall be ground off prior to welding. Repair galvanization after completion of welding.

6. Shop Drawings: Submit To Architect (Structural Engineer) for review and, upon request, to Governing Code Authority. Include sequence of erection procedures from approved WPS:

7. Sustainable Design Submittals: Submit type III factory-specific or product-specific environmental product declaration (EPD) for each of the following products:
   A. Hot Rolled Structural Steel
   B. Hollow Structural Steel
   C. Steel Plate

8. Fabrication: Perform in shop approved by LA City or AISC
   A. Moment Connections: Orient flange stiffener plates and cap plates used in moment connections so that rolling direction of plate is parallel with direction of principal stress.
   B. Horizontal Members: Place natural camber up.
   C. Filler Plates: Provide at splices of parts having more than 1/8-inch difference in thickness. Filler plates to match grade of material spliced.

9. Traceability:
   A. Material tracing is required for all steel including miscellaneous metals, connectors, and steel products manufactured by third parties. The contractor is advised that material tracing is required as directed by DSA and the project inspection team and may include any or all of the levels of traceability described below:
      a. Lot traceability: materials can be traced to the set of mill test reports (MTRs) for the project.
      b. Piece-mark traceability: heat number can be correlated to each piece mark.
      c. Piece traceability: heat number can be correlated for each piece, which requires separate piece marks for each piece, or marking of each individual piece with its heat number.
   B. Prior to placing the mill order, the contractor shall schedule a preconstruction meeting to include the AOR, SEOR, PI and inspectors responsible for inspection of the steel material fabrication and erection/installation for the purpose of reviewing material traceability requirements.
   C. The contractor shall include the cost of piece traceability in their basic services and provide deductive alternates for piece-mark and lot traceability to be provided as a credit to the Owner.

10. Cleaning: After fabrication, clean steel surfaces free of rust, loose mill scale, and oil.

11. Oversized Holes for Anchor Rods in Non-Frame Column Base Plates: Oversized holes in the base plate may be provided at the contractor's option in accordance with AISC Table 14-2 UNO. Where oversized holes are provided, provide a plate washer with a standard hole with a minimum size per AISC Table 14-2 (3/8" thick min) UNO.

12. Exposure to Soil: Encase structural steel in lean concrete with 4 inches of concrete cover where exposed to soil.

13. Exposure to Weather: UNO, All structural steel (including connection elements) exposed to weather shall be hot dipped galvanized or coated in high performance exterior grade paint. Coordinate finishes with architect at AESS. At welding on galvanized or painted members, remove and repair galvanization or paint as required.

14. Exposure to View: All structural steel (including connection elements) exposed to view in the completed structure shall be designated Architecturally Exposed Structural Steel (AESS) UNO. AESS classification of members, unless a more restrictive class is indicated in Architectural drawings or project specifications, shall be as follows:
   A. All Exposed Steel, UNO: AESS-1

15. NOT USED

16. See QUALITY ASSURANCE general notes for non-destructive testing.

17. SFRS denotes items considered part of the "SEISMIC FORCE RESISTING SYSTEM" (Refer to AISC 341-16 and AWS D1.8).

18. DC denotes welds considered "DEMAND CRITICAL" per AISC 341-16 Section A3.4B and I2.3.

19. Field weld flag symbols indicate design intent but are not requirements. Whether a weld is to be made in the shop or in the field is means and methods to be coordinated by the contractor.

20. Where bent plates specified cannot be bent due to thickness, provide two plate pieces joined with a complete penetration weld.

CAST-IN-PLACE CONCRETE

1. Concrete mixing shall comply with ASTM C94.

2. Hydraulic Cement:
   A. ASTM C595 see table for types.
   B. Alternatively, ASTM C150 type II/V.

3. Aggregates:
   A. Normal Weight Concrete Aggregate (NW): ASTM C33 for aggregates of natural sand and rock. The maximum aggregate size is noted in the table below. The maximum dry density shall be 145 pcf.
      a. Where smaller aggregate is required for workability or areas of congestion, the contractor shall submit a request to the structural engineer prior to submitting the mix design. Pea gravel is not permitted.
   B. Light Weight Aggregate (LW) for Structural Concrete: ASTM C330, expanded shale lightweight aggregate. The maximum dry density shall be 115 pcf.
   C. Alkali Aggregates: Aggregate shall be non-reactive per ASTM C1778.

4. See the table below for the required concrete properties:

Class	Use/Location	Strength (psi) 28-Day	Agg Type	Max Agg Size (in)	Slump (in)	Max w/c	Target Air %	ASTM C595 Type	Exposure Category	GWP Limit $kgCO_2e/m^3$
A	UNLESS NOTED OTHERWISE	4,000	NW	1	3-5	0.5	--	IL	F0,S0	324
B	FOOTING AND GRADE BEAMS	4,000	NW	1	3-5	0.5	--	IL	F0,S0	324
C	SLAB ON GRADE	4,000	NW	1	3-5	0.45	--	IL	F0,S0	378

5. Slump: Per ACI 301, CH. 4 and CBC section 1705A.3. The specified slump above is measured before applying chemical add mixtures. The slump may be increased at the contractor's option for workability and should be noted in the mix design submittal.

6. Global Warming Potential (GWP): as defined in the specifications.
   A. Concrete may be considered one product category to comply with the GWP Limit. A weighted average of the maximum GWP for all concrete mixes installed in the project shall be less than the weighted average maximum GWP as specified above. Calculations shall be submitted for approval.

7. Air content shall be +/- 1.5 percentage points from the specified target air content in the table above.

8. All concrete above grade, including slab on grade, deck fill, wall, topping slab, stair landing and tread, shall have 1.5 pounds of 3/4" long fibrous reinforcing per cubic yard of concrete.

9. Lean Concrete: Where specifically indicated, containing 2 sacks of cement per cubic yard of concrete. Use only where specifically called for.

10. Non-shrink Grout: ASTM C1107, cementitious, non-metallic, attaining a compressive strength of 8000 psi.

11. Concrete Mix Design Submittal: Prior to ordering concrete, submit for each compressive strength and type of concrete required designed, mix designs signed, and sealed by a registered Civil or Structural Engineer in State of California to Architect (Structural Engineer), Special Inspector and to Governing Code Authority complying with California Building Code, Chapter 19.

12. Sustainable Design Submittals: For each concrete mix design to be used on site, submit a Type III factory-specific or product-specific environmental product declaration (EPD).

13. Construction Joint: Roughen surface to 1/4-inch amplitude. Clean, remove laitance, thoroughly wet and remove standing water before placing new concrete. Submit to the Architect (Structural Engineer) at least 14 days prior to placing concrete indicating locations of construction joints and extent of pours. Place joints at locations to minimize the effects of shrinkage as well as being placed at points that least impair the strength of the structure. Provide dowels as directed.

14. Embedments and Penetrations in Concrete: No penetration through structural concrete is permitted unless shown in these drawings or specifically accepted in writing by the Architect (Structural Engineer). Do not cut any reinforcing.
   A. Pipes, Sleeves, Conduits, and Ducts: Not permitted embedded or penetrating concrete spread footings, columns, walls or concrete cast over metal decking, except as shown in these drawings.
   B. Conduits Embedded in Structural Concrete Slabs: Not permitted unless limited to two layers of 1 inch, and 1/6 slab thickness. outside diameter conduits and smaller spaced at least 3 inches center to center and within middle third of slab thickness. No conduit embedded in concrete cast over metal decking is permitted. No aluminum conduit is permitted.

15. Chamfered Corners: Provide 3/4-inch chamfer at exposed corners of columns, beams and walls except where structural walls are laid flush with column or beam faces, unless detailed otherwise.

16. Curing: Maintain concrete above 50 degrees Fahrenheit and in a moist condition for a minimum of 7 days after placement unless otherwise accepted by the Architect (Structural Engineer).

17. NOT USED

18. NOT USED

19. The maximum water-soluble chloride ION (Cl) content in concrete by percentage of weight cement is 0.30.

20. Where "Styrofoam" or "EPS" is indicated on the drawings, provide expanded polystyrene conforming to ASTM D6817 Type EPS12 with the following physical properties.
   A. Density (min): 0.70 lb/ft^2
   B. Compressive Resistance (min): 2.2 psi @ 1% strain
   C. Flexural Strength (min): 10.0 psi

REINFORCING STEEL

1. Reinforcing Steel: All bars shall be deformed.Table Notes:

Use/Location	Type/Grade	GWP Limit (unfabricated) $MTCO_{2e}$/MT	Notes
Standard Bars (#3 thru #6)	ASTM A615, Grade 60	0.89	A
Standard Bars (#7 and larger)	ASTM A615, Grade 60	0.89	A
Bars to be welded (#3 thru #6)	ASTM A706, Grade 60	0.89	-
Bars to be welded (#7 and larger)	ASTM A706, Grade 60	0.89	-
Smooth WWF	ASTM A1064, Fy = 65 ksi	-	B
Deformed wire stirrups	ASTM A1064, Fy = 65 ksi	-	C
Spiral reinforcing	ASTM A1064, Fy = 65 ksi	-	-

   A. Additional Requirements for Bars, Excluding Ties, for vertical bars in Shear Walls:
      a. No additional requirements if ASTM A706 bars are used.
      b. ASTM A615 bars are permitted provided actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi (retests shall not exceed this value by more than an additional 3,000 psi) and ratio of actual ultimate tensile stress to actual yield stress is not less than 1.25.
   B. Provide WWF in flat sheets only - do not use rolled mesh. Lap 1-1/2 wire spaces (1 foot minimum).
   C. Only D4 and larger are allowed.
   D. MT = Metric ton

2. Reinforcing shall be placed in accordance with the American Concrete Institute Standard 318 (ACI318) and Concrete Reinforcing Steel Institute's (CRSI) "Manual of Standard Practice". Reinforcing shall be kept clean and free of rust.

3. Provide all accessories needed to support reinforcing in the positions shown in the drawings. Chairs and spacers for reinforcing shall be non-ferrous or plastic-coated when resting on exposed concrete surfaces.

4. Shop Drawings: ACI 318. Show reinforcing steel placement, including sizes, quantities, spacing, clearances, splice locations, lap lengths, and concrete coverage and submit to the Architect (Structural Engineer). Promptly notify the Architect (Structural Engineer) prior to developing shop drawings if insufficient clear distances between reinforcing steel and other congestion are encountered. Notify Special Inspector of adjustments made from approved Contract Documents which are indicated on accepted shop drawings that facilitate field placement of reinforcing steel and concrete. All bars shall be marked so that they can easily be identified by the project inspector after installation.

5. Sustainable Design Submittals: For each type and grade of reinforcing, submit a type III factory-specific or product-specific environmental product declaration (EPD).

6. Lap Splices: At concrete, Provide Class B splices per Typical Bar Development Schedules UNO. At masonry, provide 72db lap splice length UNO. Splice bars only at locations indicated. If additional splice locations are proposed, promptly notify the Architect (Structural Engineer) prior to developing shop drawings.
   A. Splices in Walls: Locate splices in horizontal bars at well-staggered locations. Do not splice vertical bars except at horizontal supports such as floor and roof diaphragms.

7. Mechanical and Welded Splice: Mechanical Splices and Welded Splices are to be used only at the indicated locations. Notify the Architect (Structural Engineer) of all instances prior to developing shop drawings.
   A. Mechanical Splice: Mechanical couplers shall have a current Evaluation Report and satisfy ACI requirements for type 2 couplers for the applicable bar size/grade designation.
   B. Welded Splice: Welded splice shall develop at least 125 percent of the yield strength of the spliced bar for the applicable bar size and grade designation.

8. Minimum Clearances Between Parallel Reinforcing Steel, Including Distance Between Sets of Spliced Bars: 1 inch, 1 bar diameter, or 4/3 times the maximum aggregate size, whichever is greater. 1-1/2 inches, 1-1/2 bar diameters, or 4/3 times the maximum aggregate size, whichever is greater, at columns, piers, and pilasters only. For bundled bars, minimum clear distances between units of bundled bars shall be the same as single bars, except bar diameter is derived from the equivalent total area of the bundle.

9. Specified Concrete Coverage: Place bars as near to the concrete surface as the following specified coverages and in accordance with ACI 117:
   A. Slabs on Grade — Locate at the center of slab.
   B. Slabs Supporting Earth Above — 1-1/2 inches from top.
   C. Formed Concrete Exposed to Earth or Weather — 1-1/2 inches (#5 and smaller); 2 inches (#6 and larger)
   D. Concrete Poured Against Earth (Unformed) — 3 inches
   E. Walls Above Grade, Exposed to Weather — 1-1/2 inches (#5 and smaller); 2 inches (#6 and larger)
   F. Walls Above Grade, Not Exposed to Weather — 3/4 inch (#11 and smaller); 1-1/2 inches (#14 and larger)

10. Dowels between foundations and vertical wall & column bars shall match the size, grade and spacing of the column up wall vertical reinforcing and be lapped with a class B lap splice, UNO.

11. Dowels at Construction Joints: Provide dowels matching size and quantity of reinforcing steel interrupted at construction joints, unless detailed otherwise.

12. Placement of Bars in Walls (unless detailed otherwise): Place vertical bars closest to wall surfaces at curtains containing vertical and horizontal bars of the same size. In curtains with vertical and horizontal bars of different sizes or spacing, place the layer with the most steel area closest to the near wall surface.

13. Bars Terminating at Walls, Columns, Beams, and Foundations: Extend bars to within 2 inches (3 inches at concrete poured against earth) of the far face of the wall, column, beam, or foundation and provide a standard hook unless detailed otherwise.

14. Bars Interrupted by Structural Steel: Extend bars within 2 inches of the steel face and provide a standard hook unless detailed otherwise.

15. Welding: AWS D1.4, edition adopted by applicable code.
   A. Acceptable Reinforcing Steel for Welding: ASTM A706. If welding of reinforcing steel other than A706 is desired, submit a proposed procedure, indicating conformance with the Applicable Code and requirements of the Governing Code Authority, to the Architect (Structural Engineer) for acceptance and to the Governing Code Authority for approval prior to execution.
   B. Rebar to rebar weld is not allowed except where specifically indicated on plans. Provide electrode E80XX (80 ksi) where permitted.
   C. Welder Certification: As required by the Governing Code Authority.

16. See welding notes in the Structural Steel Section of these notes for additional requirements.

17. Bending: Bend cold unless otherwise accepted by the Architect (Structural Engineer). Do not field-bend reinforcing steel bars embedded in concrete unless otherwise accepted in writing by the Architect (Structural Engineer).

18. In-plant fusion welding of holding wires to ties, stirrups and hoops in beams, columns and grade beams to preassemble reinforcing steel cages is permitted under the following conditions per CBC 2022 1903A.8:
   A. Fusion welding is not allowed to longitudinal reinforcing steel in any beam, column or grade beam. The holding wire area shall not exceed 5% of the beam, column or grade beam cross sectional longitudinal steel area.
   B. Fusion welding of holding wires to the ends of the reinforcing steel placed in mats (spread footings, slab reinforcement, etc.) provided the fusion weld occurs within 6 bar diameters of the free end of the bar (e g. not allowed at the end of coupled, t-headed or weld spliced bars).
   C. Fusion welding of holding wires shall not occur on a bent portion of a reinforcing bar. After holding wire has been fusion welded to a reinforcing bar, that bar may not be bent where the fusion weld occurs.
   D. Contractor to submit complete shop drawings indicating which members will use fusion welding process for preassembly. Provide complete details indicating the size of stirrups, holding wires and welding requirements.
   E. Holding wires shall conform to ASTM A1064.
   F. All reinforcing steel to be welded shall comply with ASTM A706 Grade 60.
      a. Contractor to submit complete shop welding program outlining the following: Type of specific fusion welding machine (i.e. Schnell IDEA 12/25 Machine, etc.)
      b. Periodic inspection of the in-plant welding.
   G. Fusion welded reinforcing steel shall have one tensile test taken from one specimen sampled at a rate of 2.5 tons or fraction thereof of each size of reinforcing steel fusion welded. No bend test is necessary. The specimen shall have a holding wire attached to it that need not be removed. The elongation requirements shall comply with the ASTM of reinforcing steel specified on the construction documents (e g. if A615 is specified, but A706 is used due to the welding requirement, then A615 elongation requirements shall be satisfied).
   H. The use of fusion welding shall conform to ACI 318-19 26.6.4.
   I. If field conditions result in conflicts with other structural members (ex. anchor bolts) the rebar must be relocated in the field to avoid said conflicts.

PROJECT SCOPE

1. New door opening in existing wood shear wall.
2. New mechanical equipment anchorage.

DESIGN LOADING

1. Loading and Design Parameters:
   A. Live Load
      a. Floor / Roof Live Load: Per CBC 1607A.1.
         • Roof Live Load: 20.0 PSF (Reducible)
      b. Live Load Reduction:
         • Roof Live Load: General (Section 1607.14.1)
   B. Wind Design Parameters
      Wind Speed Strength level, V: 100 MPH (STRENGTH)
      a. Wind Speed Allowable Stress, V_{asd}: 77 MPH (ASD)
      b. Risk Category: II
      c. Exposure: C
      d. Enclosure Classification: Enclosed
         • Internal Pressure Coefficient, GC_{Pi}: +/-0.18
   C. Rain Loads
      a. Rain Intensity (15-minute), i: 2.22 (in/hr)
   D. Snow Loads Parameters:
      a. Ground snow load, p_g: 0 PSF
   E. Project Seismic Design Parameters:
      a. Site Class: D
      b. Mapped Spectral Acceleration (S_s, S_1): 0.706 g, 0.280 g (respectively)
      c. Site Specific Spectral Response Coefficient (S_{DS}, S_{D1}): 0.582 g, 0.571 g (respectively)
      d. Site Coefficient (F_a, F_v): 1.235, 2.04 (respectively)
      e. Risk Category: II
      f. Seismic Importance Factor I_e: 1.00
      g. Seismic Design Category: D
      h. Irregularities: None

DEFERRED SUBMITTAL ITEMS ANCHORED OR SUPPORTED BY STRUCTURE

1. Design Responsibility: Contractor to design and obtain separate AHJ approval for deferred approval items noted on Gx series sheets.

2. Shop Drawings and Structural Calculations: Submit design plans, details and calculations of deferred submittal items signed and sealed by a registered structural engineer registered in the state having jurisdiction to Architect (Structural Engineer) for acceptance and to AHJ for approval prior to fabrication.

3. Design: Design components for imposed forces, including lateral restraint, complying with the Applicable Code, Contract Documents, and applicable portions of AISI Specifications. If the building Seismic Force Resisting System (SFRS) is used for lateral restraint, indicate load paths to the building lateral resisting system in calculations and show connection forces on shop drawings. Where the building provides vertical support, indicate loads and load paths to the building in calculations and show connection forces on shop drawings. Dead load elements at the lowest level of connection uno Design loads are as follows:
   A. Dead load: Self-weight of the deferred system (including supported components of othersystems).
   B. Live load: Per applicable code. See General Notes Section LOADS
   C. Seismic and wind loads: Per applicable code. See General Notes Section LOADS.
   D. Design Movement:
      a. Lateral Movement: See General Notes Section LOADS
      b. Vertical Movement: Live Load Deflection of L/360

4. Stabilizing Elements at Connections to Structural Members: Design connections of deferred submittal items to supporting structure such that torsion in supporting elements is avoided whenever possible. Where torsion in supporting element has resulted, provide beam bottom flange kicker brace per detail 17 or 18/S6.11 at each connection point.

QUALITY ASSURANCE (STRUCTURAL OBSERVATION, MATERIALS TESTING, and SPECIAL INSPECTION)

1. Structural Observation:
   A. The Architect (Structural Engineer) of record will visually observe the construction as required by CAC 4-333 and CAC 4.341 and in accordance with the governing code. These visual observations shall not be considered a substitute for special inspections.
   B. Coordination Responsibilities of Contractor: Notify the Architect (Structural Engineer) 48 hours in advance of critical stages of construction indicated below so visits may be scheduled by the Structural Observer. Failure by the Contractor to meet the observation schedule may require the removal of subsequent Work for observation. Contractor to bear costs of removal and replacement of finished Work or framing damaged by the removal process or as required for corrective action and for any associated scheduling delays.
      a. Critical stages of construction that require structural observation.
         • After new door opening in shear wall is framed
   C. Pre-construction Meeting: The owner may coordinate and call for a meeting between the Architect (Structural Engineer) responsible for structural design, the Structural Observer, the Contractor, affected subcontractors and the Special Inspector. Structural observer will preside over this meeting. Purpose of meeting is to identify major structural elements and connections that affect vertical and lateral load resisting systems of structure and to review schedule of Structural Observation, Materials Testing, and Special Inspection of Project.

2. Mill Test Reports Certifying Materials: The contractor shall submit mill test reports certifying reinforcing steel, and structural steel are of identifiable tested stock to the Owner, Special Inspector, Architect (Structural Engineer) and, upon request, to the AHJ. Ensure materials are properly tagged for identification. If mill test reports cannot be made available or if material cannot be identified, the Testing Laboratory will perform tests as directed by the Architect (Structural Engineer). The contractor shall pay the Testing Laboratory for costs related to tests and inspections of unidentifiable materials or materials furnished without mill test reports, materials found deficient after initial tests and inspections, or materials replacing deficient materials.
   A. Ultrasonic Examination of Heavy Rolled Shapes and Thick Plates at Proposed Welded Moment Connections: Where complete penetration groove welds occur at Groups 4 and 5 structural steel shapes, as defined in ASTM A6, and plates exceeding 2 inches thick, submit mill test reports to Architect (Structural Engineer) and, upon request, to Governing Code Authority. Mill test reports shall certify that Charpy V-notch testing was conducted in compliance with ASTM A6, Supplementary Requirement S5, including impact test complying with ASTM A673 at frequency P with a minimum average value of 20 ft.-lbs. absorbed energy at 70 degrees Fahrenheit.

3. Weld Testing and Inspection: Testing Laboratory will submit weld test results to Owner, Contractor, Architect (Structural Engineer) and to Governing Code Authority. See Specifications for testing requirements not indicated on structural drawings.
   A. Structural Steel Welding: Apart from visual inspection and review of fabrication and erection reports of fabricator/erector's own quality control testing and inspection, the Owner's Testing Laboratory will perform indicated shop and field inspection and testing. The Testing Laboratory will be AWS Q.C.-1 certified and will provide inspectors for continuous inspection of steel fabrication and erection and structural welding. Shop and field testing of materials and welding will be as follows:
      a. Ultrasonic testing (UT) is required for all (100%) complete penetration welds. Test groove welding on continuity plates by ultrasonic testing after beam flange weld connection. Testing shall be performed 24 hours or more after completion of welding. Weld backing removal areas and fillet welds shall be subjected to magnetic particle examination.
         • UT testing reduction: Where the initial rate for UT is 100%, the NDT rate for an individual welder or welding operator is permitted to be reduced to 25% provided that the number of welds containing unacceptable defects divided by the number of welds completed (reject rate) is 5% or less of the welds tested for the welder or welding operator. A sampling of at least 40 completed welds for a job shall be made for such reduction evaluation. See AISC 360-10 N5.5e and AISC 341 J6.2g for additional information.
         • UT Reduction is NOT permitted at demand critical welds.
         • Documentation: All Nondestructive Testing (NDT) performed shall be documented per AISC 360-16 N5.5g.
      b. Not Used
      c. Welds shall be visually inspected and periodically measured (15 percent minimum).
      d. Check 10 percent of fillet welds by magnetic particle (ASTM 109 method). Check 25 percent of continuity plate fillet welds by magnetic particle, UNO. At continuity plates in moment connections (where CJP is used on one or more plate ends), 100 percent of fillet welds shall be tested by magnetic particles.
      e. Not Used
      f. k-Area welds shall be MT'd no sooner than 48 hours after completion of the weld.
      g. Amperage, voltage, polarity and electrode stick out will be verified for compliance with the electrode manufacturer's recommendations.

4. Special Inspection: Per DSA-103 and Chapter 17A of CBC.

GENERAL

1. Authority Having Jurisdiction (AHJ): Division of the State Architect (DSA SS)
   Applicable Building Code 2022 California Building Code (CBC) as modified by AHJ. References to industry standards herein shall be the latest edition as adopted by the Applicable Code.

2. Field Verification: Field verify the existing conditions and dimensions prior to construction. Promptly notify the Architect (Structural Engineer) in case of discrepancies.

3. Design Intent: Contract Documents indicate the design intent for the structure in its completed state. They do not indicate the method of construction. Promptly notify the Architect (Structural Engineer) prior to proceeding with the Work if the design intent requires further clarification.

4. Deviations, Modifications and Substitutions to Approved Structural Drawings: Must be accepted in writing by the Architect (Structural Engineer) and approved by AHJ. No deviation, modification or substitution will be accepted via shop drawing review.

5. Procedures of Construction: The contractor is responsible for procedures of construction that comply with national, state and local safety ordinances. Site visits (including Structural Observation) by the Architect (Structural Engineer) do not constitute supervision of the methods of construction.
   A. Protection of Utilities: Locate existing utilities, including those not shown on Contract Documents, and protect them from damage. The contractor bears the expense of repair or replacement of utilities in conjunction with the execution of Work.
   B. Excavations: Protect structure, adjacent structures, adjacent properties, streets, and utilities during excavation utilizing lagging, shoring, underpinning and related procedures as may be required. Provide necessary support for soil at the sides of excavations. The contractor and affected trades shall refer to the Geotechnical Report for more information.
   C. Protection of Structure: Provide necessary measures to protect the structure and adjacent buildings during the execution of Work.
   D. Contractor Proposed Revisions: Where a revision of structural design or connection is proposed by the Contractor to accommodate construction tolerances, construction sequence and/or dimension modifications, the Contractor shall retain a structural engineer licensed in the State having jurisdiction to perform design. Submit stamped and signed design drawings and calculations to the Architect (Structural Engineer) for review and to the AHJ for approval.
   E. Erection Plans: Determine phases of Work requiring erection plans according to applicable safety regulations. Maintain certified copies of erection plans at the site during construction.
   F. Shoring, Bracing, and Other Temporary Supports: Design and erect shoring, bracing, and other temporary supports where the structure has not attained design strength and as required for safe erection. Ensure floor, roof, and wall members are securely shored and braced during construction. Provide shoring at elevated beams and slabs supporting concrete or masonry walls during and after the wall pour until the wall attains design strength.
   G. Temporary Loading: Ensure construction loads do not exceed indicated design live load values. Notify affected sub-contractor trades of these design load limits.
   H. Fabrication, Shipment, and Erection of Structural Steel: Ensure stresses occurring during fabrication, shipment, and erection of structural steel are temporary and are less than the design and allowable stress capacities of individual members. Do not impair the full design and load-carrying capacity of members due to fabrication, shipment, or erection. The contractor is responsible for controlling the erection sequence, erection procedure, temperature differentials and weld shrinkage to minimize residue stresses. Provide additional materials for the erection of structural steel, such as temporary bracing and guy cables, as may be necessary at no additional cost. Remove these materials unless approved in writing by the Owner. Do not tighten bolts in typical beam to column connections for erection purposes.
   I. Securing Reinforcing Steel, Dowels, Anchor Bolts and Embeds: Firmly support and accurately place complying with ACI standards prior to casting concrete or grout in masonry walls. Use ties and support bars in addition to reinforcing steel shown where necessary. No welding of reinforcing steel, including tack welding, is permitted unless otherwise accepted in writing by the Architect (Structural Engineer). Provide plastic or plastic-coated chairs and spacers when resting on exposed surfaces.
   J. Coordination Responsibility: The Contractor is responsible for the coordination of Work, including that of sub-contractor trades.
   K. Core drilling of hardened concrete or masonry shall only be done after a specific review by the Architect (Structural Engineer). Core drilling shall not cut any reinforcing. Coverage for reinforcement, as described in these notes, shall be maintained at the locations of cores. Locate reinforcing by non-destructive methods as required.

6. Request for Information (RFI)/Request for Clarification (RFC): Accompany RFI/RFC's with partial structural foundation or framing plans showing the location in question and affected structural members. Copy partial plan from structural drawings and indicate grid line locations and floor level. Provide properly drawn engineering sketches illustrating issues and the Contractor's proposed solutions. Photographs are not acceptable substitutes for engineering sketches.

7. Submittals: Submit to the Architect (Structural Engineer) as indicated on structural drawings and specifications. The General Contractor shall review the submittal for completeness and compliance with Contract Documents prior to submission.
   A. Composite Slab Penetration Submittal: Submit to the Architect (Structural Engineer) for each floor indicating the size and location of each slab penetration and opening as necessary by all affected trades. Submit penetration plans together with corresponding metal decking or reinforcing steel shop drawings. Submit a written statement from the Special Inspector that no additional penetrations or openings were added to those shown in the penetration submittal.
   B. Composite Concrete and Masonry Wall Penetration Submittal: Submit to the Architect (Structural Engineer) for each wall indicating the size and location of each wall penetration, embed assembly, and opening by all trades. Submit penetration elevations together with corresponding reinforcing steel shop drawings, including locations of control and expansion joints. Submit a written statement from the Special Inspector that no additional penetrations or openings were added to those shown in the penetration submittal.

8. Contract Documents Use: Review Contract Documents in their entirety before performing structural-related Work and before developing shop drawings. Bring discrepancies to the immediate attention of the Architect (Structural Engineer) before starting Work.
   A. Scaling of Drawings: Not permitted.
   B. Additional Structural Requirements: See specifications.
   C. Building Geometry: See architectural drawings for building geometry including, but not limited to, top of floor and roof elevations; depressions; slopes; curbs; drains; trenches; slab and deck edge locations; wall overall dimensions; and size and locations of openings in floors, roof, and walls.
   D. Non-structural Items Requiring Special Provisions: See architectural, mechanical, plumbing, and electrical drawings for non-structural items requiring special provisions during construction. They include but are not limited to, non-structural walls; size and locations of openings and sleeves penetrating structure; size and location of concrete curbs and pads; size and location of piping, ductwork, and equipment anchorages mounted or suspended from the structure. Verify the exact size and location of equipment with the equipment manufacturer.
      A. Work shown is new unless noted as existing thus, (E).
   E. Materials: Furnish and install in compliance with legally constituted public authorities having jurisdiction, including county and local ordinances and safety orders of the State Industrial Accident Commission, OHSA. The Architect (Structural Engineer) and Owner accept no responsibility for the contractor's failure to comply with these requirements.
   F. Penetrations, Embedments, and Openings in Structural Members: No penetration, embedment, opening, sleeve, pipe, or conduit shall occur in structural members, including footings, slabs, walls, columns, and beams unless specifically shown or indicated on structural drawings.
   G. Typical Details: Details on sheets indicated as typical are applicable throughout the Project wherever the described condition occurs and may or may not be specifically referenced on structural drawings. The contractor is responsible for identifying these details and understanding the extent of their application prior to performing Work. Details not shown or noted shall be similar to those shown for similar construction. The contractor shall submit RFI's for details such as this to the Architect (Structural Engineer) prior to proceeding with work.

9. Evaluation Report:
   A. References to Evaluation Reports for proprietary materials herein shall be the latest edition as adopted by Authority Having Jurisdiction (AHJ).
   B. For proprietary structural elements and products, the product is to hold an Evaluation Report in compliance with the applicable code for the product's intended use.
   C. Approved Evaluation Report Agencies:
      a. ICC (ICC-ES)
      b. IAPMO (IAPMO-ES)
      c. HCAI (OPM / OSP / OPD)
      d. City Of Los Angeles (COLA/RR)
      e. Miami-Dade (NOA)
      f. Other Agencies as noted in DSA IR A-5.

EARTHWORK and FOUNDATIONS

1. Geotechnical Report: Perform soil work complying with foundation design based on recommendations in MPE No. 06317-03; prepared by MID PACIFIC ENGINEERING, INC.; dated June 6, 2025 and subsequent addenda letters. Maintain a copy of the report and all addenda on the site.

2. Grading, Excavations, Backfill and Compaction of Backfill: Comply with the Geotechnical Report and requirements of the Governing Code Authority and perform only under the Continuous Special Inspection of the geotechnical engineer. Building pads shall be over-excavated as recommended in the Geotechnical Report. If soft pockets are discovered during over-excavation, additional over-excavation will be required as directed by the Geotechnical Engineer.

3. Foundation Excavations: Footing foundations are to bear on approved compacted fill as indicated in the Geotechnical Report. Excavations are to be inspected by the geotechnical engineer prior to the placement of reinforcing steel and formwork. Ensure excavations are clean, dry and free of debris or loose soil. Slope sides of excavation not less than minimum slope indicated in Geotechnical Report. Cast concrete directly against excavated surfaces as soon as possible. Do not allow water in beam trenches or footing excavations after final compaction and before concrete placement.

4. Allowable Building Footing Foundation Design Values per Geotechnical Report.
   A. Bearing Capacity: 2500psf, for min. 2'-0" wide spread footing and 1'-3" wide continuous footings both with 2'-0" min. embedment. Values may be Increased to 3,300 psf for transient loading.
   B. Passive Lateral Bearing Pressure: 300 psf/ft.
   C. Coefficient of Friction: 0.25.
   D. Combined Lateral Resistance : Combine passive and frictional resistance only where frictional resistance has been reduced by 50%.

5. Allowable Site Structure Foundation Design Values per Geotechnical Report.
   A. Passive Lateral Bearing Pressure: 150 psf/ft. Value may be Increaed by 1/3 for transient loading.

6. Backfilling of Retaining Walls: Place after completion and inspection of waterproofing. Adequately shore retaining walls during backfill operation. Unless adequately shored, do not place backfill behind building structure retaining walls until concrete at elevated floor levels adjacent to walls is completely poured and has cured for at least 7 days at site walls; concrete shall reach full design strength prior to backfilling unless adequately shored.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER HARSHDA A. PRASAD NO. S6463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DISIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	12" = 1'-0"

GENERAL NOTES

2S0.01

ABBREVIATIONS

&	AND
@	AT
Ø	DIAMETER
>	GREATER THAN
≥	GREATER THAN OR EQUAL TO
<	LESS THAN
≤	LESS THAN OR EQUAL TO
#	"POUNDS, NUMBER"
AB	ANCHOR BOLT(S)
ABV	ABOVE
ADDL	ADDITIONAL
ADJ	ADJACENT
AESS	ARCHITECTURAL EXPOSED STRUCTURAL STEEL
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
ALUM	ALUMINUM
AOR	ARCHITECT OF RECORD
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
ASD	ALLOWABLE STRESS DESIGN
(B)	BOTTOM
BF	BRACED FRAME
BFF	BELOW FINISHED FLOOR
BLDG	BUILDING
BLKG	BLOCKING
BLW	BELOW
BM	BEAM
BN	BOUNDARY NAILING
BO	BOTTOM OF
BOD	BOTTOM OF DECK
BOF	BOTTOM OF FOOTING
BOPC	BOTTOM OF PILE CAP
BOS	BOTTOM OF STEEL
BOSL	BOTTOM OF SLAB
BOT	BOTTOM
BP	BASE PLATE
BRB	BUCKLING RESTRAINED BRACE
BRCG	BRACING
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN
BU	BUILT-UP
C	CAMBER
CA	COLUMN ABOVE
CANT	CANTILEVER
CB	COLUMN BELOW
CGS	CENTER OF GRAVITY OF PRESTRESSING STRAND
CIP	CAST-IN-PLACE
CIV	CIVIL
CJ	CONSTRUCTION/CONTROL JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CLT	CROSS LAMINATED TIMBER
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION/CONNECT
CONST	CONSTRUCTION
CONT	CONTINUOUS
COORD	COORDINATE
COV	COVER
CTR	CENTER
CVN	Charpy V-Notch
d	Penny - Nail size
db	"REBAR, WIRE, or PRESTRESSSING STRAND DIAMETER"
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DCW	DEMAND CRITICAL WELD
DEMO	DEMOLITION/DEMOLISH
DET	DETAIL
DF	Douglas Fir
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	Down
DO	DITTO
DWG	DRAWING
DWL	DOWEL
(E)	EXISTING
EA	EACH
EBF	ECCENTRICALLY BRACED FRAME
EDP	ENVIRONMENTAL PRODUCT DECLARATION
EF	EACH FACE
EFF	EFFECTIVE
EGRS	Elevator Guide Rail Support
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMBED	"EMBEDMENT, EMBEDDED"
EN	EDGE NAILING
ENGR	ENGINEER
EOR	ENGINEER OF RECORD
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ER	EVALUATION REPORT
ESR	EVALUATION SERVICE REPORT
ETC	ET CETERA
EW	EACH WAY
EXP	EXPANSION
EXT	EXTERIOR
FAB	FABRICATE
fc	28-DAY (UNO) COMPRESSIVE STRENGTH OF CONCRETE
FDN	FOUNDATION
FF	Finished Floor
FG	FINISHED GRADE
FIN	FINISH(ED)
FLR	FLOOR
fm	28-DAY (UNO) COMPRESSIVE STRENGTH OF MASONRY
FN	FIELD NAILING
FRP	FIBER-REINFORCED POLYMER
FS	FAR SIDE / FINISHED SURFACE
FT	"FOOT, FEET"
FTG	FOOTING
FUT	FUTURE
Fy	YIELD STRENGTH
GA	"GAGE, GAUGE"
GALV	GALVANIZE(D)
GC	GENERAL CONTRACTOR
GEN	GENERAL
GWP	GLOBAL WARMING POTENTIAL
GLB	GLUED-LAMINATED BEAM
GR	GRADE
HD	HOLDDOWN
HDR	HEADER
HGR	HANGER
HORIZ	HORIZONTAL
HS	HIGH STRENGTH
HSA	HEADED STUD ANCHOR
HSB	HIGH STRENGTH BOLT
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
IAPMO	INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS
ICC	INTERNATIONAL CODE COUNCIL
ID	INSIDE DIAMETER
IN	INCH
INFO	INFORMATION
INT	INTERIOR
IOR	INSPECTOR OF RECORD
JST	JOIST
JT	JOINT
K	KIPS (1000 LBS)
KLF	KIPS PER LINEAR FOOT
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH
L	ANGLE
LAND	LANDSCAPE
LBS	POUNDS
LCA	LIFE CYCLE ASSESSMENT
Ld	DEVELOPMENT LENGTH of straight rebar
Ldh	DEVELOPMENT LENGTH for hooked rebar
Ldt	DEVELOPMENT LENGTH for headed rebar
LL	DOUBLE ANGLE
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LOR	LAB OF RECORD
LRFD	LOAD AND RESISTANCE FACTOR DESIGN
Ls	SPLICE LENGTH of straight rebars
LSH	LONG SIDE HORIZONTAL
LSL	LONG-SLOTTED HOLE
LSV	LONG SIDE VERTICAL
LT GA	LIGHT GAUGE
LVL	LAMINATED VENEER LUMBER
LWC	LIGHTWEIGHT CONCRETE
MAX	MAXIMUM
MECH	MECHANICAL
MEP	"MECH, ELECT, & PLUMB"
MEZZ	MEZZANINE
MF	MOMENT FRAME
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
(N)	NEW
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
NWC	NORMALWEIGHT CONCRETE
O/C	ON CENTER
OD	OUTSIDE DIAMETER
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OVS	OVERSIZED HOLE
PAF	POWDER/POWER ACTUATED FASTENER
PAR	PARALLEL
PC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PCY	POUNDS PER CUBIC YARD
PERF	PERFORATED
PERP	PERPENDICULAR
PI	PROJECT INSPECTOR
PJ	PANEL JOINT
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PLF	POUNDS PER LINEAR FOOT
PLUMB	PLUMBING
PQR	PROCEDURE QUALIFICATION RECORD
PRELIM	PRELIMINARY
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PT	PRESSURE TREATED OR POST-TENSION(ED)
PWD	PLYWOOD
QTY	QUANTITY
RAD	RADIUS
RBS	REDUCED BEAM SECTION
REF	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
REV	REVISION
RO	ROUGH OPENING
RR	ROOF RAFTER
RTU	ROOF TOP UNIT
SC	SLIP CRITICAL OR SAW CUT
SCBF	SPECIAL CONCENTRICALLY BRACED FRAME
SCHED	SCHEDULE(D)
SDS	SELF-DRILLING SCREW
SECT	SECTION
SEOR	STRUCTURAL ENGINEER OF RECORD
SEP	SEPARATION
SFRS	SEISMIC FORCE RESISTING SYSTEM
SHT	SHEET
SHTG	SHEATHING
SIM	SIMILAR
SLBB	SHORT LEG BACK TO BACK
SMRF	SPECIAL MOMENT RESISTING FRAME
SMS	SHEET METAL SCREW
SOG	SLAB-ON-GRADE
SPEC(S)	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL
SSL	SHORT-SLOTTED HOLE
STAGG	STAGGERED
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STRUCT	"STRUCTURE, STRUCTURAL"
SUSP	SUSPENDED
SW	SHEAR WALL
SYM	"SYMMETRIC, SYMMETRICAL"
(T)	TOP
(T&B)	TOP AND BOTTOM
T.O.	TOP OF
THK	THICK
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING / FOUNDATION
TOM	TOP OF MASONRY
TOPC	TOP OF PILE CAP
TOS	TOP OF STEEL
TOSL	TOP OF SLAB
TOW	TOP OF WALL
TRANS	TRANSVERSE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UT	ULTRASONIC TESTING
VERT	VERTICAL
VIF	VERIFY IN FIELD
W/	WITH
W/C	WATER-CEMENT RATIO
W/O	WITHOUT
"WF, W"	WIDE FLANGE
WP	WORK POINT
WPS	WELD PROCEDURE SPECIFICATIONS
WT	"WEIGHT" OR "T" SECTION CUT
WWF	WELDED WIRE FABRIC
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG

ROUGH CARPENTRY

1. Structural Lumber: Grade-marked Douglas Fir-Larch structural lumber complying with Standard Grading Rules No. 17 (2018) of the West Coast Lumber Inspection Bureau. Provide air-dry lumber with 19 percent maximum moisture content. 4x and larger members may be provided green and air-dried to 19 percent maximum moisture content. Size designations, as noted, correspond to nominal member size. Provide dressed member size in accordance with American Softwood Lumber Standard PS20, UNO.
2. Classifications and Grades:

Member	Size Classification	Grade
Rafters and Joists Larger Than 2x4	2" to 4" thick, 2" and wider	No. 1
2x4 Joists and Rafters	2" to 4" thick, 2" and wider	No. 1
4x Beams, Headers and Stringers	2" to 4" thick, 2" and wider	No. 1
Beams, Headers and Stringers Larger Than 4x	Beams and Stringers	No. 1
4x Posts	4" thick, 4" and wider	No. 1
Posts Larger Than 4x	Posts and Timbers	No. 1
Studs, Plates and Blocking in bearing or shear walls	2" to 4" thick, 2" and wider	No. 1
Studs, Plates and Blocking in non-bearing walls	2" to 4" thick, 2" and wider	No. 2

3. Plywood: U.S. Product Standard PS 1-19, classified as Exposure 1. Each sheet of plywood shall be identified with an appropriate trademark of the American Plywood Association.
4. Pressure Treat Lumber in contact with Concrete or Masonry: See Specifications. Provide hot-dipped galvanized or stainless steel fasteners and hardware connectors for pressure-treated structural lumber.
5. Nails: Common nails with dimensional properties complying with ASTM F1667. Install nails in compliance with Applicable Code Chapter 23, including Table 2304.10.2 (repeated below).
6. Bolts: ASTM A307 bolts with a standard cut washer under the bolt head and nut. Provide holes for bolts 1/32 to 1/16 inch larger than the nominal bolt diameter. Re-tighten bolts before applying sheathing or finishing.
7. Anchor Bolts: See GENERAL STEEL notes.
8. Lag Screws: ANSI/ASME Standard B18.2.1, including Appendix I for lag screw dimensions. Pre-drill all holes. Hole at the shank portion to match the diameter of the shank. Holes at the threaded portion are to be 40-70 percent of the shank diameter and equal to the length of the threaded portion. Use soap and lubricants to facilitate installation. Driving with a hammer is not permitted.
9. Wood Screw: ANSI/ASME Standard B18.6.1 for wood screw dimensions. Driving with a hammer is not permitted.
10. Plate Washers: Provide under heads or nuts of bolts (including anchor bolts at sill plates) and lag screws per 09/S6.81 when anchoring wood.
11. Wood Hardware Connectors: Manufactured by Simpson Strong-Tie Company. Inc complying with ICC-ES Evaluation Report No's ESR-2105, ESR-2523. ESR-2552, ESR-2604. ESR-2615, and ESR-3096. Install connectors using fasteners in accordance with the manufacturer's written instructions. Fill all holes to achieve maximum load capacity per manufacturer. For connectors requiring nails. use common nails unless shorter nails (sinkers) are specifically indicated.
12. Notching or Cutting Structural Lumber: Not permitted unless specifically detailed or indicated
13. Lateral Support for Beams. Rafters and Joists: Full Depth 2 inches thick continuous solid blocking shall be provided at 8 feet on center or midspan, whichever is less
14. Provide 4x or 3 1/2" min. thick framing members at fire sprinkler lateral and longitudinal bracing attachment locations. Coordinate with fire sprinkler drawings for locations of pipe bracing required.

NAILING SCHEDULE (PORTION OF CBC TABLE 2304.10.2)

1. The schedule below partially reproduces Table 2304.10.2 from the building code. Where there are variations between this table and Table 2304.10.2 the more stringent shall govern.
2. All nails are common nails unless written acceptance by the Architect (Structural Engineer) is attained.
3. Machine Nailing: The use of nailing guns is subject to a satisfactory jobsite demonstration and the approval of the Structural Engineer and DSA. This approval is subject to continued satisfactory performance. If the nailheads penetrate the outer ply or if the minimum allowable edge distances are not maintained, the performance will be deemed unsatisfactory.

Description of Building Element	Number and Type of Fastener
1. Joist to sill or girder, toenail	3-8d
2. Bridging to joist, toenail each end	2-8d
3. 1"x6" subfloor or less to each joist, face nail	2-8d
4. Wider than 1"x6" subfloor to each joist, face nail	3-8d
5. 2" subfloor to joist or girder, blind and face nail	12-16d
6. Sole plate to joist or blocking, typical face nail	16d @ 6" o/c
7. Sole plate to joist or blocking, at braced wall panels	3-16d per 16"
8. Top plate to stud, end nail	2-16d
9. Stud to sole plate	4-8d, toenail or 2-16d, end nail
10. Double studs, face nail	16d @ 24 o/c
11. Doubled top plates, typical face nail	16d @ 16" o/c
12. Doubled top plates, lap splice	8-16d
13. Blocking between joists or rafters to top plate, toenail	3-8d
14. Rim joist to top plate, toenail	8d @ 6" o/c
15. Top plates, laps and intersections, face nail	2-16d
16. Continuous header, two pieces	16d @ 16" o/c along each edge
17. Ceiling joist to plate, toenail	3-8d
18. Continuous header to stud, toenail	4-8d
19. Ceiling joists, laps over partitions, face nail	3-16d
20. Ceiling joists to parallel rafters, face nail	3-16d
21. Rafter to plate, toenail	3-8d
22. 1" brace to each stud and plate, face nail	2-8d
23. 1"x8" sheathing or less to each bearing, face nail	3-8d
24. Wider than 1"x8" sheathing to each bearing, face nail	3-8d
25. 2" planks	2-16d at each bearing
26. Built-up corner studs	16d @ 24" o/c
27. Built-up girder and beams	20d @ 32" o/c at top and bottom and staggered 2-20d at ends and at each splice

PROPRIETARY ANCHORAGES and FASTENERS

1. Anchorages:
   1. Drill and Epoxy Anchors:
      a. At Concrete: Hilti HIT-RE 500 V3 adhesive anchor system complying with ICC-ES Evaluation Report ESR-3814.
      b. At Masonry: Hilti HIT-HY 270 adhesive anchor system complying with ICC-ES Evaluation Report ESR-4143.
      c. Provide anchor type, size and embedment as indicated in details.
      d. Overhead applications must be installed using the Hilti HIT-SZ piston plug system.
   2. Mechanical (Expansion) Anchors:
      a. At Concrete: Hilti KB-TZ2 carbon steel expansion anchor complying with ICC-ES Evaluation Report ESR-4266.
      b. At Masonry: Hilti KB-TZ2 carbon steel expansion anchor complying with ICC-ES Evaluation Report ESR-4561.
      c. Where mechanical anchor is exposed to weather, provide stainless steel anchor conforming to the Evaluation Report in lieu of carbon steel.
   3. Welded Shear Studs: Nelson S3L flux filled, headed stud anchors, 65,000 psi minimum ultimate tensile strength conforming to ASTM A29, automatically end welded in the field and complying with ICC-ES Evaluation Report ESR-2856.
   4. Welded Deformed Anchors: Nelson D2L, cold rolled, deformed steel reinforcing bars conforming to ASTM A1064 and complying with ICC-ES Evaluation Report ESR-2907.
2. Fasteners:
   A. Power/Powder Actuated Fasteners (Indicated "Shot Pins" or "PAF" on Drawings): Hilti Low-velocity Power Actuated Drive, 0.157" diameter (X-U), complying with ICC-ES Report ESR-2269. Provide an appropriate washer between the fastener head and light gauge metal or wood surface. Shot pins shall not be used @ PT slab or beams.
   B. Self-Drilling Metal Screws (Indicated "Screws" or "SMS" on Drawings): Hilti Self-Drilling Screw complying with current ICC-ES Evaluation Report ESR-2196.
   C. Concrete Screws: Hilti KH-EZ carbon steel screw anchor complying with ICC ES Evaluation Report ESR-3027.
   D. Masonry Screws: Hilti KH-EZ carbon steel screw anchor complying with ICC ES Evaluation Report ESR-3056.
   E. Self-Drilling wood Screw: At steel-to-wood connections (Indicated "SDS" on drawings): Simpson SDS screw complying with ICC-ES ESR 2236. At wood-to-wood connections (Indicated "SDWS" on drawings): Simpson SDWS screw complying with IAPMO-UES ER 192.
   F. Lag Screw: Lag Screw complying with ANSI / ASME B18.2.1
   G. Where fasteners are exposed to weather, provide stainless steel fasteners conforming to the Evaluation Report in lieu of carbon steel.
3. Installation: Follow all manufacturer's written instructions and the referenced ICC-ES evaluation report. The contractor shall arrange for an anchor manufacturer's representative to provide onsite installation training for all anchor products specified.
   A. Prior to drilling holes for post-installed anchors, the contractor shall locate existing rebar, prestressing tendons, post-tensioning tendons, and embedded utilities using non-hazardous, non-destructive methods with accurate location tolerances (plus or minus 1/4-inch). Do not cut, hit, or otherwise damage existing rebar or tendons during anchor installation.
   B. Drilling Holes in Existing Concrete or Masonry for Anchorages: Use non-pneumatic, rotary hammer tools with ANSI-compliant non-rebar cutting drill bits to drill holes of proper tolerances. Locate existing rebar, including prestressing and post-tensioning tendons, using non-hazardous, non-destructive methods with accurate location tolerances (plus or minus 1/4-inch) prior to drilling holes to avoid cutting or damaging rebar. Holes shall be thoroughly cleaned per the manufacturer's written recommendations prior to the installation of anchorages.
   C. Deleterious Materials: Keep anchorages, including holes for drill and epoxy anchors and mechanical anchors, free of dust, grease, and other materials that impair bond.
   D. The use of a diamond core bit with a roughening tool for anchor holes requires approval from the Engineer of Record prior to drilling. Unless otherwise shown in the drawings, all holes shall be drilled perpendicular to the concrete surface.
   E. Embedment Depths:
      a. Mechanical Anchors: Embedment depths noted in drawings are the effective minimum embedment UNO. Refer to the applicable evaluation report for the corresponding minimum hole depth and nominal embedment.
      b. Screw Anchors: Embedment depths noted in drawings are the nominal minimum embedment UNO. Refer to the applicable evaluation report for the corresponding minimum hole depth.
   F. Anchor installer certification is required for all installers of drill and epoxy anchors in a horizontal or upwardly inclined orientation. Installer qualification must be provided to the inspector prior to installation.
   G. Installation Torques for Expansion Anchors shall be as noted:

Nominal Anchor Diameter	Expansion Anchor Installation Torque (ft-lb)			
	Into Concrete		Into Masonry	
	KB-TZ2 Carbon Steel	KB-TZ2 Stainless Steel	KB-TZ2 Carbon Steel	KB-TZ2 Stainless Steel
1/4"	4	6	4	6
3/8"	30	30	15	15
1/2"	50	40	25	15
5/8"	40	60	30	35
3/4"	110	125	50	50

   H. Installation Torques for Screw Anchors shall be as noted:

Nominal Anchor Diameter	Screw Anchor Installation Torque (ft-lb)					
	Into Concrete			Into Masonry		
	Hilti KH-EZ Hex	Hilti KH-EZ C	Hilti KH-EZ CRC	Hilti KH-EZ E & KH-EZ I	Hilti KH-EZ (Hex, P, PM, PL & C)	Hilti KH-EZ CRC
1/4"	18		N/A	18	21	N/A
3/8"	40 (19 @ h_{nom} <2.5")		40	40	22	20
1/2"	45	N/A	45	N/A	34	25
5/8"	85	N/A	85	N/A	38	35
3/4"	95	N/A	85	N/A	70	45

Note: 1/4" dia. Hilti KH-EZ P, PM & PL in concrete shall have installation torque of 18 ft-lb.

4. Testing:
   A. See DSA-103 Testing and Inspections.
   B. Installation in Concrete:
      a. Provide testing of post-installed anchors in concrete per CBC 2022 1910A.5 as noted in details.
   C. Installation in Masonry:
      a. Provide testing of post-installed anchors in masonry per CBC 2022 1910A.5 as required by section 1705A.4 as noted in details.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER MANISHA A. PRASAD NO. 56463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DSSR DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	12" = 1'-0"

GENERAL NOTES

2S0.02

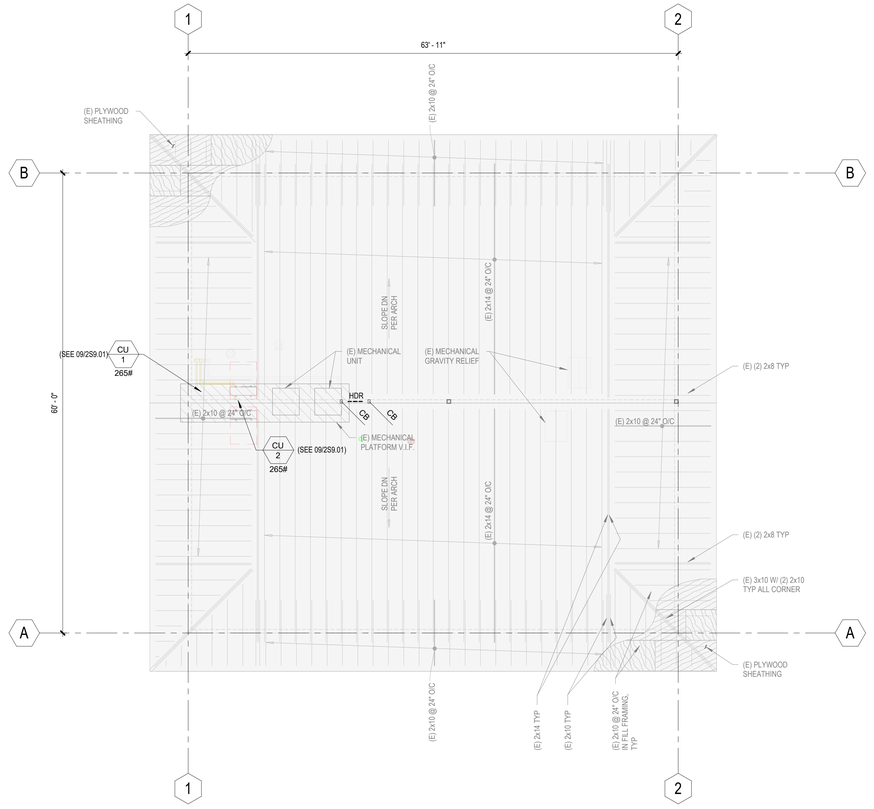
ROOF FRAMING PLAN NOTES

1. FOR GENERAL NOTES 2S0 SERIES SHEETS and TYPICAL DETAILS SEE 2S6 SERIES SHEETS.
2. SEE ARCHITECTURAL DRAWINGS FOR DRAINS, OVERALL WALL DIMENSIONS and LOCATIONS OF OF OPENINGS NOT INDICATED ON STRUCTURAL DRAWINGS.
3. SEE MECHANICAL, ELECTRICAL and/or PLUMBING FOR EXACT SIZE and LOCATION OF PLATFORMS and/or UNITS. UNIT WEIGHT NOTED ON PLAN IS THE MAXIMUM ALLOWABLE WEIGHT.
4. REMOVE, REPAIR and REPLACE (E) ROOFING, INSULATION, FIREPROOFING, GYPSUM BOARD, ETC. AS REQUIRED FOR (N) CONSTRUCTION PER ARCHITECTURAL
5. VERIFY IN FIELD ALL (E) FRAMING, DIMENSIONS, CONDITIONS, ETC.
6. DO NOT CUT ANY (E) FRAMING MEMBERS EXCEPT AS SHOWN ON DETAILS.
7. SEE AC/1L FOR EXTENT OF HARD CEILINGS - CONSTRUCT CEILING JOISTS PER DETAIL 11/S6.83.
8. SOLID SAWN HANGERS SHALL BE SIMPSON "JB" HANGERS, U.N.O.
9. PROVIDE MODIFICATIONS TO HANGERS (I.E. SKEWED, SLOPED SEAT, OFFSET TOP-FLANGE, ETC.) AS REQUIRED TO PROPERLY FRAME SKEWED AND/OR SLOPED FRAMING MEMBERS
10. PROVIDE OPENINGS IN ROOF UP TO 4'-0" SQUARE PER DETAIL 01/S6.83.

PRIOR TO COMMENCEMENT OF NEW CONSTRUCTION, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, IN CASE OF DISCREPANCIES FROM THIS DOCUMENT COORDINATE WITH ARCHITECTURAL/STRUCTURAL ENGINEER PRIOR TO COMMENCING ANY CONSTRUCTION. CONSTRUCTION DOCUMENT MAY BE REVISED TO ACCOMMODATE CONDITION AS REQUIRED (and DSA APPROVAL).

ROOF FRAMING LEGEND

- EXISTING FRAMING MEMBER TO BE VERIFIED IN THE FIELD
- NEW FRAMING MEMBER
- XX / XXXX — INDICATES MECHANICAL, ELECTRIAL OR PLUMBING EQUIPMENT MARK
- XXX# — INDICATES MAX MECHANICAL UNIT WEIGHT INCLUDING ALL ACCESSORIES & CURB



BUILDING F - ROOF FRAMING PLAN | 1/8" = 1'-0" | 07

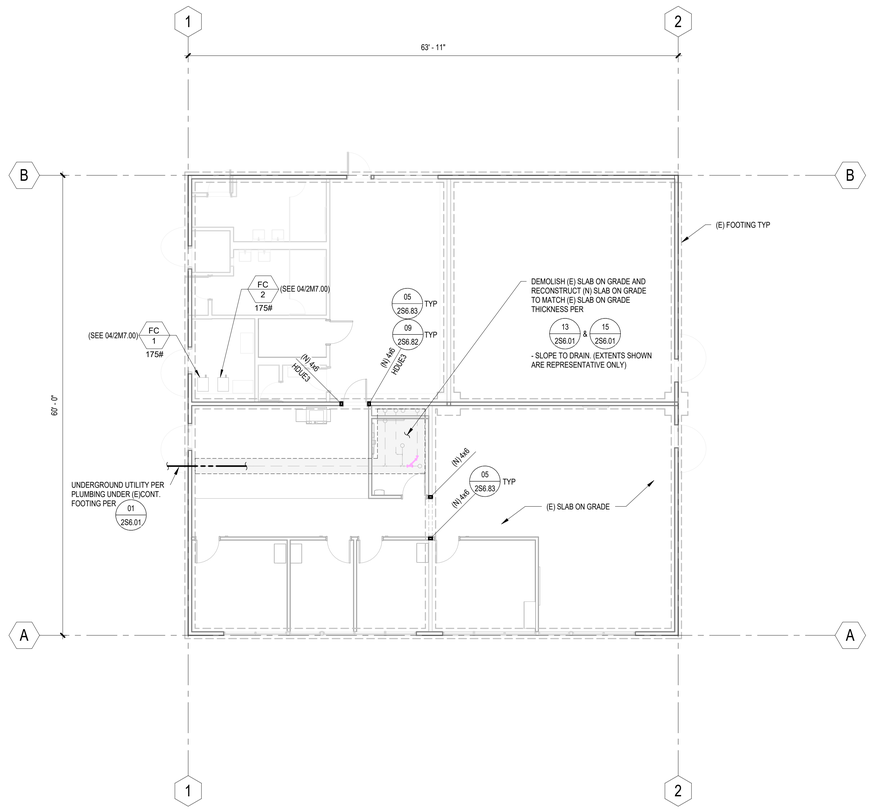
FOUNDATION PLAN NOTES

1. FOR GENERAL NOTES SEE 2S0 SERIES SHEETS and TYPICAL DETAILS SEE 2S6 SERIES SHEETS.
2. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, and PLUMBING DRAWINGS FOR TOP OF CONCRETE SLAB ON GRADE ELEVATIONS, DEPRESSIONS, SLOPES, OPENINGS, DRAINS, TRENCHES, PADS, and CURBS; SLAB EDGE LOCATIONS; WALL OVERALL DIMENSIONS; and LOCATIONS OF OPENINGS NOT INDICATED ON STRUCTURAL DRAWINGS.
3. SEE MECHANICAL, ELECTRICAL AND/OR PLUMBING FOR EXACT SIZE AND LOCATION OF PLATFORMS AND/OR UNITS.
4. CENTER COLUMNS and POSTS ON STUD WALLS UNLESS NOTED OTHERWISE.
5. REMOVE, REPAIR and REPLACE (E) ROOFING, INSULATION, FIREPROOFING, GYPSUM BOARD, ETC AS REQUIRED FOR NEW CONSTRUCTION PER ARCHITECTURAL.
6. VERIFY IN FIELD ALL (E) FRAMING, DIMENSIONS, CONDITIONS, ETC.
7. DO NOT CUT ANY (E) FRAMING MEMBERS EXCEPT AS SHOWN ON DETAILS.
8. ALL EXISTING FRAMING IS ASSUMBED AND SHALL BE VERIFIED BY CONTRACTOR, ANY MEMBER DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SEOR PROMPTLY.

PRIOR TO COMMENCEMENT OF NEW CONSTRUCTION, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, IN CASE OF DISCREPANCIES FROM THIS DOCUMENT COORDINATE WITH ARCHITECTURAL/STRUCTURAL ENGINEER PRIOR TO COMMENCING ANY CONSTRUCTION. CONSTRUCTION DOCUMENT MAY BE REVISED TO ACCOMMODATE CONDITION AS REQUIRED.

FRAMING LEGEND

- XXX / HDR — INDICATES POST ABOVE RUNNING FULL HEIGHT TO TOP PLATES AT ROOF OR TOP OF PARAPET ABOVE (RUN UNINTERRUPTED TO DOUBLE TOP PLATES AT BALLOON-FRAMED WALLS) - PROVIDE (2) SIMPSON A35's TOP (TO DOUBLE TOP PLATES) and BOTTOM (TO SILL PLATE) WHERE POST OCCURS IN STUD WALL UNLESS OTHER HARDWARE IS INDICATED
- INDICATES HOLDOWN MARK - SEE DETAIL 09/2S6.82.
- DENOTES (E) WALL DEMO
- DENOTES (E) NON BEARING WALL
- XX / XX# — INDICATES MEP EQUIPMENT TAG; INDICATES MAX. EQUIPMENT WEIGHT INCLUDING ALL ACCESSORIES



BUILDING F - FOUNDATION FLOOR PLAN | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER — MANINDA A. PRASAD — NO. S6463 — STRUCTURAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	1/8" = 1'-0"

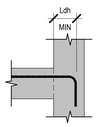
BUILDING F - FOUNDATION AND ROOF FRAMING PLANS

2SF2.01

HOOKED BAR DEVELOPMENT LENGTH (Ldh)SCHEDULE

CASE TYPE	Fc' = 3000psi				Fc' = 4000psi				Fc' = 5000psi				Fc' = 6000psi			
BAR SIZE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
#3	8"	6"	6"	6"	7"	6"	6"	6"	7"	6"	6"	6"	7"	6"	6"	6"
#4	12"	7"	9"	6"	11"	7"	9"	6"	10"	7"	8"	6"	10"	7"	8"	6"
#5	16"	10"	13"	8"	15"	10"	12"	8"	15"	9"	12"	7"	14"	9"	11"	7"
#6	21"	13"	17"	11"	20"	12"	16"	10"	19"	12"	15"	10"	19"	14"	15"	9"
#7	26"	17"	21"	13"	25"	16"	20"	13"	24"	15"	19"	12"	23"	15"	19"	12"
#8	32"	20"	26"	16"	30"	19"	24"	15"	29"	18"	23"	15"	28"	18"	23"	14"
#9	38"	24"	31"	19"	36"	23"	29"	18"	35"	22"	28"	18"	34"	21"	27"	17"
#10	46"	29"	37"	23"	43"	27"	35"	22"	42"	26"	33"	21"	41"	25"	33"	20"
#11	54"	34"	43"	27"	50"	32"	40"	25"	49"	30"	39"	24"	47"	30"	38"	24"

NOTES:
1. FOR TYP BAR HOOKS & BENDS, SEE DETAIL 03/-
2. HOOKED BAR LENGTHS SHOWN IN SCHEDULE ABOVE APPLY TO NORMAL WEIGHT CONC - MULTIPLY THE SPECIFIED DEVELOPMENT LENGTH BY 1.33 FOR LIGHTWEIGHT CONC
3. LENGTHS SHOWN IN SCHEDULE ABOVE APPLY TO UNCOATED GRADE 60 BARS. MULTIPLY THE SPECIFIED LENGTH BY 1.33 FOR GRADE 80 BARS
4. CASE I: TYPICAL
5. CASE II: HOOKED BARS SPACED GREATER THAN 6db O/C
6. CASE III: HOOKED BARS WITH SIDE COVER PARALLEL WITH HOOKED BAR GREATER THAN OR EQUAL TO 6db or HOOKED BARS TERMINATING WITHIN CONFINED COLUMN CORE WITH SIDE COVER PARALLEL WITH HOOKED BAR BAR GREATER THAN OR EQUAL TO 2 1/2"
7. CASE IV: HOOKED BARS MEETING REQUIREMENTS OF BOTH CASE II AND CASE III
8. HOOKED BARS MAYBE SUBSTITUTED WITH HEADED BARS PER 'Ldt' SCHEDULE AT LEFT



Ldh

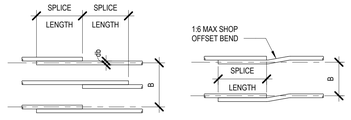
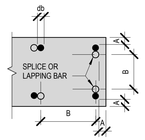


DIAGRAM @ STAGGERED SPLICES

DIAGRAM @ NON-STAGGERED SPLICES



BAR SPACING DIAGRAM

LEGEND:
A. CLEAR EDGE DISTANCE
B. CLEAR SPACING OF SPLICED OR LAPPED BARS (SEE GEN NOTE 'E.8' FOR MIN CLEAR SPACING)
db = BAR Ø

NOTES:
1. ALL SPLICES SHALL HAVE SPLICE LENGTH "Ls" UNO. DEVELOPMENT LENGTH "Ld" TO BE USED WHERE SPECIFICALLY INDICATED.
2. SCHEDULE APPLIES TO UNCOATED GRADE 60 BARS IN NORMALWEIGHT CONC.
3. TOP BARS (INDICATED "T" IN SCHEDULE) ARE HORIZ BARS WITH MORE THAN 12" OF CONC CAST BELOW THE BARS.
4. BOTTOM BARS (INDICATED "B" IN SCHEDULE) ARE ALL VERT BARS AND HORIZ BARS WITH LESS THAN 12" OF CONC CAST BELOW HORIZ BARS.
5. FOR LIGHTWEIGHT CONC MULTIPLY LENGTHS IN SCHEDULE BY 1.33.
6. AT SPLICE BETWEEN BARS OF VARYING SIZE, PROVIDE LAP SPLICE CORRESPONDING TO LARGER OF "Ls" OF SMALLER BAR & "Ld" OF LARGER BAR.

SCHEDULE FOR DETERMINING CATEGORY

I	II
A>db and B>2db	OTHER CASES

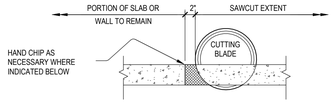
TENSION LAP SPLICE "Ls" SCHEDULE

CATEGORY	NORMAL WEIGHT CONCRETE f'c PSI	SPLICE LENGTH (INCHES) 0.375		0.500		0.625		0.750		0.875		1.000		1.128		1.270		1.410	
		#3		#4		#5		#6		#7		#8		#9		#10		#11	
		T	B	T	B	T	B	T	B	T	B	T	B	T	B	T	B	T	B
I	3000	28	22	37	29	47	36	56	43	81	63	93	72	105	81	118	91	131	101
	4000	24	19	32	25	40	31	48	37	70	54	80	62	91	70	102	79	113	87
	5000	22	17	29	22	36	28	43	33	63	49	72	55	81	63	91	70	101	78
II	3000	42	32	56	43	70	54	84	64	122	94	139	107	157	121	177	136	196	151
	4000	36	28	48	37	60	47	72	56	106	81	121	93	136	105	153	118	170	131
	5000	33	25	43	33	54	42	65	50	94	73	108	83	122	94	137	105	152	117

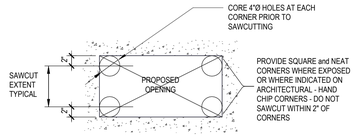
DEVELOPMENT "Ld" SCHEDULE

CATEGORY	NORMAL WEIGHT CONCRETE f'c PSI	DEVELOPMENT LENGTH (INCHES) 0.375		0.500		0.625		0.750		0.875		1.000		1.128		1.270		1.410	
		#3		#4		#5		#6		#7		#8		#9		#10		#11	
		T	B	T	B	T	B	T	B	T	B	T	B	T	B	T	B	T	B
I	3000	22	17	29	22	36	28	43	33	63	48	72	55	81	62	91	70	101	78
	4000	19	15	25	19	31	24	37	29	54	42	62	48	70	54	79	61	87	67
	5000	17	13	22	17	28	22	33	26	49	37	55	43	63	48	70	54	78	60
II	3000	32	25	43	33	54	41	64	50	94	72	107	82	121	93	136	105	151	116
	4000	28	22	37	29	47	36	56	43	81	63	93	71	105	81	118	91	131	101
	5000	25	19	33	26	42	32	50	38	73	56	83	64	94	72	105	81	117	90

HOOKED (Ldh) BAR DEVELOPMENT LENGTH SCHED — N.T.S. — 16

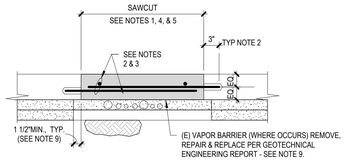


SECTION AT SLAB OR WALL

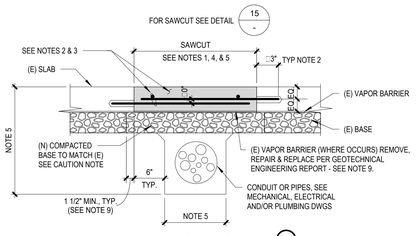


PLAN AT SLAB OR ELEVATION AT WALL

TYP. SAWCUT DETAIL — N.T.S. — 15



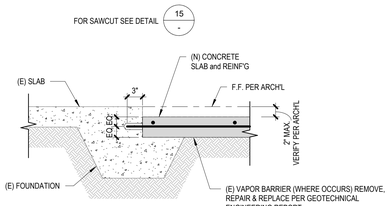
ELECTRICAL TRENCH (B)



PLUMBING TRENCH (VIF) (A)

NOTES:
1. SAW-CUTTING SHALL BE AVOIDED NEAR ANY OF THE (E) PAD FOOTINGS, GRADE BEAMS, AND CONT FOOTINGS.
2. REBAR TO MATCH (E) SIZE AND SPACING IN BOTH DIRECTIONS (#4 @ 18"oc MIN.). INSTALL REBAR IN EPOXY ADHESIVE PER GENERAL NOTES. SPECIAL INSPECTION IS NOT REQUIRED UNLESS NOTED ON THE PLANS.
3. CONCRETE STRENGTH SHALL BE 4000 PSI. REBAR SHALL BE 60 KSI. SPECIAL INSPECTION IS NOT REQUIRED.
4. REPLACE/RECOMPACT SOIL MATERIAL PER GEOTECHNICAL REPORT OR MATCH (E) COMPACTION.
5. FOR ANY SLAB ON GRADE SAW-CUTTING THAT IS NOT SHOWN ON THESE DRAWINGS, PRIOR TO CUTTING THE SLAB, THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ARCHITECT SHOWING LOCATIONS,WIDTH, DEPTH, AND LENGTH OF TRENCH. SIZE OF TRENCH WILL BE AS REQ'D BY ELECTRICAL OR PLUMBING.
6. VERIFY IN FIELD ALL (E) INFORMATION.
7. CONTRACTOR SHALL DETERMINE WHICH TRENCH DETAIL TO USE, EXCEPT WHERE A DETAIL IS SPECIFICALLY REFERENCED ON THE PLAN.
8. INSPECTION IS REQUIRED WHEN CALLED OUT ON PLAN.
9. WHERE NO (E) VAPOR BARRIER OCCURS, OMIT (N) VAPOR BARRIER UNDER EXTENT OF SLAB ON GRADE PATCH. WHERE (E) VAPOR BARRIER DOES OCCUR, PROVIDE LAP PER MANUF (1 1/2" MIN) ALL AROUND SLAB INFILL FROM (N) VAPOR BARRIER PER GEOTECHNICAL REPORT TO (E) VAPOR BARRIER

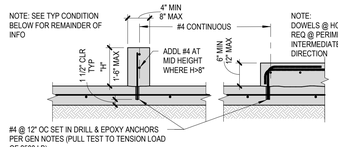
TYP. SAW CUT SLAB TRENCH — N.T.S. — 13



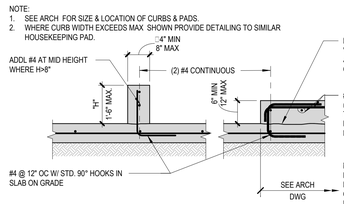
NOTES:
1. SAW-CUTTING SHALL BE AVOIDED NEAR ANY OF THE (E) CONT FOOTINGS. CONTRACTOR SHALL CHIP/REMOVE (E) CONCRETE SLAB OVER EXTENT OF (E) FOUNDATION. SCAN AND LOCATE (E) REINFORCEMENT PRIOR TO SLAB DEMOLITION. DO NOT CUT, HIT, OR OTHERWISE DAMAGE EXISTING REBAR.
2. SEE DETAIL 13/- FOR ADDITIONAL NOTES AND INFORMATION.

(N) SLAB INFILL AT BLDG A RESTROOMS — N.T.S. — 17

TYP REBAR TENSION SPLICE & BAR DEVELOPMENT SCHD (IN CONC) — N.T.S. — 04

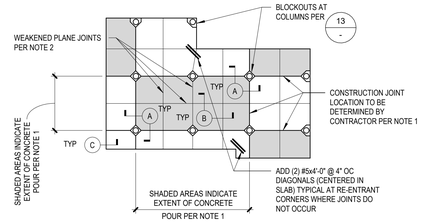


DRILL and EPOXY ANCHOR OPTION (INTERIOR ONLY)



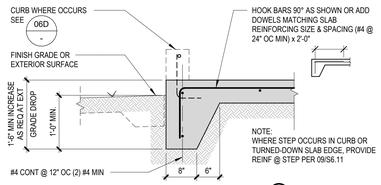
TYPICAL CONDITION

CONDITION AT CURB OR HOUSEKEEPING PAD (D)

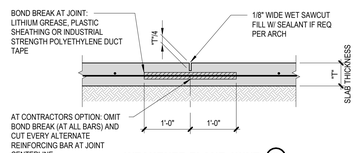


NOTES:
1. AREA OF CONCRETE POURS TO BE DETERMINED BY CONTRACTOR. SUBMIT JOINT LAYOUT PRIOR TO POURING SLABS PER GENERAL NOTES. PROVIDE CONSTRUCTION JOINTS SURROUNDING AREA OF EA POUR UNLESS DETAILED OTHERWISE. ALLOW 24 HOURS MIN BEFORE CASTING SLABS AT ADJACENT AREAS.
2. SAWCUT WEAKENED PLANE JOINT AS SOON AS CONCRETE CAN SUPPORT WEIGHT OF PERSONNEL and SAW WITHOUT AFFECTING FINAL FINISH BUT NO LATER THAN 12 HOURS AFTER POUR. LOCATE WEAKENED PLANE JOINTS NO GREATER THAN 24 TO 36 TIMES SLAB THICKNESS "T" (15'-0" MAX) IN BOTH DIRECTIONS, UNLESS NOTED OTHERWISE.

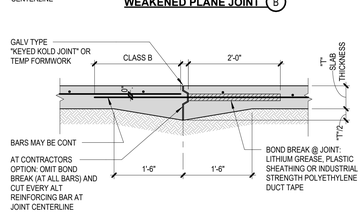
SLAB ON GRADE JOINT DIAGRAM (PLAN VIEW)



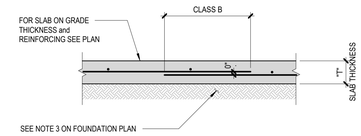
TURNED-DOWN SLAB EDGE (C)



WEAKENED PLANE JOINT (B)

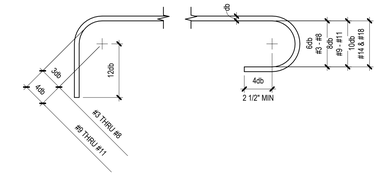


CONSTRUCTION JOINT (A)

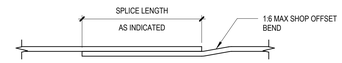


TYPICAL SECTION AT SLAB ON GRADE

TYPICAL SLAB ON GRADE DETAILS — N.T.S. — 06



STANDARD HOOKS OTHER THAN STIRRUPS AND TIES

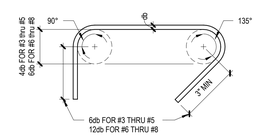


MAX OFFSET AT SPLICES

BAR DIAMETER DISTANCES

BAR DIA	BAR SIZE #3	#4	#5	#6	#7	#8	#9	#10	#11
3db	1 1/8"	1 1/2"	1 7/8"	2 1/4"	2 5/8"	3"	-	-	-
4db	1 1/2"*	2"*	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"
6db	2 1/4"*	3"	3 3/4"	4 1/2"	5 1/4"	6"	-	-	-
8db	-	-	-	-	-	-	9"	10"	11"
12db	4 1/2"	6"	7 1/2"	9"	10 1/2"	12"	13 1/2"	15"	16 1/2"

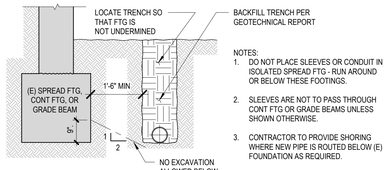
* INDICATES MIN DIM MAY GOVERN



NOTE:
HOOKS OF TWO SUCCESSIVE STIRRUPS OR TIES ENGAGING SAME LONGITUDINAL BAR SHALL BE ALTERNATED END FOR END

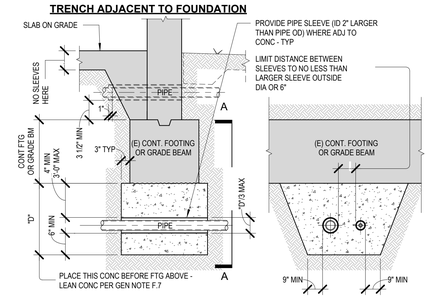
STANDARD HOOKS FOR STIRRUPS AND TIES

TYP REINF STL HOOKS BENDS & OFFSETS @ SPLICES — N.T.S. — 03



NOTES:
1. DO NOT PLACE SLEEVES OR CONDUIT IN ISOLATED SPREAD FTG - RUN AROUND OR BELOW THESE FOOTINGS.
2. SLEEVES ARE NOT TO PASS THROUGH CONT FTG OR GRADE BEAMS UNLESS SHOWN OTHERWISE.
3. CONTRACTOR TO PROVIDE SHORING WHERE NEW PIPE IS ROUTED BELOW (E) FOUNDATION AS REQUIRED.

TRENCH ADJACENT TO FOUNDATION



PIPES THRU OR BELOW FOUNDATION

ELEVATION A-A

TYP PIPES THRU OR TRENCHES ADJ TO FOUNDATIONS — N.T.S. — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER MARINDA A. PRASAD NO. 56463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision	Date

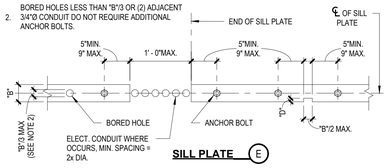
Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	As indicated

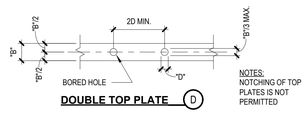
TYP FOUNDATION AND SOG DETAILS

2S6.01

NOTES:
1. WHERE DEPTH OF NOTCH "D" IS GREATER THAN "B"/5, PROVIDE ANCHOR BOLT EA SIDE OF NOTCH AS SHOWN.
2. BORED HOLES LESS THAN "B"/3 OR (2) ADJACENT 3/4"Ø CONDUIT DO NOT REQUIRE ADDITIONAL ANCHOR BOLTS.



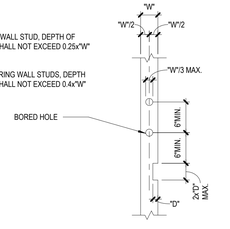
SILL PLATE (E)



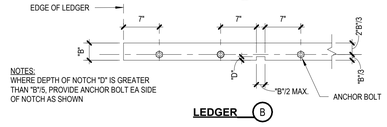
DOUBLE TOP PLATE (D)

NOTCHING OF TOP PLATES IS NOT PERMITTED

NOTES:
1. AT BEARING WALL STUD, DEPTH OF NOTCH "D" SHALL NOT EXCEED 0.25x"W"
2. AT NON-BEARING WALL STUDS, DEPTH OF NOTCH SHALL NOT EXCEED 0.4x"W"

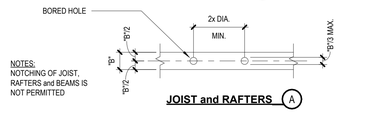


STUD (C)



NOTES:
WHERE DEPTH OF NOTCH "D" IS GREATER THAN "B"/5, PROVIDE ANCHOR BOLT EA SIDE OF NOTCH AS SHOWN

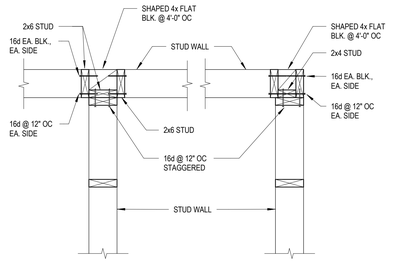
LEDGER (B)



NOTES:
NOTCHING OF JOIST, RAFTERS and BEAMS IS NOT PERMITTED

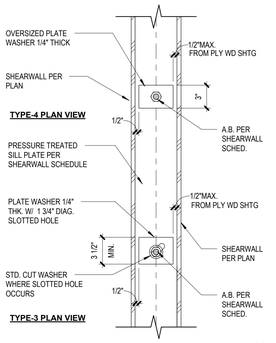
JOIST and RAFTERS (A)

TYP. WOOD LUMBER FRAMING HOLES and NOTCHING — N.T.S. — 19

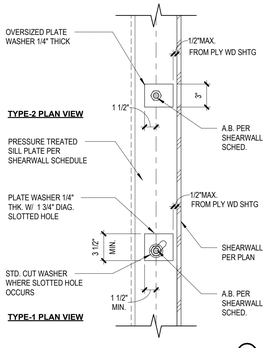


PLAN AT INTERSECTION **PLAN AT CORNER**

WOOD STUD WALL INTERSECTIONS — N.T.S. — 15

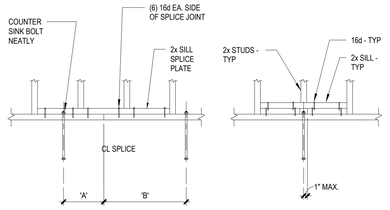


DOUBLE SIDED SHEARWALL (B)



SINGLE SIDED SHEARWALL (A)

TYP. WASHER PLATE AT SHEARWALL ANCHOR BOLTS — N.T.S. — 11



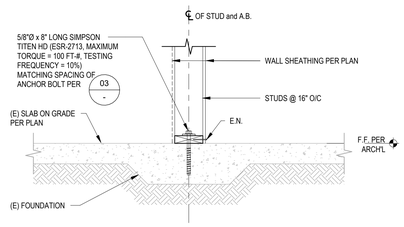
SPLICE DETAIL
(REQ WHEN EITHER 'A' OR 'B' DIM. IS > 9")

STUD CONFLICT W/ A.B.'s
(REQUIRED WHERE STUDS OCCUR OVER ANY PART OF SILL ANCHOR BOLT)

TYP. SILL PLATE DETAIL at SPLICES and CONFLICT W/ A.B.'s — N.T.S. — 10

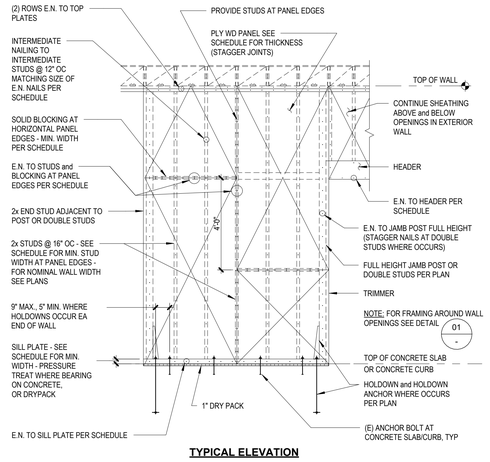
WASHER SCHEDULE			
BOLT SIZE	MALLEABLE IRON WASHER	STEEL PLATE WASHER	SIMPSON PRODUCT
1/2"Ø	1/4x2 1/2"Ø	1/4x3"x3"	BP1/2-3,BPS1/2-3
5/8"Ø	5/16x2 1/2"Ø	1/4x3"x3"	BPS/8-3, BPSS/8-3, BPSS/8-6

NOTES:
1. FOR WASHER AT SILL ANCHORS AT WOOD SHEAR WALLS SEE 11/-.
2. PROVIDE STANDARD CUT WASHERS UNDER ALL HEADS and NUTS BEARING ON WOOD EXCEPT WHERE SPECIFICALLY NOTED ON DRAWINGS.



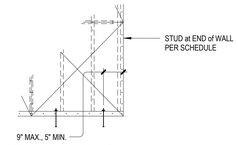
POST-INSTALLED SILL PLATE ANCHOR — N.T.S. — 13

TYP. WOOD FRAMING WASHER SCHEDULE — N.T.S. — 09



TYPICAL ELEVATION

SHEAR WALL SCHEDULE NOTES:
1. PLY WD SHEATHING PANELS SHALL NOT BE LESS THAN 4'-0"x8'-0", EXCEPT AT BOUNDARIES and CHANGES IN FRAMING. STAGGER SHEATHING JOINTS and NO INDIVIDUAL PIECE OF SHEATHING SHALL BE LESS THAN 2'-0" IN ANY DIRECTION.
2. MIN EDGE DISTANCES FROM NAILS TO EDGE OF PLY WD, STUDS, SILL and TOP PLATES, and BLOCKING SHALL BE AS FOLLOWS:
   FOR NAIL SPACING GREATER THAN 3" OC.....3/8"
   FOR NAIL SPACING 3" OC OR LESS.....1/2"
   W/ NAILS STAGGERED PER DETAIL 02/S6.84.
3. PROVIDE GALV. STEEL PLATE WASHERS AT SILL PLATE ANCHOR BOLTS BETWEEN NUTS and SILL PLATE PER 09/- and 11/-.
4. ALL PLY WD TO BE MIN 5 PLY. PI IN SCHEDULE INDICATES PANEL SPAN RATING.
5. PLY WD MAY BE INSTALLED EITHER VERTICALLY (AS SHOWN) OR HORIZONTALLY.
6. WHERE PLY WD SHEATHING OCCURS EA SIDE OF WALL, STAGGER NAILS ON EA SIDE.
7. RETIGHTEN ALL BOLTS BEFORE FINISHING OVER, COVERING, OR INSTALLING PLY WD.
8. TYPICAL UNO, PROVIDE PLY WD SHEATHING AND FASTENING CORRESPONDING TO SHEAR WALL TYPE A AT ALL EXTERIOR WALLS (INCLUDING PARAPETS AND WALL EXTENT ABOVE AND BELOW WINDOWS AND DOORS).
9. TYPICAL U.N.O, EXTENT OF PLY WD SHALL BE FULL LENGTH OF WALL and SHALL INCLUDE EXTENT ABOVE AND BELOW WINDOWS AND DOORS. SEE DETAIL 15/2S6.82 FOR ADDITIONAL INFORMATION.
10. SMALL OPENINGS MAY PENETRATE SHEAR WALL PER 01/2S6.82. TOTAL LENGTH OF PENETRATIONS AT THE SAME ELEVATION SHALL NOT EXCEED 5% OF SHEAR WALL DESIGN LENGTH GIVEN ON PLAN.
11. NAILS TO BE GALV. AT PRESSURE TREATED WOOD.
12. PROVIDE NAILING PER DETAIL AT ALL NEW FRAMING AT EXISITING SHEAR WALL PER 01/-.



TYPICAL ELEVATION at WALL END WITHOUT HOLDOWN

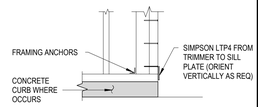
PLYWOOD SHEAR WALL SCHEDULE					
PLY WD EA SIDE OF WALL? (YES/NO)	APA RATED PLY WD SEE NOTE 4	MIN STUD and BLKG. WIDTHS AT PANEL EDGES - MIN SILL PLATE WIDTH	EDGE NAILING (INDICATED "E.N." ON DETAILS) - SEE NOTE 2	GALV. ANCHOR BOLTS at SILL PLATE to CONCRETE SLAB	ALLOWANCE SHEAR PER FLOOR
NO	15/32" STR I (PI 32/16)	3X	10d @ 6" OC	5/8"Ø @ 32" OC	340 PLF

TYP. PLYWOOD SHEAR WALL FRAMING AND SCHEDULE — N.T.S. — 03

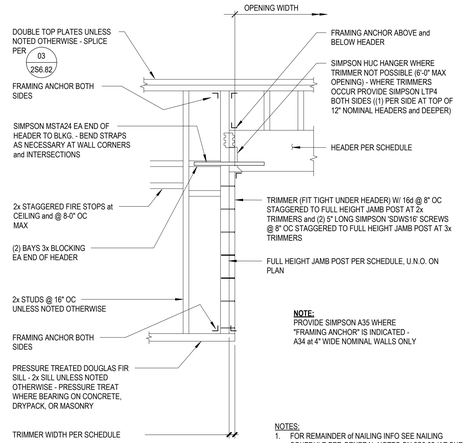
WALL OPENING SCHEDULE					
MAX OPENING WIDTH	HEADER - MIN NOMINAL HEADER DEPTH "D"		JAMB POST		TRIMMER WIDTH
	LOAD BEARING WALL AND/OR SHEAR WALL	NON-LOAD BEARING WALL	LOAD BEARING WALL AND/OR SHEAR WALL	NON-LOAD BEARING WALL	
3'-6"	6"	4"	4x	(2) 2x	2x
4'-0"	8"	4"	4x	(2) 2x	2x
6'-0"	10"	6"	4x	(2) 2x	2x
8'-0"	12"	8"	6x	(3) 2x	3x

NOTE: ALL PERIMETER WALLS ARE TO BE CONSIDERED LOAD BEARING WALLS AND/OR SHEAR WALLS.

NOTE: FOR REMAINDER OF INFO SEE TYPICAL CONDITION



CONDITION AT WALL ENDS OR OPENING JAMBS
(SEE PLAN FOR LOCATIONS)



NOTE:
PROVIDE SIMPSON A35 WHERE "FRAMING ANCHOR" IS INDICATED - A34 at 4" WIDE NOMINAL WALLS ONLY

NOTES:
1. FOR REMAINDER of NAILING INFO SEE NAILING SCHEDULE PER GENERAL NOTES ON 2S0.02 (AT SHEAR WALL FRAMING SEE 03/-).
2. NO HOLES SHALL BE DRILLED VERTICALLY OR HORIZONTALLY THROUGH HEADERS. A 1"Ø MAX HOLE IS PERMITTED AT 4'-0" A.F.F. IN JAMB POST PER 19/-.

TYPICAL CONDITION

TYPICAL WOOD STUD WALL CONSTRUCTION at OPENING and WALL ENDS — N.T.S. — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER MARINDA A. PRASAD NO. S6463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	As indicated

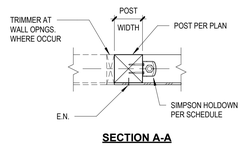
TYP WOOD FRAMING DETAILS

2S6.81

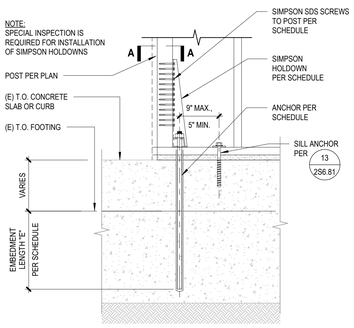
HOLDOWN SCHEDULE					
HOLDOWN MARK	SIMPSON MODEL	ANCHOR	EMBED. LENGTH "E" (MIN.)	SIMPSON SDS SCREWS TO POST	TENSION PULL TEST
HDUE3	HDUE3 - SDS3	DRILL AND EPOXY 5/8"Ø ASTM F1554, GR. 55 FULLY THREADED ANCHOR ROD	9"	(8) 1/4x 2 1/2" SDS SCREWS	7,725#

* DRILL AND EPOXY ANCHORS PER STRUCTURAL GENERAL NOTES – SEE 2S0.02. TENSION PULL TEST 100% OF HOLDOWN ANCHORS.

INSTALLATION REQUIREMENTS FOR SIMPSON HOLDOWNS:
FINGER TIGHTEN ANCHOR BOLT NUTS PLUS 1/3 TO 1/2 TURN. ENSURE NUT IS TIGHTENED PRIOR TO PLACING SHEATHING OR FINISH. DO NOT OVERTIGHTEN WHICH MAY SPLIT WOOD MEMBERS. SPLIT MEMBERS SHALL BE REMOVED and REPLACED. PROVIDE STEEL NYLON LOCKING NUT OR A THREAD ADHESIVE ON THREADED ROD TO RESTRAIN NUT.



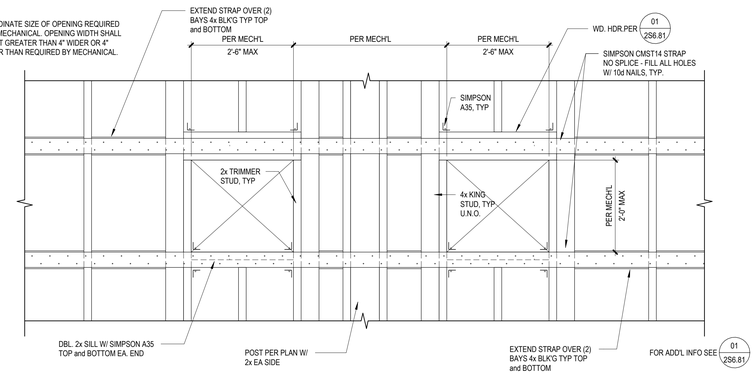
SECTION A-A



ELEVATION

TYPICAL HOLDOWN SCHEDULE and DETAIL — N.T.S. — 09

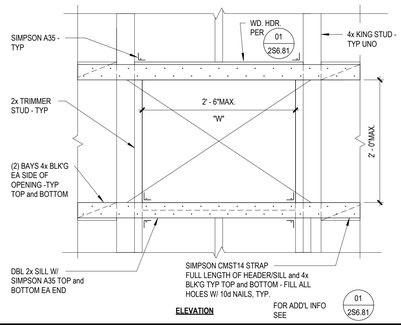
NOTES:
1. COORDINATE SIZE OF OPENING REQUIRED WITH MECHANICAL. OPENING WIDTH SHALL BE NOT GREATER THAN 4" WIDER OR 4" TALLER THAN REQUIRED BY MECHANICAL.



ELEVATION

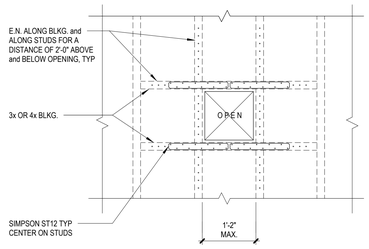
SHEARWALL PENETRATION — N.T.S. — 02

NOTES:
1. COORDINATE SIZE OF OPENING REQUIRED WITH MECHANICAL. OPENING WIDTH SHALL BE NOT GREATER THAN 4" WIDER OR 4" TALLER THAN REQUIRED BY MECHANICAL.
2. MIN DISTANCE BETWEEN OPENINGS IN SHEAR WALL = 4'-0".
3. WHERE OPENING WIDTH W> 1'-2" ARE SPACED CLOSER THAN 8'-0" APART PROVIDE CONTINUOUS STRAP TOP and BOTTOM BETWEEN OPENINGS.



ELEVATION

TYP. OPENING IN SHEAR WALL (W> 1'-2") — N.T.S. — 05



NOTES:
1. DO NOT CUT STUDS UNLESS SPECIFICALLY DETAILED.
2. MAX. VERT. DIMENSION = 2x HORIZONTAL DIMENSION.
3. NO MORE THAN ONE OPENING IN EVERY SIX STUD SPACES IS PERMITTED.
4. HOLES SMALLER THAN 4 1/2" IN DIAMETER OR HORIZONTAL DIMENSION DO NOT REQUIRE BLOCKING AND STRAPPING PER THIS DETAIL. NOTE 9 PER DETAIL 03/2S6.81 STILL APPLIES.

TYP. SMALL OPENINGS IN PLYWOOD SHEAR WALL — N.T.S. — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER — HAMIDA A. PARSAD — NO. S6463 — STRUCTURAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

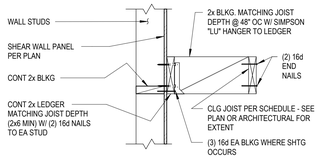
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

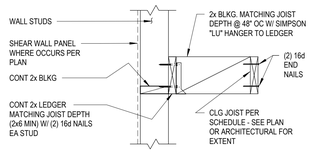
Job Number	31942
Checked By	DS
Scale	1" = 1'-0"

TYP WOOD FRAMING DETAILS

2S6.82

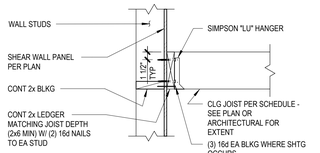


WALL PARALLEL TO JOIST SPAN



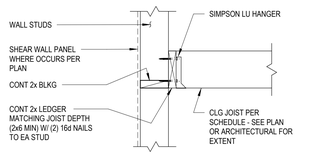
WALL PARALLEL TO JOIST SPAN

JOIST SCHEDULE	
SPAN BTWN. WALLS	JOIST SIZE
6'-0" MAX.	2x4 @ 16" OC
11'-0" MAX.	2x6 @ 16" OC
15'-0" MAX.	2x8 @ 16" OC



WALL PERPENDICULAR TO JOIST SPAN

CLG JOIST CONNECTION TO WALL AT OBSTRUCTING SHEAR WALL PANEL

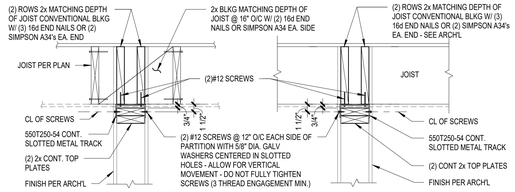


WALL PERPENDICULAR TO JOIST SPAN

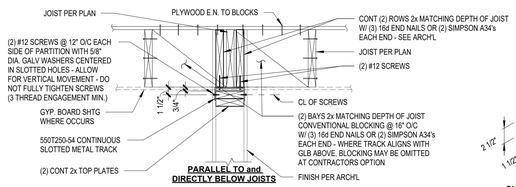
TYP CLG JOIST CONNECTION TO WALL

(NO OBSTRUCTING SHEAR WALL PANEL)

TYP CEILING JOIST SCHEDULE & DETAILS — N.T.S. — 11

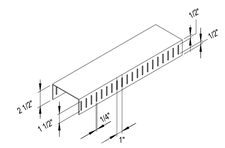


PARALLEL TO JOISTS TYP. CONDITION **PERPENDICULAR OR SKEWED TO JOISTS TYP. CONDITION**



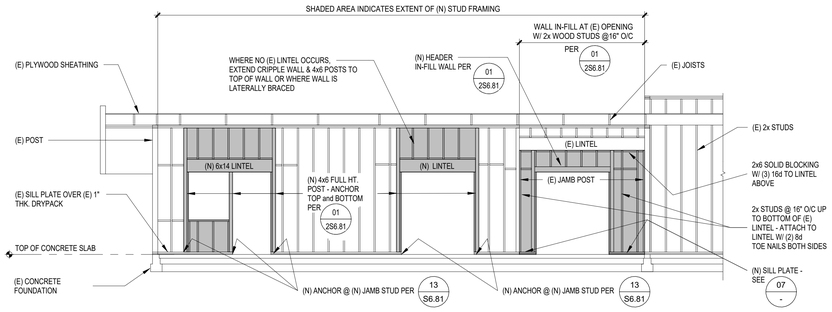
PARALLEL TO and DIRECTLY BELOW JOISTS

SECTIONS AT TOP OF PARTITION

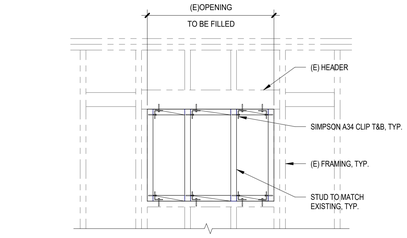


SLOTTED TRACK DIAGRAM

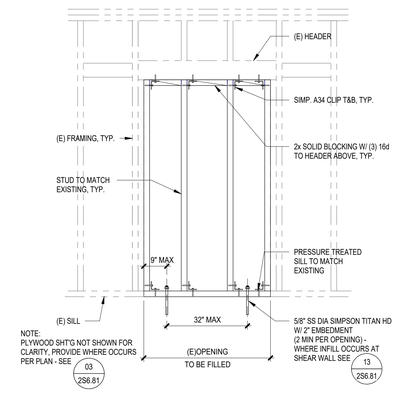
TYP. NON-BEARING PARTITION DETAILS — N.T.S. — 06



TYP. FRAMING ELEVATION AT (E) WALL INFILL AND (N) OPENINGS — N.T.S. — 05



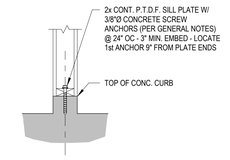
TYPICAL INFILL OF (E) WINDOW / (E) WALL — N.T.S. — 08



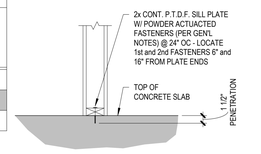
TYPICAL (E) DOOR INFILL DETAIL — N.T.S. — 07

NOTES:
1. SEE SCHEDULE BELOW FOR NON-FRAME PARTITION MIN STUD SIZES.
2. STUD SIZES INDICATED ON SCHEDULE ARE MIN DESIGN SIZES - PROVIDE WIDER 2x STUDS OF SAME SPACING IF ARCHITECTURAL CONSTRAINTS REQUIRE WIDER WALLS.

SCHEDULE	
MAX. STUD HEIGHT	STUD SIZE and SPACING
14'-0"	2x4 @ 16" OC
22'-0"	2x6 @ 16" OC
29'-0"	2x8 @ 16" OC



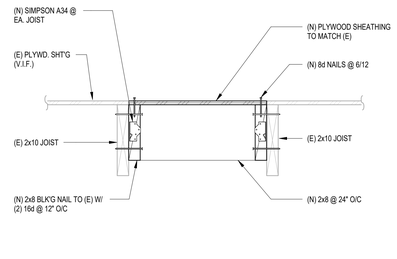
CONNECTION TO CONCRETE CURB



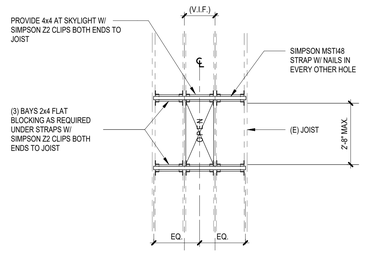
CONNECTION TO CONCRETE SLAB (NO CURB)

SECTIONS AT BASE OF PARTITION

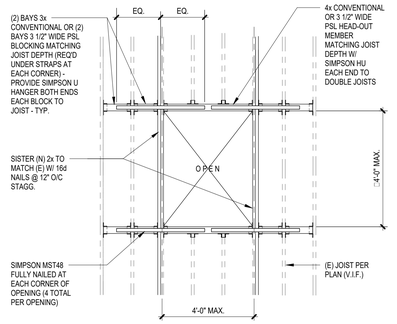
(N) OPENING AT (E) ROOF — N.T.S. — 01



(N) INFILL AT (E) ROOF PENETRATION — N.T.S. — 03



PLAN VIEW AT SMALL OPENINGS and PENETRATIONS (B)



PLAN VIEW AT LARGER OPENINGS (A)

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER — MARINDA A. PRASAD — NO. S6463 — STRUCTURAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

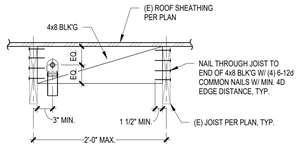
Date
Revision

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

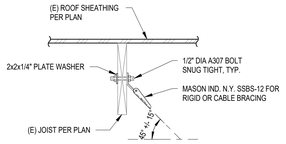
Job Number	31942
Checked By	DS
Scale	As indicated

TYP WOOD FRAMING DETAILS

2S6.83



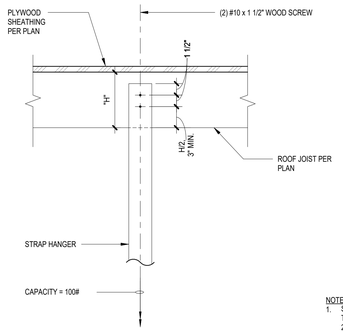
SEISMIC BRACE BRACKET PARALLEL TO JOIST

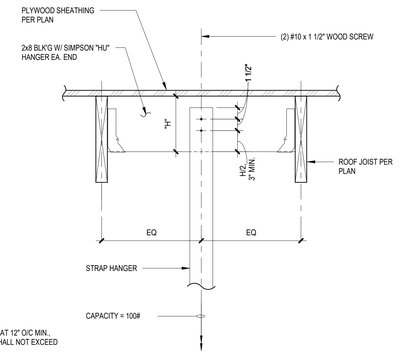


SEISMIC BRACE BRACKET PERPENDICULAR TO JOIST

TYP. BRACE CONNECTION TO WOOD FRAMING

N.T.S. 12

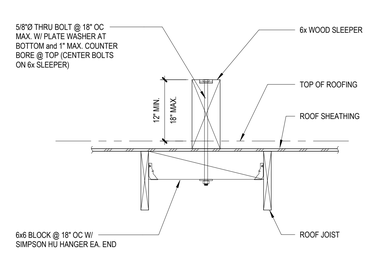




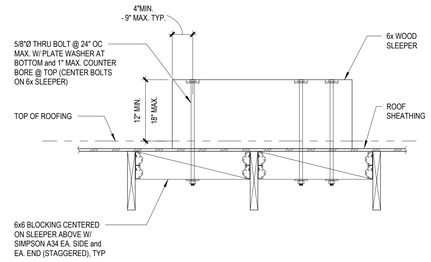
NOTE:
1. SPACE STRAP HANGERS AT 12" O/C MIN., TOTAL HANGING LOAD SHALL NOT EXCEED 225# PER JOIST.

TYP. STRAP HANGER AT WOOD FRAMING

N.T.S. 04



PARALLEL

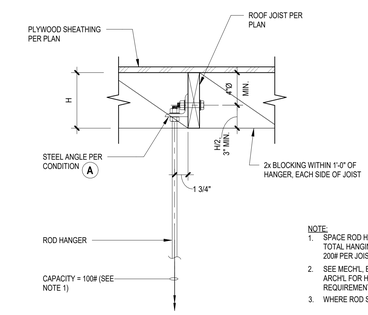


PERPENDICULAR

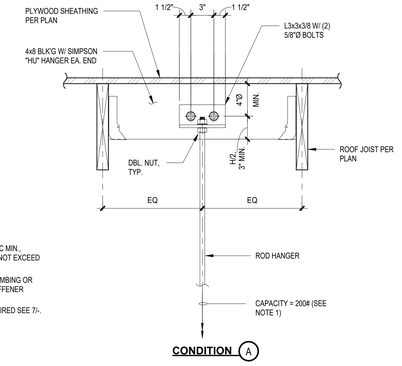
CONDITION AT 2x JOIST (A)

TYPICAL WOOD SLEEPER DETAIL

N.T.S. 11



CONDITION (B)

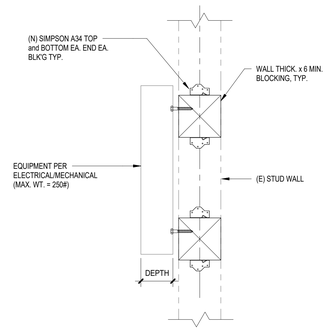


CONDITION (A)

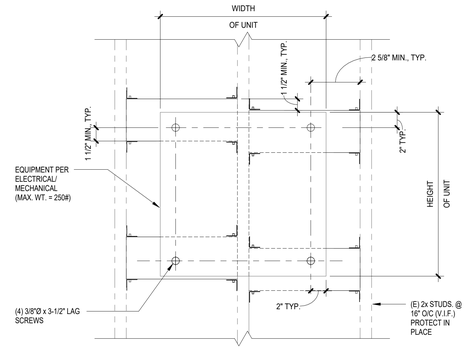
NOTE:
1. SPACE ROD HANGRS AT 12" O/C MIN., TOTAL HANGING LOAD SHALL NOT EXCEED 200# PER JOIST.
2. SEE MECH'L, ELECTRICAL, PLUMBING OR ARCH'L FOR HANGER ROD STIFFENER REQUIREMENTS.
3. WHERE ROD STIFFENER REQUIRED SEE 7/-.

TYP. ROD HANGER AT WOOD FRAMING

N.T.S. 03



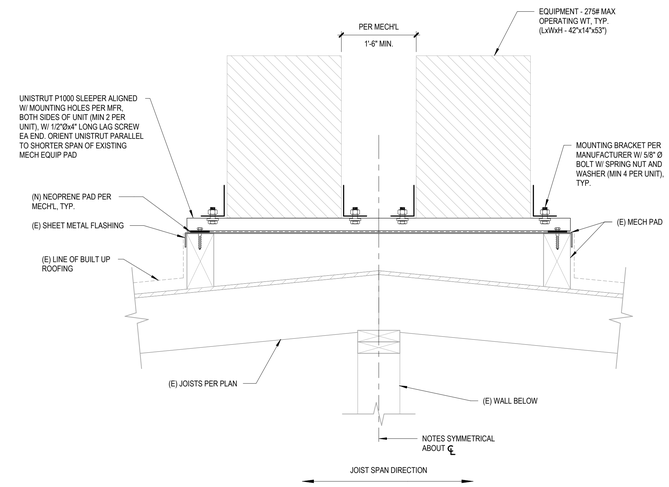
SIDE ELEVATION (B)



FRONT ELEVATION (A)

WALL MOUNTED EQUIPMENT AT (E) WOOD STUD WALL

N.T.S. 02



EQUIPMENT ANCHORAGE AT EXISTING PLATFORM

N.T.S. 09

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER MARINDA A. PRASAD NO. S6463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

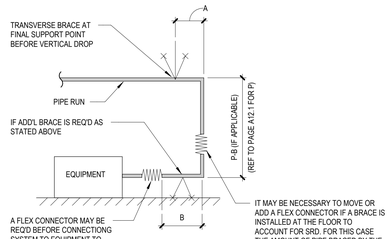
Revision
Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	As indicated

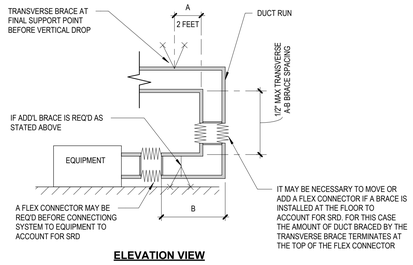
TYP EQUIPMENT ANCHORAGE DETAILS

2S9.01



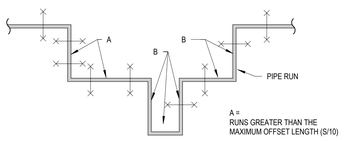
ELEVATION VIEW

SEE PIPING/CONDUIT SEISMIC BRACING NOTE 4 (F)



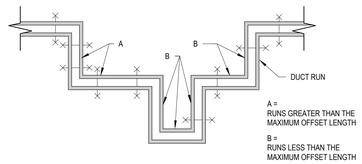
ELEVATION VIEW

SEE DUCT SEISMIC BRACING NOTE 4 (C)



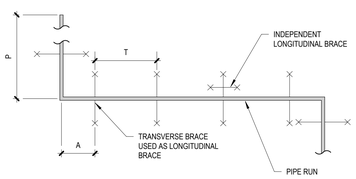
PLAN VIEW

SEE PIPING/CONDUIT SEISMIC BRACING NOTE 3 (E)



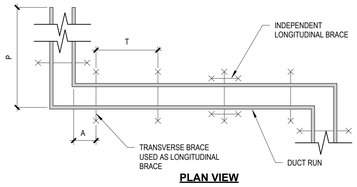
PLAN VIEW

SEE DUCT SEISMIC BRACING NOTE 3 (B)



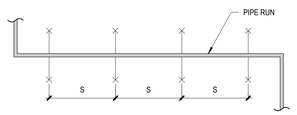
PLAN VIEW

SEE PIPING/CONDUIT SEISMIC BRACING NOTE 2 (D)

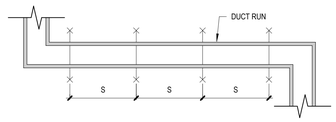


PLAN VIEW

SEE DUCT SEISMIC BRACING NOTE 2 (A)



PLAN VIEW



PLAN VIEW

PIPING/CONDUIT/TRAPEZE SUSPENDED CONDUIT SEISMIC BRACING NOTES:
1. A STRAIGHT RUN IS DEFINED AS A SECTION OF THE UTILITY BETWEEN CHANGES IN DIRECTION. IF AN OFFSET OCCURS BETWEEN CHANGES IN DIRECTION, IT MAY BE NEGLECTED IF THE DISTANCE PERPENDICULAR TO THE RUN IS LESS THAN THE OFFSET LENGTH "S/10", WHERE S IS THE MAXIMUM TRANSVERSE BRACE SPACING.

2. EACH STRAIGHT RUN SHALL BE BRACED IN THE LONGITUDINAL DIRECTION WITH AT LEAST ONE LONGITUDINAL BRACE. TRANSVERSE BRACES WITHIN OFFSET DISTANCE 'A' MAY BE USED IN ADDITION TO OR IN LIEU OF INDEPENDENT LONGITUDINAL BRACES. THE MAXIMUM LENGTH OF PIPE AROUND A 90 DEGREE TURN LONGITUDINALLY BRACED BY A TRANSVERSE BRACE AT OFFSET DISTANCE 'A' IS AS FOLLOWS:

WHERE A IS LESS THAN 0.30"S, P = 0.5"S
WHERE A IS LESS THAN 0.25"S, P = 0.75"S
WHERE A IS LESS THAN 0.20"S, P = S
WHERE A IS LESS THAN 0.15"S, P = 1.5"S

S = MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING
T = THE AS-BUILT DISTANCE BETWEEN TRANSVERSE BRACES
A = OFFSET LENGTH

3. MULTIPLE CHANGES IN DIRECTION MAY BE TREATED AS ONE COMPLETE SYSTEM. STRAIGHT RUNS GREATER THAN THE MAXIMUM OFFSET LENGTH REQUIRE 2 TRANSVERSE BRACES. STRAIGHT RUNS LESS THAN THE MAXIMUM OFFSET LENGTH MAY REQUIRE AS FEW AS ONE OR NO BRACES.

4. VERTICAL DROPS TO EQUIPMENT SHALL BE RESTRAINED WITH A TRANSVERSE BRACE AT THE FINAL SUPPORT POINT BEFORE THE VERTICAL DROP. THE DISTANCE FROM THE TRANSVERSE BRACE TO THE DROP MUST BE WITHIN THE MAXIMUM OFFSET DISTANCE 'A'. THE MAXIMUM ALLOWABLE LENGTH OF THE SYSTEM BRACED FROM THE TRANSVERSE BRACE TO THE FLEXIBLE CONNECTION IS EQUAL TO 'P' AS INDICATED ABOVE. IF THIS DISTANCE IS GREATER THAN 'P', AN ADDITIONAL BRACE IS REQUIRED AT THE END OF THE VERTICAL DROP BY ATTACHING TO THE FLOOR. CONSIDERATION MUST BE GIVEN TO SEISMIC RELATIVE DISPLACEMENTS (SRD) IMPOSED ON DUCT WHEN BRACED TO THE FLOOR.

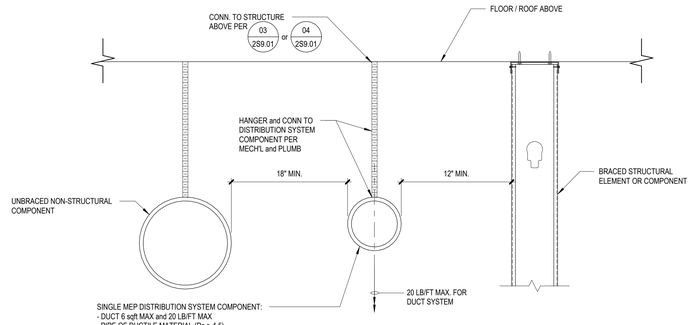
DUCT SEISMIC BRACING NOTES:
1. A STRAIGHT RUN IS DEFINED AS A SECTION OF THE UTILITY BETWEEN CHANGES IN DIRECTION. IF AN OFFSET OCCURS BETWEEN CHANGES IN DIRECTION, IT MAY BE NEGLECTED IF THE DISTANCE PERPENDICULAR TO THE RUN IS LESS THAN 2'-0".

2. EACH STRAIGHT RUN SHALL BE BRACED IN THE LONGITUDINAL DIRECTION WITH AT LEAST ONE LONGITUDINAL BRACE. TRANSVERSE BRACES WITHIN THE MAXIMUM OFFSET LENGTH MAY BE USED IN ADDITION TO OR IN LIEU OF INDEPENDENT LONGITUDINAL BRACES. THE LENGTH OF DUCT AROUND A 90 DEGREE TURN LONGITUDINALLY BRACED BY A TRANSVERSE BRACE IS "P = S-0.5T-A", WHERE

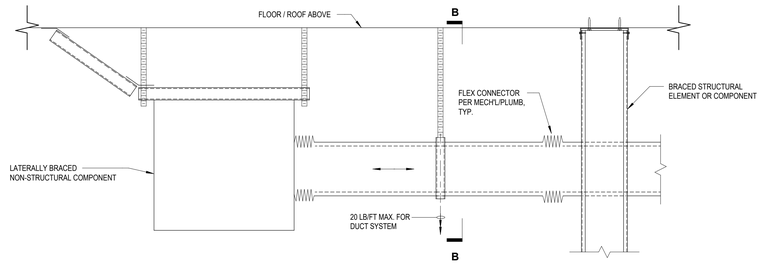
P = DUCT LENGTH AROUND A 90 DEG TURN
S = MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING
T = THE AS-BUILT DISTANCE BETWEEN TRANSVERSE BRACES
A = OFFSET LENGTH (2'-0")

3. MULTIPLE CHANGES IN DIRECTION MAY BE TREATED AS ONE COMPLETE SYSTEM. STRAIGHT RUNS GREATER THAN THE MAXIMUM OFFSET LENGTH REQUIRE 2 TRANSVERSE BRACES. STRAIGHT RUNS LESS THAN THE MAXIMUM OFFSET LENGTH MAY REQUIRE AS FEW AS ONE OR NO BRACES.

4. VERTICAL DROPS TO EQUIPMENT SHALL BE RESTRAINED WITH A TRANSVERSE BRACE AT THE FINAL SUPPORT POINT BEFORE THE VERTICAL DROP. THE DISTANCE FROM THE TRANSVERSE BRACE TO THE DROP MUST BE WITHIN THE MAXIMUM OFFSET LENGTH OF THE SYSTEM. THE MAXIMUM ALLOWABLE LENGTH OF THE SYSTEM BRACED FROM THE TRANSVERSE BRACE TO THE FLEXIBLE CONNECTION IS EQUAL TO ONE HALF OF THE MAXIMUM TRANSVERSE BRACE SPACING INDICATED. IF THIS DISTANCE IS GREATER THAN ONE HALF OF THE MAXIMUM TRANSVERSE BRACE SPACING, AN ADDITIONAL BRACE IS REQUIRED AT THE END OF THE VERTICAL DROP BY ATTACHING TO THE FLOOR. CONSIDERATION MUST BE GIVEN TO SEISMIC RELATIVE DISPLACEMENTS (SRD) IMPOSED ON DUCT WHEN BRACED TO THE FLOOR.



LATERAL SECTION OF COMPONENT (B)



LONGITUDINAL ELEVATION OF COMPONENT (A)

NOTES:
1. DETAIL NOT APPLICABLE TO SINGLE-HUNG < 2.5" TRADE SIZE, WHICH DO NOT REQUIRE ANY SEISMIC BRACING PER CBC 1617A.1.26
2. WHERE SUSPENDED DISTRIBUTION SYSTEMS DO NOT MEET THE SEISMIC BRACING EXEMPTION CRITERIA ABOVE, PROVIDE SEISMIC BRACING PER 01/2S9.02, U.N.O

Utility Component Seismic Anchorage

MEP Utility Components	Max. wt. (#/ft)	Min. Hanger Rod Diameter	Max. Distance to Adjacent Gravity Hanger Either Direction	Transverse	Longitudinal	Solid Brace			Cable Brace		
				Max. Transverse Brace Spacing	Max. Longitudinal Brace Spacing	Transverse Brace Kit	Longitudinal Brace Kit	All- Direction Brace Kit	Transverse Brace Kit	Longitudinal Brace Kit	All- Direction Brace Kit
1" Ø pipe	2.8	3/8"	7'- 0"	20'- 0"	40'- 0"	01/2S9.02A	02/2S9.02A	03/2S9.02A	01/2S9.02B	02/2S9.02B	03/2S9.02B
2" Ø pipe	6.2	1/2"	10'- 0"	20'- 0"	40'- 0"	01/2S9.02A	02/2S9.02A	03/2S9.02A	01/2S9.02B	02/2S9.02B	03/2S9.02B
3" Ø pipe	12.1	1/2"	10'- 0"	20'- 0"	40'- 0"	01/2S9.02A	02/2S9.02A	03/2S9.02A	01/2S9.02B	02/2S9.02B	03/2S9.02B
4" Ø pipe	18.3	5/8"	10'- 0"	20'- 0"	40'- 0"	01/2S9.02A	02/2S9.02A	03/2S9.02A	01/2S9.02B	02/2S9.02B	03/2S9.02B
Duct with Max Dim = 18" (including 18"Ø)	7.8	3/8"	10'- 0"	20'- 0"	40'- 0"	10/2S9.02A	11/2S9.02A	12/2S9.02A	10/2S9.02B	11/2S9.02B	12/2S9.02B
14"x14" Duct	10.0	3/8"	10'- 0"	20'- 0"	40'- 0"	07/2S9.02A	08/2S9.02A	09/2S9.02A	07/2S9.02B	08/2S9.02B	09/2S9.02B

NOTES:
1. INCLUDES WEIGHT OF WATER and INSULATION AS APPLICABLE.
2. NOT USED.
3. THESE DETAILS ARE NOT APPLICABLE FOR FIRE SPRINKLER SYSTEMS.
4. TRANSVERSE BRACING SHALL OCCUR AT SPECIFIED SPACING AND AT BEGINNING AND END OF EACH RUN. LONGITUDINAL BRACING SHALL OCCUR AT EACH RUN AT SPECIFIED SPACING. REFER TO DETAIL 02/- FOR LAYOUT OF TRANSVERSE AND LONGITUDINAL BRACING.
5. FOR SUPPORT OF GRAVITY ONLY HANGERS, REFER TO DETAIL 03/2S9.01 and 04/2S9.01.
6. CABLES SHALL BE PRESTRETCHED GALVANIZED 7x19 STRAND CORE AIRCRAFT CABLE. CABLES SHALL BE PER MIL-DTL-83420M WITH AMENDMENT 2, TYPE1 NON-JACKETED CABLE.
7. CABLES SHALL BE INSTALLED SLIGHTLY SLACK SO AS NOT TO SUPPORT GRAVITY LOADS.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
DAVID SHARP
NO. S6463
STRUCTURAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

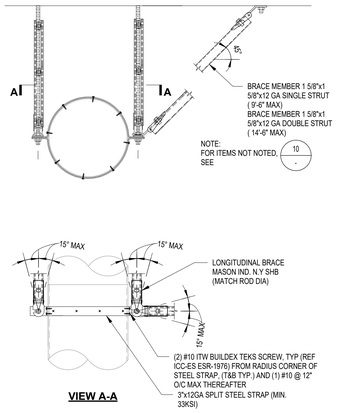
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	

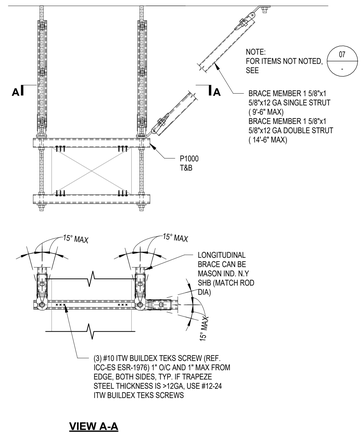
TYPICAL EQUIPMENT ANCHORAGE DETAILS

2S9.02



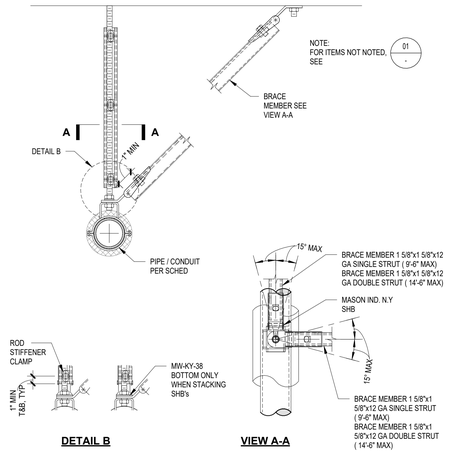
VIEW A-A

TYPICAL DUCT SEISMIC BRACING | N.T.S. | 12



VIEW A-A

TYPICAL DUCT SEISMIC BRACING | N.T.S. | 09



DETAIL B **VIEW A-A**

TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 03

VIEW A-A

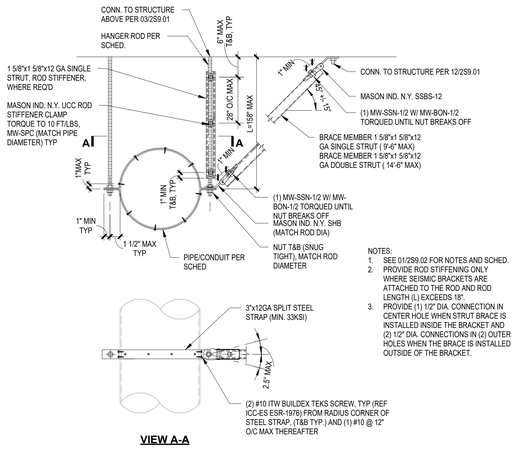
TYPICAL DUCT SEISMIC BRACING | N.T.S. | 11

VIEW A-A

TYPICAL DUCT SEISMIC BRACING | N.T.S. | 08

DETAIL B **VIEW A-A**

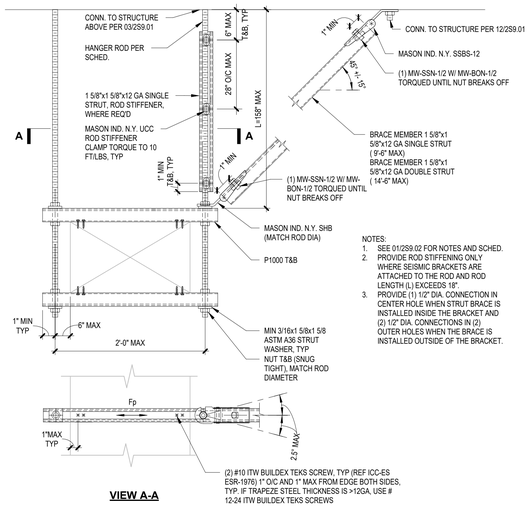
TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 02



VIEW A-A

NOTES:
1. SEE 01/2S9.02 FOR NOTES AND SCHED.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18".
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET.

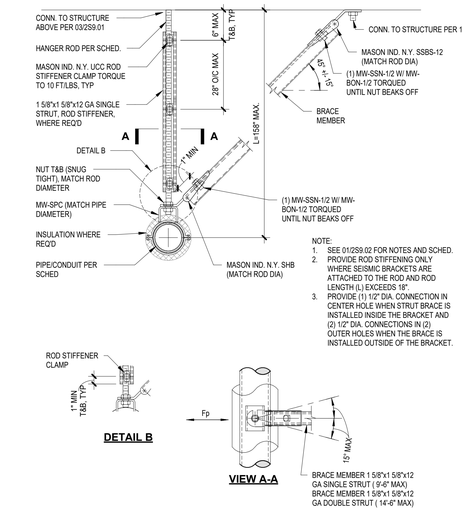
TYPICAL DUCT SEISMIC BRACING | N.T.S. | 10



VIEW A-A

NOTES:
1. SEE 01/2S9.02 FOR NOTES AND SCHED.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18".
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET.

TYPICAL DUCT SEISMIC BRACING | N.T.S. | 07



DETAIL B **VIEW A-A**

NOTE:
1. SEE 01/2S9.02 FOR NOTES AND SCHED.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18".
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET.

TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
949-261-1001 Office
LPADesignStudios.com
5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER MANNGA A. PAYAD NO. S6463 STRUCTURAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

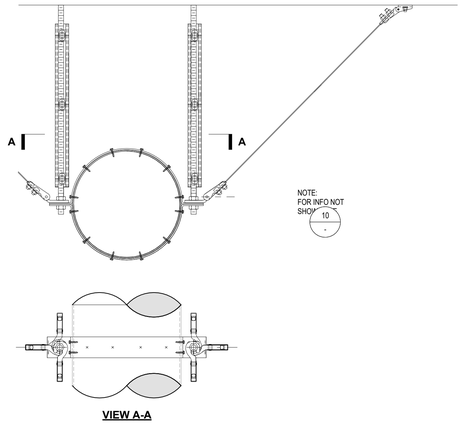
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DISIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

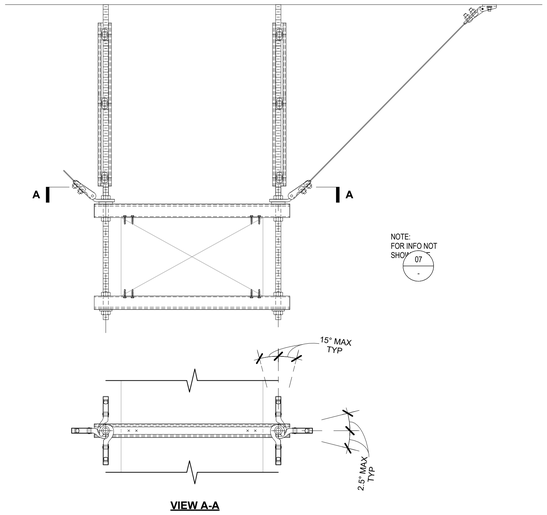
Job Number	31942
Checked By	DS
Scale	

TYPICAL EQUIPMENT ANCHORAGE DETAILS

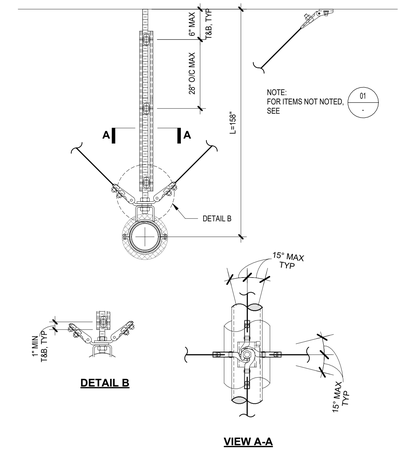
2S9.02A



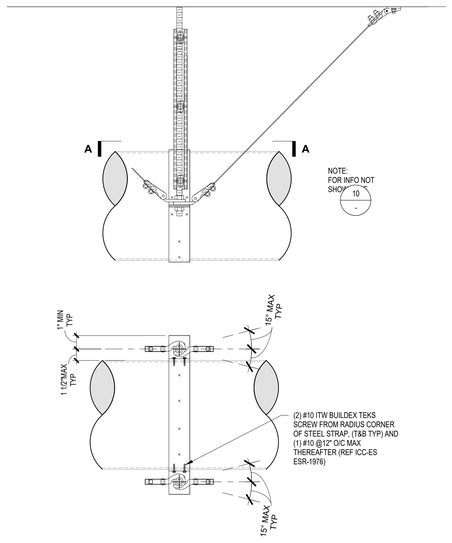
TYPICAL DUCT SEISMIC BRACING | 12



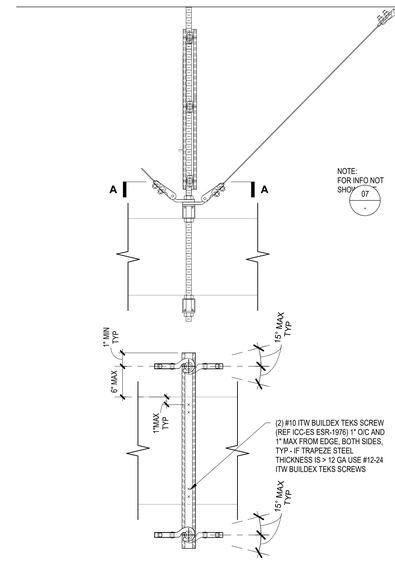
TYPICAL DUCT SEISMIC BRACING | N.T.S. | 09



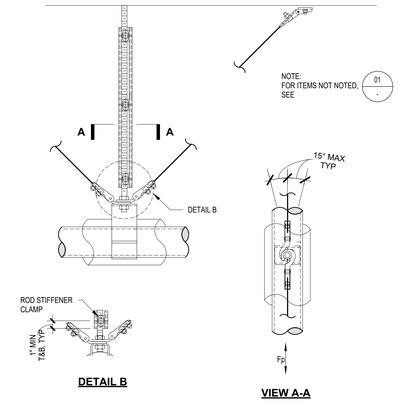
TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 03



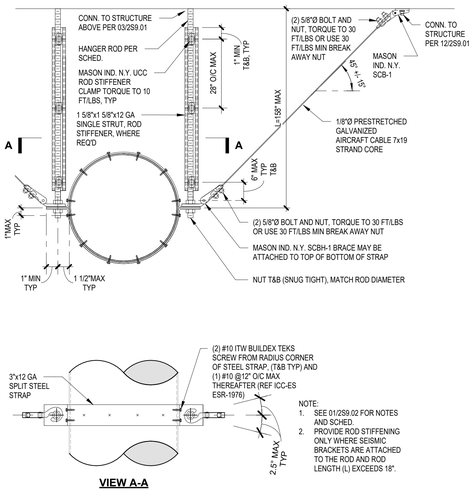
TYPICAL DUCT SEISMIC BRACING | 11



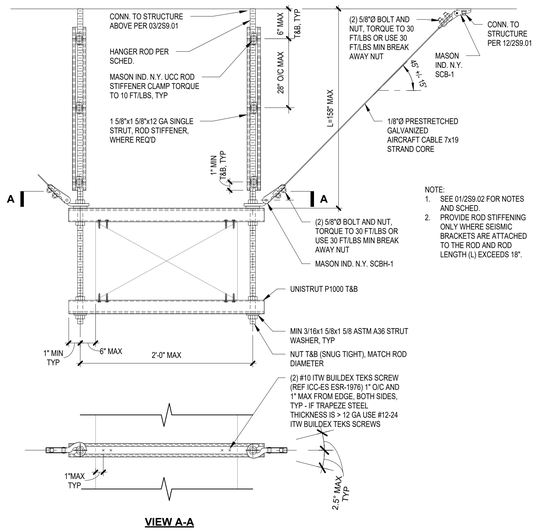
TYPICAL DUCT SEISMIC BRACING | 08



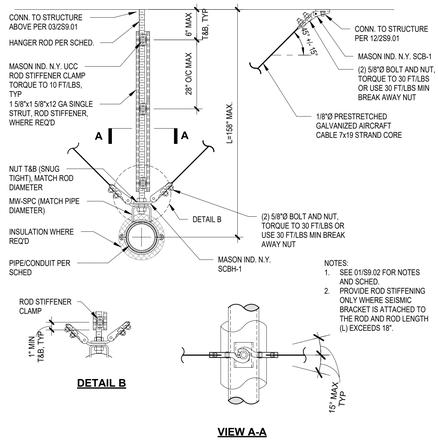
TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 02



TYPICAL DUCT SEISMIC BRACING | N.T.S. | 10



TYPICAL DUCT SEISMIC BRACING | 07



TYPICAL PIPE/CONDUIT SEISMIC BRACING | N.T.S. | 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office

LPADesignStudios.com

5301 California Avenue, Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER
MANINDA K. PARASD
NO. S6463
STRUCTURAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	DS
Scale	

TYPICAL EQUIPMENT ANCHORAGE DETAILS

2S9.02B

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
A	AIR, AMPS
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
AC	AIR CONDITIONING
ACT	ACOUSTICAL CEILING TILE
AD	ACCESS DOOR
AFF	ABOVE FINISH FLOOR
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AMB	AMBIENT
APD	AIR PRESSURE DROP
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS, INC.
ASSY	ASSEMBLY
ATM	ATMOSPHERE
B	BOILER
BFF	BELOW FINISHED FLOOR
BHP	BRAKE HORSE POWER
BEL	BELOW
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTUH	BRITISH THERMAL UNIT PER HOUR
BV	BALL VALVE
C	CONDENSATE PIPING
CA	COMPRESSED AIR
CAP	CAPACITY
CD	CEILING DIFFUSER, CONDENSATE DRAIN
CFG	CEILING FIRE DAMPER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
CH	CHILLER
CHR	CHILLED WATER RETURNED
CHS	CHILLED WATER SUPPLY
CV	CHECK VALVE
CLG	CEILING, COOLING
CO	CARBON MONOXIDE SENSOR
CO2	CARBON DIOXIDE SENSOR
COMB	COMBINATION, COMBUSTION
COND	CONDENSER, CONDENSATE
CONT	CONTINUE, CONTROL
COP	COEFFICIENT OF PERFORMANCE
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
Cx	COMISSIONING
CxA	COMISSIONING AGENT
(D)	DEMOLISH
DB	DRY BULB
dB	DECIBEL
DDC	DIRECT DIGITAL CONTROL
DIA	DIAMETER
DN	DOWN
Ø	DIAMETER
EXIST	EXISTING
(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ELEC	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
EQUIV	EQUIVALENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EVAP	EVAPORATOR, EVAPORATIVE
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FC	FLUID COOLER
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FLR	FLOOR
FLTR	FILTER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSD	COMBINATION FIRE SMOKE DAMPER
FT	FOOT, FEET
FV	FACE VELOCITY
GA	GAGE
GAL	GALLONS
GPM	GALLONS PER MINUTE
GRD	GRILLES, REGISTERS, AND DIFFUSERS
GWR	GLYCOL WATER RETURN PIPING
GWS	GLYCOL WATER SUPPLY PIPING
H	HUMIDISTAT, HEIGHT
HD	HEAD
HORIZ	HORIZONTAL
HP	HORSE POWER, HEAT PUMP
HTG	HEATING
HVAC	HEATING VENTILATION AND AIR CONDITIONING
HHR	HEATING WATER RETURN
HHS	HEATING WATER SUPPLY
HZ	HERTZ
IAQ	INDOOR AIR QUALITY
IN	INCHES
IN WC	INCHES WATER COLUMN
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LRA	LOCKED ROTOR AMPS
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
MAT	MIXED AIR TEMPERATURE
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MECH	MECHANICAL
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MOCP	MAXIMUM OVER CURRENT PROTECTION
NA	NOT APPLICABLE
NC	NORMALLY CLOSED, NOISE CRITERIA
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
P	PUMP
PD	PRESSURE DROP
POC	POINT OF CONNECTION
POD	POINT OF DISCONNECTION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR, RELIEF AIR
REF	REFRIGERANT
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID LINE
RLA	RATED LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
RTU	ROOF TOP UNIT
S	SENSOR
SA	SUPPLY AIR, SOUND ATTENUATOR
SAT	SUPPLY AIR TEMPERATURE
SF	SUPPLY FAN, SQUARE FOOT
SG	SUPPLY GRILLE
SIM	SIMILAR
SL	REFRIGERANT SUCTION LINE
SMACNA	SHEET METAL AND AIR-CONDITIONING CONTRACTOR NATIONAL ASSOCIATION
SOO	SEQUENCE OF OPERATION
ST	SOUND TRAP
TD	TEMPERATURE DIFFERENCE
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF STEEL / STRUCTURE
TSP	TOTAL STATIC PRESSURE
T'STAT	THERMOSTAT
TU	TERMINAL UNIT
TYP	TYPICAL
UH	UNIT HEATER
V	VOLT
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VEL	VELOCITY
VENT	VENTILATION, VENTILATOR
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIDE, WATER
W/	WITH
W/O	WITHOUT
WB	WET BULB TEMPERATURE
WT	WEIGHT

MECH LEGEND

(NOT TO SCALE)

SYMBOL	DESCRIPTION
	SUPPLY DIFFUSER
	RETURN GRILLE
	EXHAUST GRILLE
	FLEXIBLE CONNECTION
	TRANSITION - RECTANGULAR TO ROUND
24x10	DUCT SIZE (CLEAR INSIDE DIMENSION IN INCHES)
	SOUNDLINED DUCTWORK
	SUPPLY AIR DUCT UP AND DOWN
	RETURN AIR DUCT UP AND DOWN
	EXHAUST AIR DUCT UP AND DOWN
	SUPPLY DUCT ROOF PENETRATION
	RETURN DUCT ROOF PENETRATION
	EXHAUST DUCT ROOF PENETRATION
	RECTANGULAR DUCT UP
	RECTANGULAR DUCT DN
	ROUND OR OVAL DUCT UP
	ROUND OR OVAL DUCT DN
	DUCT RISE / DROP W/ 90° ELBOWS (RECTANGULAR DUCTS)
	DUCT RISE / DROP W/ 45° ELBOWS (RECTANGULAR DUCTS)
	DUCT RISE / DROP W/ 90° ELBOWS (ROUND AND / OR OVAL DUCT)
	DUCT RISE / DROP W/ 45° ELBOWS (ROUND AND / OR OVAL DUCTS)
	WYE AND 45° ELBOW W/ REDUCER (ROUND AND / OR OVAL DUCT)
	TRANSITION OR REDUCER
	TRANSITION - ECCENTRIC
	45° ELBOW, R/D OR R/W=1.5
	90° ELBOW, R/D OR R/W=1.5
	MITERED ELBOW WITH TURNING VANES
	90° STRAIGHT TAP
	90° CONICAL TAP
	90° TAP WITH 45° BEVEL
	45° TAP
	RADIUS TAP IN
	WYE FITTING
	RADIUS TEE
	SQUARE TEE W/ TURNING VANES
	BULLHEAD TEE
CHS	CHILLED WATER SUPPLY PIPING
CHR	CHILLED WATER RETURN PIPING
HHS	HEATING WATER SUPPLY PIPING
HHR	HEATING WATER RETURN PIPING
REF	REFRIGERANT PIPING
	SHUT-OFF VALVE ABOVE GRADE
	CONTINUATION OF PIPING
	CONTINUATION OF DUCT
SD	DUCT SMOKE DETECTOR
	SMOKE DAMPER
	FIRE DAMPER
	BACK DRAFT DAMPER
	FIRE / SMOKE DAMPER
	MANUAL VOLUME DAMPER
	ELECTRONIC REMOTE DAMPER
	MECHANICAL REMOTE DAMPER
RDCL	REMOTE DAMPER CONTROL LOCATION
	POINT OF CONNECTION
	POINT OF DISCONNECTION

ANNOTATION SYMBOLS

(NOT TO SCALE)

SYMBOL	DESCRIPTION
S-1: 12"	DIFFUSER IDENTIFICATION, NECK SIZE
200 TYP.3	AIR FLOW, NUMBER OF OCCURRENCES
1	DETAIL NUMBER
M7.01	SHEET NUMBER
D/L	DOOR LOUVER
T/L	TRANSOM LOUVER
U/C	UNDERCUT DOOR
SA	SUPPLY AIR FLOW DIRECTION
OA	OUTSIDE AIR FLOW DIRECTION
EA	EXHAUST AIR FLOW DIRECTION
RA	RETURN AIR FLOW DIRECTION
?	KEYNOTE SYMBOL
?	EQUIPMENT TAG SYMBOL

CONTROL DIAGRAM

SYMBOL	DESCRIPTION
MD	MOTORIZED DAMPER
SD	DUCT SMOKE DETECTOR
T	TEMPERATURE TRANSMITTER
A	AQUASTAT
AF	AIRFLOW MEASURING UNIT
SP	DUCT STATIC PRESSURE TRANSMITTER
WC	OPERABLE WINDOW CONTACT
DC	OPERABLE DOOR CONTACT
BP	BUILDING PRESSURE TRANSMITTER
DP	DIFFERENTIAL PRESSURE TRANSMITTER

GENERAL STRUCTURAL NOTES

1. ALL EQUIPMENT, PIPING, UTILITIES, & THEIR CONNECTIONS SHALL BE SEISMICALLY BRACED PER LATEST CBC & EQUIPMENT ANCHORAGE FOR PIPING, DUCTWORK, & ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTES PER STRUCTURAL DWG.
2. PROVIDE SHOP DWG W/ LARGE SCALE PLANS & SECTIONS SHOWING HANGERS & BRACING LOCATIONS. SHOP DWG SHALL BE PREPARED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA & SHALL BE STAMPED & SIGNED. INDICATE HANGERS & BRACING LOADS ON STRUCTURAL FRAMING PLANS.
3. EXPANSION ANCHORS & EPOXY ANCHORS, WHERE USED, SHALL HAVE A MIN EMBEDMENT OF EIGHT TIMES THE ANCHOR DIA & A MIN EDGE DISTANCE OF 10 TIMES THE DIA. EXPANSION ANCHORS & EPOXY ANCHORS MUST HAVE CURRENT & VALID ICC REPORT. SHOT PINS ARE NOT ACCEPTABLE.
4. UNLESS SPECIFIED ON STRUCTURAL DWG, ANY ALTERATIONS OR MODIFICATIONS TO A STRUCTURAL ELEMENT BY CUTTING, DRILLING, BORING, BRACING, WELDING, ETC. SHALL HAVE WRITTEN APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD & DSA PRIOR TO STARTING WORK.
5. REFER TO ARCHITECTURAL & STRUCTURAL DWG FOR LOCATIONS OF BUILDING SEISMIC/EXPANSION JOINTS. PROVIDE SEISMIC/EXPANSION JOINTS FOR ALL DUCTWORK & PIPES CROSSING THESE LOCATIONS.

MEP SYSTEMS COMPONENT ANCHORAGE AND BRACING NOTES

MEP COMPONENT ANCHORAGE NOTE

1. ALL MECHANICAL, PLUMBING, & ELECTRICAL COMPONENTS SHALL BE ANCHORED & INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE & DISPLACEMENT REQ PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 & ASCE 7-16 CHAPTERS 13, 26 & 30:
   1. ALL PERMANENT EQUIPMENT & COMPONENTS.
   2. TEMPORARY, MOVEABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
   3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 LBS OR HAS A CENTER OF MASS LOCATED 4 FT OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQ TO BE RESTRAINED IN A MANNER APPROVED BY DSA.
2. THE FOLLOWING MECHANICAL & ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE W/ THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT & ASSOCIATED DUCTWORK, PIPING, & CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE & LONGITUDINAL DIRECTIONS:
   A. COMPONENTS WEIGHING LESS THAN 400 LBS & HAVE A CENTER MASS LOCATED 4 FT OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
   B. COMPONENTS WEIGHING LESS THAN 20 LBS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 LBS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.
3. THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL & PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY & ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS & EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE W/ ABOVE REQ.

PIPING DUCTWORK & ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, & ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY W/ THE FORCES & DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; & 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 & 1617A.1.26.

THE METHOD OF SHOWING BRACING & ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING & ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (e.g. HCAI OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF & DURING THE HANGING & BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER & BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP	MD	PP	E	
■	■	☐	☐	OPTION 1: DETAILED ON THE APPROVED DWGS W/ PROJECT SPECIFIC NOTES & DETAILS.
☐	☐	☐	☐	OPTION 2: SHALL COMPLY W/ THE APPLICABLE PRE-APPROVAL (OPM#): MASON WEST 0043-13 OR MW SAUSSE 0203-13

CONTROL SYSTEM (PLAN VIEW)

TYPE	DESCRIPTION
T	THERMOSTAT
Z	ZONE TEMPERATURE SENSOR - W/ LOCAL OVERRIDE / DISPLAY
S	SPACE TEMPERATURE SENSOR- STAINLESS STEEL FLAT PLATE

EXAMPLE

TCR = THERMOSTAT W/ CO2 & HUMIDISTAT SENSOR

DEFINITION:

THERMOSTAT - FACTORY PROVIDED W/ ON-BOARD CONTROL LOGIC & LOCAL USEABILITY CONTROLS. CONNECT TO EMS FOR MONITORING ONLY.

ZONE TEMPERATURE SENSOR W/ LOCAL OVERRIDES - FIELD PROVIDED SENSOR W/ WIRING TO CENTRAL EMS W/ LOCAL USER OVERRIDE CONTROLS. MOUNT FLUSH & AT EQ HEIGHT W/ LIGHT SWITCHES & OTHER DEVICES. SENSOR MODEL TO BE APPROVED BY THE ARCHITECT.

SPACE TEMPERATURE SENSOR W/O LOCAL OVERRIDES - FIELD PROVIDED SENSOR W/ WIRING TO CENTRAL EMS W/O LOCAL USER OVERRIDE CONTROLS EQ TO KELE ST-S. EXACT SENSOR TYPE TO MATCH ARCHITECTURAL FEATURES & TO BE APPROVED BY THE ARCHITECT.

SYMBOL	DESCRIPTION
	AUTOMATIC CONTROL VALVE, 3-WAY
	AUTOMATIC CONTROL VALVE, 2-WAY
DDC	MAIN BUILDING DIRECT DIGITAL CONTROL PANEL
VFD	VARIABLE FREQUENCY DRIVE

GENERAL CONTROL NOTES

1. BUILDING EMS TO INTERCONNECT W/ EXG CAMPUS EMS SYSTEM FOR FULL CONTROL & MONITORING.
2. BUILDING EMS TO CONNECT TO LIGHTING CONTROL PANELS THROUGH BACNET INTERFACE CARD.
3. BUILDING CONTROLS TO COMPLY W/ OWNER CONTROLS STANDARDS.
4. MOTOR STARTERS SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. STARTERS SHALL BE EQ TO CERUS MODEL 'BAS'.

GENERAL NOTES

1. ALL CONSTRUCTION & MATERIALS SHALL BE AS SPECIFIED & IN ACCORDANCE W/ ALL APPLICABLE CODES, ORDINANCES, LAWS, PERMITS, & THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURATE PLACEMENT OF ALL NEW CONSTRUCTION ON THE SITE.
3. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS & DIMENSIONS, & EXACT LOCATIONS & ELEVATIONS OF PIPING BEFORE STARTING WORK. SHOULD A DISCREPANCY APPEAR IN THE CONTRACT DOCUMENTS, OR BETWEEN THE CONTRACT DOCUMENTS & EXG CONDITIONS, NOTIFY THE ARCHITECT AT ONCE FOR INSTRUCTION ON HOW TO PROCEED.
4. THE MECHANICAL CONTRACTOR SHALL ACQUIRE & PAY FOR ALL PERMITS & FEES.
5. COORDINATE MECHANICAL WORK W/ ALL OTHER TRADES (ELECTRICAL, ARCHITECTURAL, STRUCTURAL, CIVIL, & LANDSCAPE). REFER TO ELECTRICAL, ARCHITECTURAL,STRUCTURAL, CIVIL, & LANDSCAPE DWGS & SPECIFICATIONS FOR DETAILS. COORDINATION SHALL OCCUR PRIOR TO FABRICATION, PURCHASE, &/OR INSTALLATION OF ALL WORK.
6. COORDINATE MECHANICAL, ELECTRICAL, PLUMBING, & FIRE PROTECTION SYSTEM ROUTING PRIOR TO INSTALLATION. DUCTWORK ROUTING TAKES PRECEDENCE OVER OTHER DISCIPLINES INCLUDING FIRE PROTECTION. DWGS ARE DIAGRAMMATIC IN NATURE. PROVIDE ALL FITTINGS, TRANSITIONS &/OR OFFSETS AS REQ FOR A COMPLETE SYSTEM.
7. PRIOR TO COMMENCING ANY WORK VERIFY ALL EQUIPMENT LOCATIONS W/ THE GENERAL CONTRACTOR, OTHER TRADES, ARCHITECT & STRUCTURAL ENGINEER.
8. MECHANICAL SYSTEMS SEISMIC RESTRAINTS SHALL CONFORM TO "SEISMIC RESTRAINT MANUAL: GUIDELINES FOR MECHANICAL SYSTEMS" AS PUBLISHED BY SMACNA 3RD EDITION 2008, ANSI/SMACNA 001-2008.
9. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THE SAFE KEEPING OF HIS OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR THE PROTECTION OF PROPERTIES AGAINST, FIRE, SMOKE, THEFT, & ENVIRONMENTAL CONDITIONS.
10. MECHANICAL MATERIALS, EQUIPMENT, DUCTWORK & PIPING SHALL BE STORED IN ORDERLY PROFESSIONAL FASHION. ALL ITEMS SHALL BE COVERED & PROTECTED FROM RAIN & ALL OTHER ENVIRONMENTAL CONDITIONS.
11. VERIFY & COORDINATE THE MAINTENANCE ACCESS & CODE REQ CLEARANCES FOR ALL MECHANICAL EQUIPMENT. INSTALL ALL WORK & COORDINATE THE WORK OF OTHER TRADES TO MAINTAIN CODE REQ CLEARANCE & ACCESS FOR PROPER MAINTENANCE OF EQUIPMENT.
12. PROVIDE EQUIPMENT TAGS FOR ALL MECHANICAL EQUIPMENT. TAG SHALL BE MADE OF BAKELITE W/ ETCHED 1/2" HIGH LETTERS. LOCATE TAG ON EQUIPMENT NEAR MFRS NAMEPLATE.
13. PROVIDE DUCTWORK THAT CONFORMS TO THE "HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE" AS PUBLISHED IN THE LATEST EDITION OF THE CALIFORNIA MECHANICAL CODE. ACOUSTICAL LINING SHALL CONFORM TO SMACNA 2006 EDITION (ANSI / SMACNA 006-2006) STANDARDS.
14. FLEXIBLE DUCTWORK SHALL BE USED FOR CONNECTIONS TO AIR TERMINAL DEVICES IN CONCEALED, LOW PRESSURE, ENVIRONMENTAL AIR DUCT SYSTEMS. FLEXIBLE DUCT CONNECTIONS SHALL BE 5'-0" MAX LENGTH & SHALL BE INSTALLED IN ACCORDANCE W/ SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
15. REFRIGERANT PIPING SHALL BE SIZED & ROUTED IN ACCORDANCE W/ MFR'S REQUIREMENTS. REFRIGERANT SYSTEM SHALL INCLUDE ALL ADDITIONAL TRAPS, VALVES, & ACCESSORIES REQ BY THE MFR FOR THE INSTALLED PIPE ROUTING. PROVIDE MIN 1" CLOSED CELL FOAM INSULATION FOR ALL REFRIGERANT PIPING, ARMACELL "ARMAFLEX" OR SIMILAR. REFER TO SPECIFICATIONS.
16. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING IN CONDUIT.
17. THERMOSTATS SHALL BE MOUNTED 48" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE.
18. THE MECHANICAL CONTRACTOR SHALL PROVIDE AS-BUILT DWGS. DWGS SHALL BE SUBMITTED IN AUTO CAD FORMAT. AS-BUILT DWGS SHALL BE COMPLETED & SUBMITTED TO ENGINEER/ARCHITECT PRIOR TO SUBSTANTIAL COMPLETION. ENGINEER WILL NOT PERFORM PUNCH LIST UNTIL AS-BUILT DWGS ARE RECEIVED.
19. PROVIDE COMPLETE AIR & WATER BALANCE FOR ALL MECHANICAL SYSTEMS. BALANCING CONTRACTOR SHALL BE AN INDEPENDENT THIRD PARTY & A MEMBER OF "AABC" OR THE "NEBB". MECHANICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY BELTS SHEAVES & PULLEYS AS REQ BY THE BALANCING CONTRACTOR TO COMPLETE THE BALANCING OF THE SYSTEM.
20. DUCT SIZES INDICATED ON PLANS ARE THE "FREE" INSIDE DIMENSION OF THE DUCT. THE CONTRACTOR SHALL INCREASE THE SIZE OF THE DUCT TO ACCOMMODATE ACOUSTICAL &/OR PERFORATED LINERS.
21. SEAL ALL DUCT SYSTEMS AIRTIGHT USING MASTIC &/OR LIQUID ELASTIC SEALANT. "DUCT TAPE" SHALL NOT BE USED.
22. PROVIDE VOLUME DAMPERS FOR EA SUPPLY DIFFUSER AS WELL AS FOR RETURN & EXHAUST OPENINGS AS REQ BY THE BALANCING CONTRACTOR TO BALANCE THE SYSTEM. LOCATE DAMPER AS FAR UPSTREAM AS POSSIBLE. FOR ALL VOLUME DAMPERS LOCATED ABOVE CEILINGS PROVIDE 12" LONG 1/2" WIDE FLUORESCENT ORANGE TAPE TO MARK DAMPER LOCATIONS.
23. PROVIDE "PETE'S PLUG" TYPE TEST WELLS BEFORE & AFTER EA PIECE OF EQUIPMENT REQ BALANCING OR MONITORING IN THE HYDRONIC SYSTEMS INCL BUT NOT LIMITED TO COILS, HEAT EXCHANGERS, CONTROL VALVES, TEMPERATURE & / OR PRESSURE SENSORS, ETC. PROVIDE ADDL TEST WELLS AS REQ BY THE COMMISSIONING AGENT.
24. DUCT SYSTEMS USED W/ BLOWER TYPE EQUIPMENT WHICH ARE PORTIONS OF HEATING COOLING, ABSORPTION, EVAPORATIVE COOLING OR OUTDOOR AIR VENTILATION SYSTEM SHALL BE SIZED IN ACCORDANCE W/ CHAPTER 17 OF THE CALIFORNIA MECHANICAL CODE.
25. AIR-MOVING SYSTEMS SUPPLYING AIR IN EXCESS OF 2000 CFM SHALL BE INTERLOCKED TO & SHUTDOWN BY AREA WIDE FIRE ALARM SYSTEM SIGNAL. FOR BUILDINGS W/O AREA WIDE SYSTEM THE EQUIPMENT SHALL BE EQUIPPED W/ AN AUTOMATIC SHUTOFF ACTIVATED BY SMOKE DETECTOR LOCATED IN THE MAIN SUPPLY-AIR DUCT.
26. PROVIDE TURNING VANES IN ALL 90° MITERED ELBOWS
27. DUCT SYSTEMS SHALL BE LEAK TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF 2022 CALIFORNIA ENERGY CODE SECTION 120.4(g).
28. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED W/ ADEQUATE CLEARANCE FOR MAINTENANCE ACCESS, PER MFR'S REQUIREMENTS.
29. REFER TO ARCHITECTURAL PLANS FOR LOCATION OF FIRE &/OR SMOKE SEPARATION WALLS. THE MECHANICAL CONTRACTOR SHALL PROVIDE FIRE &/OR SMOKE DAMPERS FOR ALL RATED WALLS/CEILINGS/ASSEMBLIES.

MECHANICAL SHEET INDEX

SHEET NUMBER	SHEET NAME
2M0.01	MECHANICAL LEGENDS AND GENERAL NOTES
2MA2.01	MECHANICAL PLANS - BLDG A
2MF2.01	MECHANICAL HVAC PLANS - BLDG F
2MF2.02	MECHANICAL HVAC PLANS - BLDG F
2MF2.10	MECHANICAL PIPING & CONTROLS PLANS
2MF3.00	MECHANICAL SECTIONS
2M5.10	MECHANICAL CONTROL DIAGRAMS
2M6.00	MECHANICAL SCHEDULES
2M7.00	MECHANICAL DETAILS
2M7.01	MECHANICAL DETAILS
2M8.00	MECHANICAL ENERGY COMPLIANCE DOCUMENTATION
2M8.01	MECHANICAL ENERGY COMPLIANCE DOCUMENTATION

CALGREEN BUILDING STANDARDS NON-RESIDENTIAL MANDATORY MEASURES

■	5.201.1	COMPLY W/ REQ OF CALIFORNIA ENERGY CODE (CCR TITLE-24, PART 6, 2022)
■	5.410.3	PERFORM TESTING & ADJ PROCEDURES IN ACCORDANCE W/ INDUSTRY BEST PRACTICES & APPLICABLE NATIONAL STANDARDS ON EA SYSTEM.
■	5.410.4	TESTING & ADJUSTING OF SYSTEMS SHALL BE REQ FOR BUILDINGS LESS THAN 10,000 SQ FT OR NEW SYSTEMS TO SERVE AN ADDITION OR ALTERATION.
■	5.410.4.3.1	BEFORE A NEW SPACE-CONDITIONING SYSTEM SERVING A BUILDING OR SPACE IS OPERATED FOR NORMAL USE, THE SYSTEM SHALL BE BALANCED IN ACCORDANCE W/ THE PROCEDURES DEFINED BY THE TESTING, ADJUSTING, AND BALANCING BUREAU NATIONAL STANDARDS; THE NATIONAL ENVIRONMENTAL BALANCING BUREAU PROCEDURAL STANDARDS; OR ASSOCIATED AIR BALANCE COUNCIL NATIONAL STANDARDS.
■	5.410.4.4	AFTER COMPLETION OF TESTING, ADJUSTING & BALANCING, PROVIDE A FINAL REPORT OF TESTING SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
■	5.410.4.5	BUILDING OWNER SHALL BE PROVIDED W/ DETAILED OPERATING & MAINTENANCE INSTRUCTIONS & COPIES OF GUARANTEES & WARRANTIES FOR EA SYSTEM PRIOR TO FINAL INSPECTION.
■	5.504.4.1	ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS & CAULKS SHALL COMPLY W/ LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.4.1 & 5.504.4.2. AEROSOL ADHESIVES & SMALLER UNIT SIZES OF ADHESIVES AND SEALANT OR CAULKING COMPOUNDS (IN UNITS OF PRODUCT, LESS PACKAGING, WHICH DO NOT WEIGH MORE THAN ONE LB & DO NOT CONSIST OF MORE THAN 16 FLUID OZ) SHALL COMPLY WITH STATEWIDE VOC STANDARDS & OTHER REQ, INCL PROHIBITIONS ON USE OF CERTAIN TOXIC COMPOUNDS, OF CALIFORNIA CODE OF REGULATIONS, TITLE 17, COMMENCING W/ SECTION 94507.
■	5.504.3	AT THE TIME OF ROUGH INSTALLATION & DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING, & VENTILATION EQUIPMENT, ALL DUCT & OTHER AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED W/ TAPE, PLASTIC, SHEETMETAL, OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER, & DEBRIS WHICH MAY ENTER THE SYSTEM.
■	5.504.5.3	IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDINGS W/ AIR FILTRATION MEDIA FOR OUTSIDE & RETURN AIR THAT PROVIDES AT LEAST A MERV 13. MERV 13 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY & RECOMMENDATIONS FOR MAINTENANCE W/ FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE M&O MANUAL.
■	5.504.5.3.1	INSTALLED FILTERS SHALL BE CLEARLY LABELED BY THE MANUFACTURER INDICATING THE MERV RATING.
■	5.506.1	FOR MECHANICALLY OR NATURALLY VENTILATED SPACES IN BUILDINGS, MEET THE MIN REQ OF SECTION 120.1 OF THE CALIFORNIA ENERGY CODE, CCR TITLE 24, PART 6 & CHAPTER 4 OF CCR, TITLE 8 OR THE APPLICABLE LOCAL CODE WHICHEVER IS MORE STRINGENT.
■	5.506.2	FOR BUILDINGS EQUIPPED W/ DEMAND CONTROL VENTILATION, CO2 SENSORS & VENTILATION CONTROLS SHALL BE SPECIFIED & INSTALLED IN ACCORDANCE W/ THE REQ OF THE LATEST EDITION OF THE CALIFORNIA ENERGY CODE, CCR, TITLE 24, PART 6, SECTION 120.1(c).1.
■	702.1	HVAC SYSTEM INSTALLERS SHALL BE TRAINED & CERTIFIED IN THE PROPER INSTALLATION OF HVAC SYSTEMS INCL DUCTS & EQUIPMENT BY A NATIONALLY OR REGIONALLY RECOGNIZED TRAINING OR CERTIFICATION PROGRAM. UNCERTIFIED PERSONS MAY PERFORM HVAC INSTALLATIONS WHEN UNDER THE DIRECT SUPERVISION & RESPONSIBILITY OF A PERSON TRAINED & CERTIFIED TO INSTALL HVAC SYSTEMS OR CONTRACTOR LICENSED TO INSTALL HVAC SYSTEMS. ACCEPTABLE HVAC TRAINING & CERTIFICATION PROGRAMS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: 1) STATE CERTIFIED APPRENTICESHIP PROGRAMS, 2) PUBLIC UTILITY TRAINING PROGRAMS, 3) TRAINING PROGRAMS SPONSORED BY TRADE, LABOR, OR STATEWIDE ENERGY CONSULTING OR VERIFICATION ORGANIZATIONS, 4) PROGRAMS SPONSORED BY MFR ORGANIZATIONS, 5) OTHER PROGRAMS ACCEPTABLE TO THE ENFORCING AGENCY.
■	702.2	SPECIAL INSPECTORS MUST BE QUALIFIED & ABLE TO DEMONSTRATE COMPETENCE IN THE DISCIPLINE THEY ARE INSPECTING.
■	703.1	THE BUILDING OWNER SHALL BE PROVIDED W/ THE FINAL REPORT OF ALL INSPECTION VERIFICATIONS & REPORTS REQ BY THE ENFORCING AGENCY.

APPLICABLE CODES

BUILDING CODES

2025 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.

2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.; (2021 INTERNATIONAL BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, WITH CALIFORNIA AMENDMENTS)

2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.; (2020 NATIONAL ELECTRICAL CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NFPA)

2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R.; (2021 UNIFORM MECHANICAL CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)

2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R.; (2021 UNIFORM PLUMBING CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)

2022 ENERGY CODE (CEC), PART 6, TITLE 24 C.C.R.;

2022 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.; (2021 INTERNATIONAL FIRE CODE OF THE INTERNATIONAL CODE COUNCIL)

2022 CALIFORNIA GREEN BUILDING CODE (CAL GREEN), PART 11, TITLE 24 C.C.R.

2022 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.

2022 TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.

PARTIAL LIST OF APPLICABLE STANDARDS

ASHRAE 62.1	VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY	VERSION 2022
ASHRAE 55	THERMAL COMFORT FOR HUMAN OCCUPANCY	VERSION 2020
ASHRAE G36	HIGH PERFORMANCE SEQUENCE OF OPERATIONS FOR HVAC SYSTEMS	VERSION 2021

2019 CALIFORNIA BUILDING CODE (FOR SFM) REFERENCED STANDARDS CH. 35

NFPA 13	AUTOMATIC SPRINKLER SYSTEMS (CALIFORNIA AMENDED)	2022 EDITION
NFPA 14	STANDPIPE SYSTEMS (CALIFORNIA AMENDED)	2019 EDITION
NFPA 17	DRY CHEMICAL EXTINGUISHING SYSTEMS	2020 EDITION
NFPA 17A	WET CHEMICAL EXTINGUISHING SYSTEMS	2020 EDITION
NFPA 20	STATIONARY PUMPS	2022 EDITION
NFPA 24	PRIVATE FIRE SERVICE MAINS (CALIFORNIA AMENDED)	2019 EDITION
NFPA 72	NATIONAL FIRE ALARM AND SIGNALING CODE (CALIFORNIA AMENDED) (NOTE: SEE UL STANDARD 1971 FOR "VISUAL DEVICES")	2022 EDITION
NFPA 80	FIRE DOOR AND OTHER OPENING PROTECTIVES	2019 EDITION
NFPA 253	CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS	2023 EDITION
NFPA 2001	CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (CALIFORNIA AMENDED)	2018 EDITION

TITLE-24 MECHANICAL MANDATORY MEASURES

GENERAL

■	110.1	ANY APPLIANCE FOR WHICH THERE IS A CALIFORNIA STANDARD ESTABLISHED IN THE APPLIANCE EFFICIENCY REGULATIONS SHALL COMPLY WITH THE APPLIANCE STANDARD.
☐	120.6	COVERED PROCESS REFRIGERATED WAREHOUSES, COMMERCIAL REFRIGERATION, ENCLOSED PARKING GARAGES, PROCESS BOILERS, AND COMPRESSED AIR SYSTEMS SHALL MEET THE REQUIREMENTS WITHIN THIS SECTION.
☐	120.8	BUILDING COMMISSIONING PROCEDURES, REVIEWS, AND REPORTS SHALL BE FOLLOWED AS DESCRIBED WITHIN THIS SECTION.

AIR-SIDE SYSTEMS

■	110.2(a)	HEATING AND COOLING EQUIPMENT EFFICIENCY ANY SPACE-CONDITIONING EQUIPMENT SHALL BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED THAT THE EQUIPMENT COMPLIES WITH ALL THE APPLICABLE REQUIREMENTS OF THE CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS.
☐	110.2(b)	HEAT PUMP CONTROLS HEAT PUMPS WITH SUPPLEMENTARY ELECTRIC RESISTANCE HEATERS SHALL HAVE CONTROLS: 1. THAT PREVENT SUPPLEMENTARY HEATER OPERATION WHEN THE HEATING LOAD CAN BE MET BY THE HEAT PUMP ALONE; AND 2. IN WHICH THE CUT-ON TEMPERATURE FOR COMPRESSION HEATING IS HIGHER THAN THE CUT-ON TEMPERATURE FOR SUPPLEMENTARY HEATING, AND THE CUT-OFF TEMPERATURE FOR COMPRESSION HEATING IS HIGHER THAN THE CUT-OFF TEMPERATURE FOR SUPPLEMENTARY HEATING.
■	110.2(c)	THERMOSTATS ALL UNITARY HEATING OR COOLING SYSTEMS, INCLUDING HEAT PUMPS, NOT CONTROLLED BY A CENTRAL ENERGY MANAGEMENT SYSTEM SHALL HAVE A SETBACK THERMOSTAT.
☐	110.2(d)	FURNACE CONTROLS GAS-FIRED AND OIL-FIRED FORCED AIR FURNACES WITH INPUT RATINGS 225,000 BTU/H SHALL NOT HAVE A PILOT LIGHT, AND SHALL HAVE EITHER POWER VENTING OR A FLUE DAMPER.
☐	120.1(c.2)	NATURAL VENTILATION NATURALLY VENTILATED SPACES SHALL BE PERMANENTLY OPEN TO AND WITHIN 20 FEET OF OPERABLE WALL OR ROOF OPENINGS TO THE OUTDOORS; THE OPENABLE AREA OF WHICH IS NOT LESS THAN 5% OF THE CONDITIONED FLOOR AREA OF THE NATURALLY VENTILATED SPACE. WHERE OPENINGS ARE COVERED WITH LOUVERS OR OTHERWISE OBSTRUCTED, OPENABLE AREA SHALL BE BASED ON THE FREE UNOBSTRUCTED AREA THROUGH THE OPENING. THE MEANS TO OPEN REQUIRED OPERABLE OPENINGS SHALL BE READILY ACCESSIBLE TO BUILDING OCCUPANTS WHENEVER THE SPACE IS OCCUPIED.
■	120.1(d.1)	MINIMUM VENTILATION EACH SPACE THAT IS NOT NATURALLY VENTILATED SHALL BE VENTILATED WITH A MECHANICAL SYSTEM CAPABLE OF PROVIDING AN OUTDOOR AIR RATE NO LESS THAN AS REQUIRED BY THE CALIFORNIA ENERGY EFFICIENCY STANDARDS.
☐	120.1(d.2)	PRE-OCCUPANCY VENTILATION PURGE THE MINIMUM RATE OF OUTDOOR AIR OR THREE COMPLETE AIR CHANGES SHALL BE SUPPLIED TO THE ENTIRE BUILDING DURING THE ONE-HOUR PERIOD IMMEDIATELY BEFORE THE BUILDING IS NORMALLY OCCUPIED.
☐	120.1(d.3)	DEMAND CONTROL VENTILATION HVAC SINGLE ZONE SYSTEMS WITH AN OUTDOOR AIR ECONOMIZER AND WITH A DESIGN OCCUPANT DENSITY, OR A MAXIMUM OCCUPANT LOAD FACTOR FOR EGRESS PURPOSES GREATER THAN OR EQUAL TO 25 PEOPLE PER 1000 SF SHALL HAVE DEMAND CONTROL VENTILATION OR OCCUPANT SENSOR VENTILATION CONTROLS.
■	120.2(e.1)	TIME CONTROL EACH SPACE-CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS THAT ARE CAPABLE OF AUTOMATICALLY SHUTTING OFF THE SYSTEM DURING PERIODS OF NON-USE AND SHALL HAVE EITHER AN AUTOMATIC TIME SWITCH CONTROL DEVICE WITH AN ACCESSIBLE MANUAL OVERRIDE THAT ALLOWS OPERATION OF THE SYSTEM FOR UP TO FOUR HOURS; OR AN OCCUPANCY SENSOR; OR A FOUR-HOUR TIMER THAT CAN BE MANUALLY OPERATED.
■	120.2(e.2)	SETBACK AND SETUP CONTROL THE CONTROL SHALL AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN A SETBACK HEATING THERMOSTAT SETPOINT. IF THE SYSTEM PROVIDES MECHANICAL HEATING AND A SETUP COOLING THERMOSTAT SETPOINT IF THE SYSTEM PROVIDES MECHANICAL COOLING.
☐	120.2(f)	OUTDOOR DAMPER CONTROL OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON FAN SHUTDOWN.
☐	120.2(g)	ISOLATION ZONES EACH SPACE-CONDITIONING SYSTEM SERVING MULTIPLE ZONES WITH A COMBINED CONDITIONED FLOOR AREA OF MORE THAN 25,000 SQUARE FEET SHALL BE DESIGNED, INSTALLED, AND CONTROLLED TO SERVE ISOLATION AREAS.
☐	120.2(h)	AUTOMATIC DEMAND SHED CONTROLS HVAC SYSTEMS WITH DDC TO ZONE LEVEL SHALL BE PROGRAMMED TO ALLOW CENTRALIZED DEMAND SHED FOR NON-CRITICAL ZONES.
☐	120.2(i)	ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) AIR-COOLED UNITARY DIRECT-EXPANSION UNITS EQUIPPED WITH AN ECONOMIZER AND MECHANICAL COOLING AT AHRI CONDITIONS OF GREATER THAN OR EQUAL TO 54.0 MBH SHALL INCLUDE A FDD SYSTEM.
■	120.4	DUCT INSULATION ALL AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS SHALL BE INSTALLED, SEALED AND INSULATED TO MEET THE REQUIREMENTS OF THE 2022 CMC SECTIONS 601, 602, 603, 604, 605.

WATER-SIDE SYSTEMS

☐	110.2(a)	EQUIPMENT EFFICIENCY HEATING AND COOLING EQUIPMENT EFFICIENCY ANY SPACE-CONDITIONING EQUIPMENT SHALL BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED THAT THE EQUIPMENT COMPLIES WITH ALL THE APPLICABLE REQUIREMENTS OF THE CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS.
■	120.3	PIPE INSULATION ALL HVAC PIPING CONVEYING LIQUIDS OR LOCATED WITHIN HVAC EQUIPMENT SHALL BE INSULATED IN ACCORDANCE WITHIN THIS SECTION.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM RING
M31731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

MECHANICAL LEGENDS AND GENERAL NOTES

2M0.01

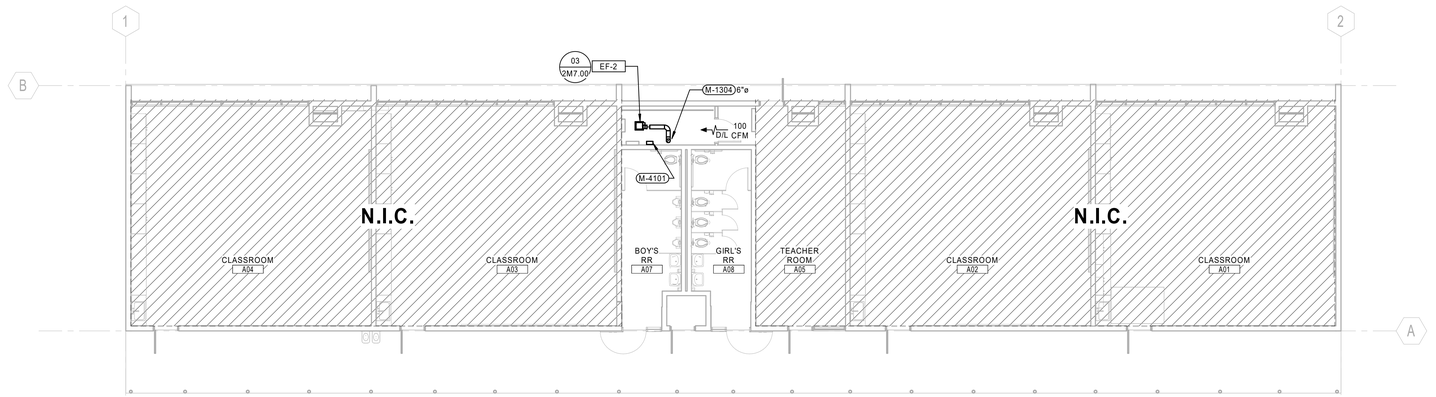
KEYNOTES

ITEM	DESCRIPTION
M-1304	EXHAUST AIR DUCT UP THRU ROOF
M-1305	EXHAUST AIR DUCT DOWN THRU ROOF
M-4101	PROVIDE NEW PELICAN REPEATER POWERED FROM 120V OUTLET. CONFIRM FINAL LOCATION WITH OWNER. SEE DETAIL 15/2M5.10.

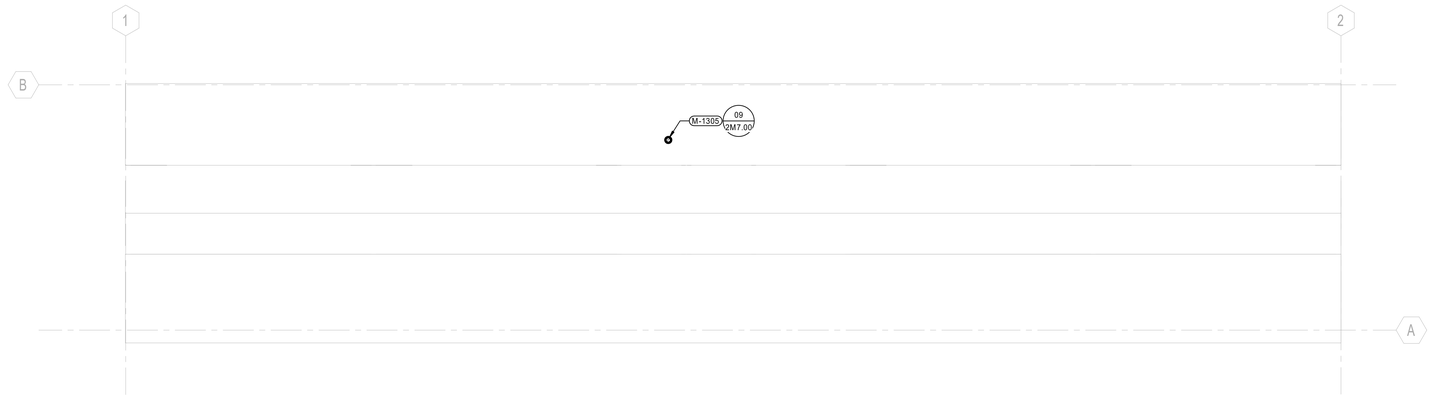
LEGEND

NOT IN SCOPE OF WORK

SCOPE OF WORK



BUILDING A - MECHANICAL PLAN | 1/8" = 1'-0" | 06



BUILDING A - MECHANICAL ROOF PLAN | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAMS
M51731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

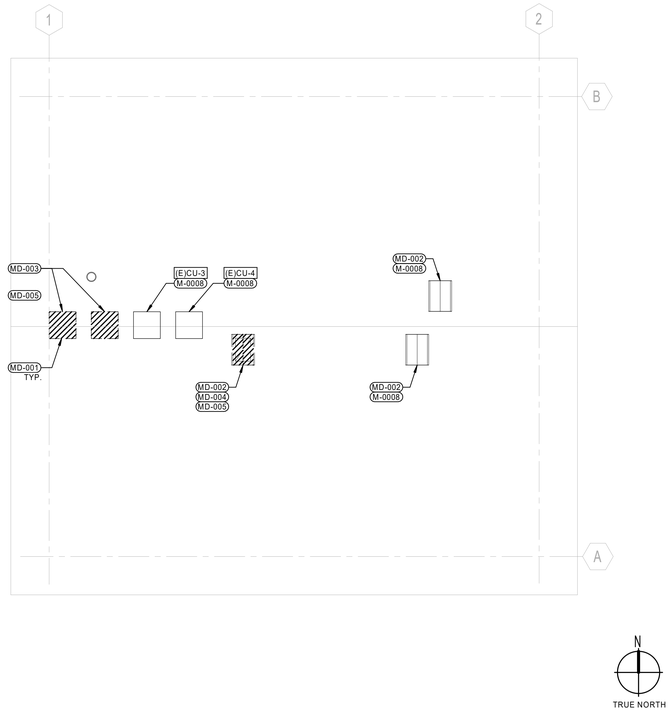
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

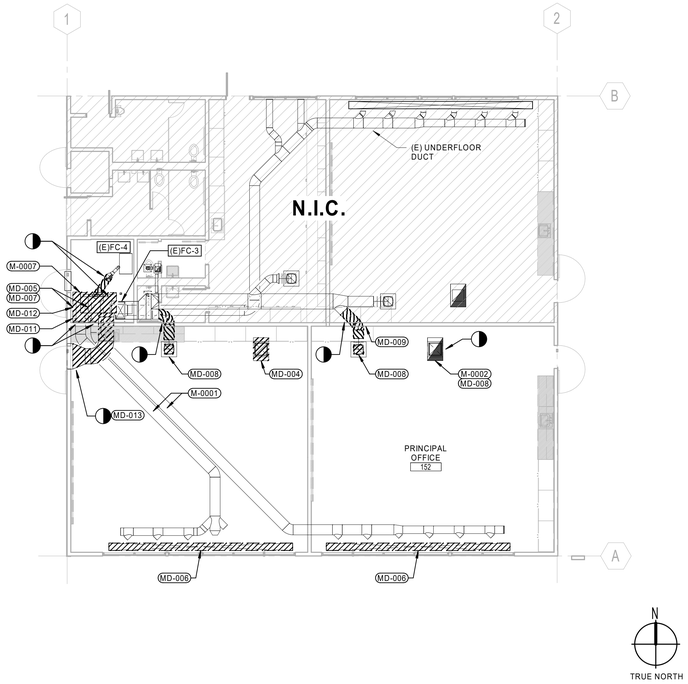
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

MECHANICAL PLANS - BLDG A

2MA2.01



BUILDING F MECHANICAL ROOF PLAN - DEMO | 1/8" = 1'-0" | 07



BUILDING F MECHANICAL FLOOR PLAN - DEMO | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
M-0001	(E) UNDERFLOOR DUCT TO BE ABANDONED IN PLACE
M-0002	(E) GRAVITY RELIEF THRU ROOF TO REMAIN. PROTECT OPENING UNTIL NEW GRAVITY RELIEF DUCT CONNECTION.
M-0007	PROTECT EXISTING REFRIGERANT PIPING & SUPPORTS IN PLACE DURING WORK. IF PIPING
M-0008	(E) UNIT SHOWN FOR REFERENCE. PROTECT IN PLACE DURING DURATION OF WORK.
MD-001	(E) HEAT PUMP. CONTRACTOR TO FIELD VERIFY THAT HEAT PUMP IS SERVING CLASSROOM WITHIN SCOPE PRIOR TO COMMENCEMENT OF DEMO WORK.
MD-002	(E) GRAVITY RELIEF
MD-003	DEMOLISH (E) HEAT PUMP ALONG WITH ASSOCIATED SUPPORTS, ELECTRICAL WIRING, CONTROLS, & REFRIGERANT PIPING
MD-004	DEMOLISH (E) GRAVITY RELIEF. SEE STRUCTURAL DETAIL 03/S6.83 & ARCHITECTURAL DETAIL 07/2AF2.03 FOR INFILL OF ROOF.
MD-005	CLEAN UP AREA & PREPARE FOR NEW EQUIPMENT INSTALLATION.
MD-006	(E) BASEBOARD TO BE DEMOLISHED. CAP DUCT OPENINGS AT SLAB.
MD-007	DEMOLISH (E) REFRIGERANT PIPING (RL & RS) FROM INDOOR UNIT TO OUTDOOR UNIT
MD-008	DEMOLISH (E) GRAVITY RELIEF DCUT & GRILLE. CLEAN & PREPARE OPENING FOR NEW DUCT CONNECTION.
MD-009	PATCH & REPAIR WALL PER ARCHITECTURE & STRUCTURAL DETAILS
MD-011	DEMOLISH (E) FC & ASSOCIATED SUPPORTS, PIPING, WIRING & CONTROLS.
MD-012	PATCH CONCRETE SLAB PER STRUCTURAL DETAIL 13/2S6.01
MD-013	EXISTING LOUVER TO REMAIN IN PLACE. CLEAN & REPAINT PER ARCHITECTURE. PROTECT LOUVER IN PLACE & PREPARE FOR NEW DUCT CONNECTION.

LEGEND

NOT IN SCOPE OF WORK

DEMOLITION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM RIVA
M31731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

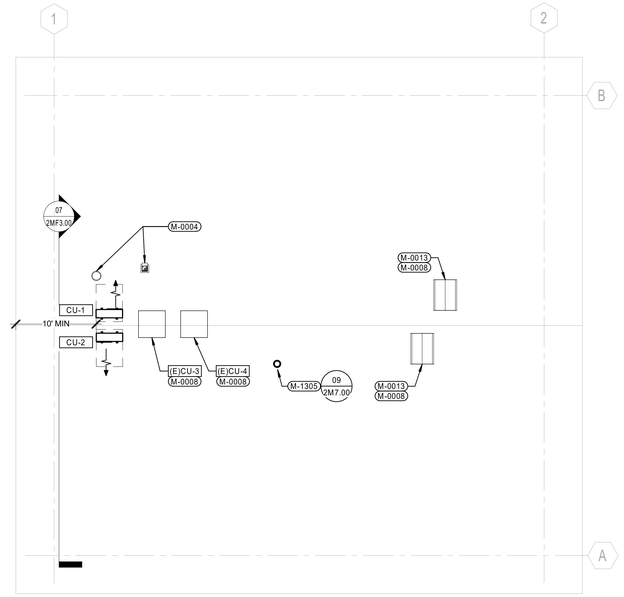
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

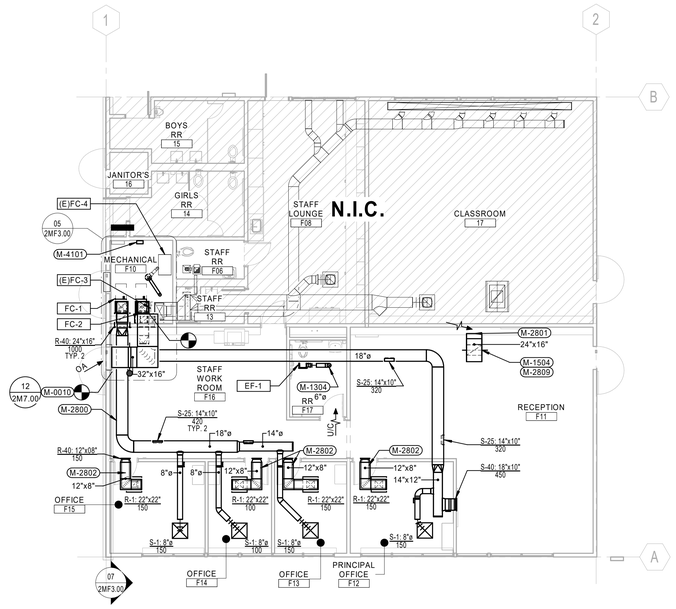
MECHANICAL HVAC PLANS - BLDG F

2MF2.01



N
TRUE NORTH

BUILDING F MECHANICAL ROOF PLAN 1/8" = 1'-0" 07



N
TRUE NORTH

BUILDING F MECHANICAL FLOOR PLAN 1/8" = 1'-0" 05

KEYNOTES

ITEM	DESCRIPTION
M-0004	(E) EXHAUST FLUE ROOF JACK TO REMAIN IN PLACE
M-0008	(E) UNIT SHOWN FOR REFERENCE. PROTECT IN PLACE DURING DURATION OF WORK.
M-0010	CONNECT NEW OSA DUCT TO (E) LOUVER
M-0013	(E) GRAVITY RELIEF TO REMAIN
M-1304	EXHAUST AIR DUCT UP THRU ROOF
M-1305	EXHAUST AIR DUCT DOWN THRU ROOF
M-1504	RELIEF AIR DUCT UP THRU ROOF TO (E) GRAVITY RELIEF ON ROOF
M-2800	PROVIDE CLEAR DUCT SEALANT AT ALL EXPOSED JOINTS AND SEAMS (TYP). APPLY PER MANUFACTURER'S RECOMMENDATIONS FOR A NEAT, TRANSPARENT FINISH.
M-2801	WIRE MESH SCREEN AT OPENING
M-2802	PROVIDE 1" DUCT LINING FOR SOUND ATTENUATION
M-2809	BACKDRAFT DAMPER
M-4101	PROVIDE NEW PELICAN REPEATER POWERED FROM 120V OUTLET. CONFIRM FINAL LOCATION WITH OWNER. SEE DETAIL 15/2M5.10.

LEGEND

NOT IN SCOPE OF WORK

DEMOLITION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM RIVER
M31731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

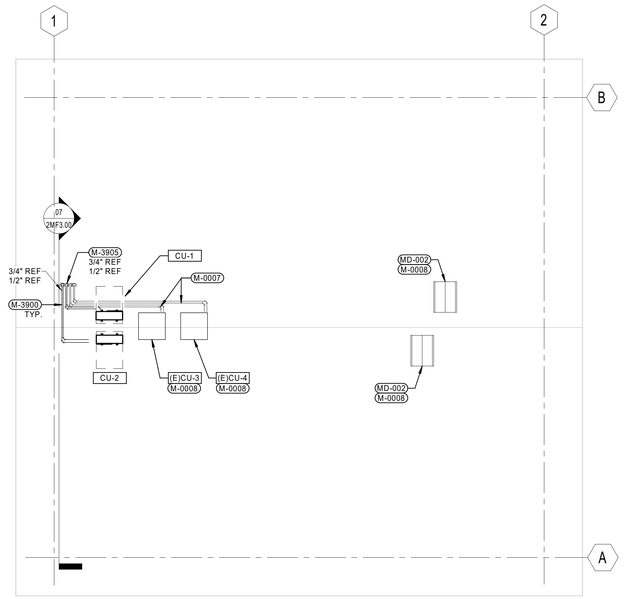
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

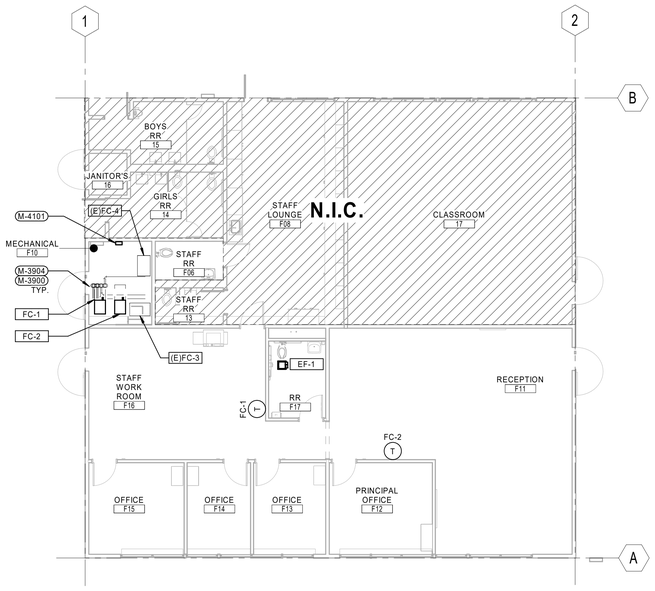
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

MECHANICAL HVAC PLANS - BLDG F

2MF2.02



R - ROOF - PIPING & CONTROLS | 1/8" = 1'-0" | 07



1 - FLOOR - PIPING & CONTROLS | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
M-0007	PROTECT EXISTING REFRIGERANT PIPING & SUPPORTS IN PLACE DURING WORK. IF PIPING
M-0008	(E) UNIT SHOWN FOR REFERENCE. PROTECT IN PLACE DURING DURATION OF WORK.
M-3900	PROVIDE INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES. SIZE PER MANUFACTURERS RECOMMENDATIONS
M-3904	INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES UP THRU ROOF
M-3905	INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES DOWN THRU ROOF
M-4101	PROVIDE NEW PELICAN REPEATER POWERED FROM 120V OUTLET. CONFIRM FINAL LOCATION WITH OWNER. SEE DETAIL 15/2M5.10.
MD-002	(E) GRAVITY RELIEF

LEGEND

NOT IN SCOPE OF WORK

DEMOLITION

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM RIVOLI
M31731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

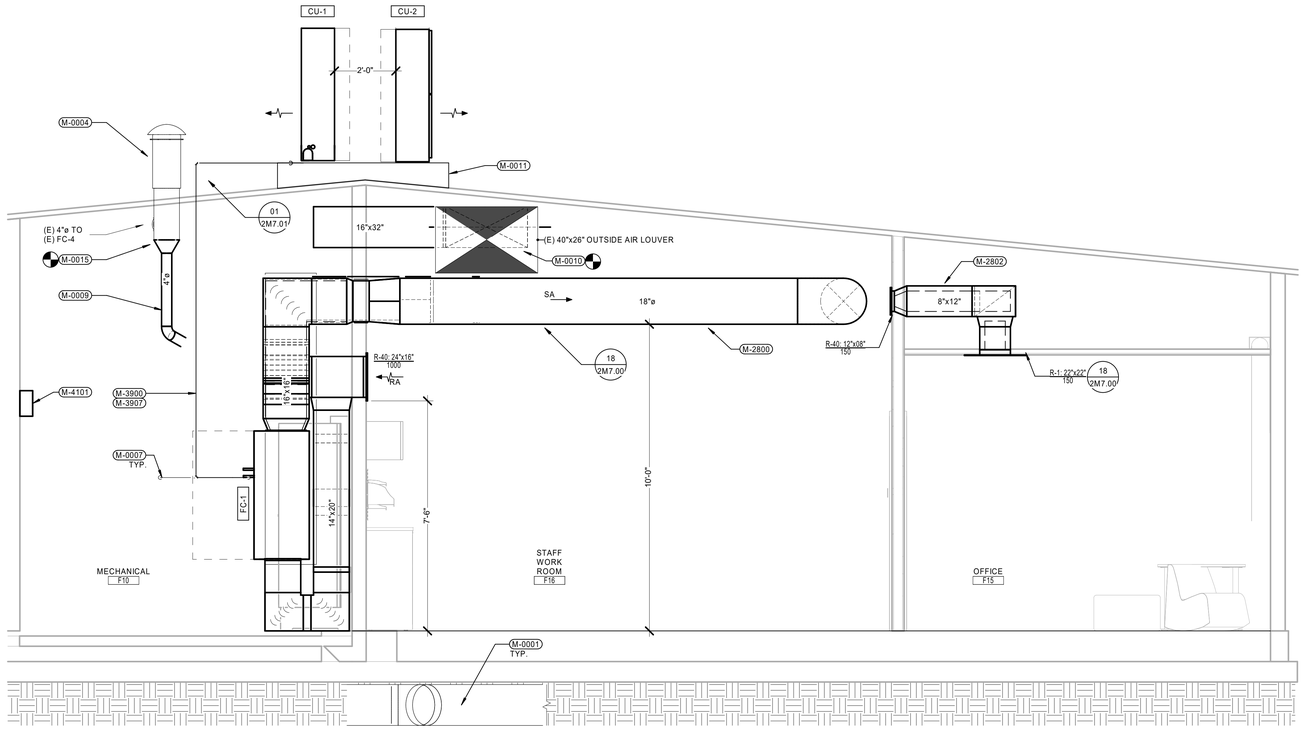
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

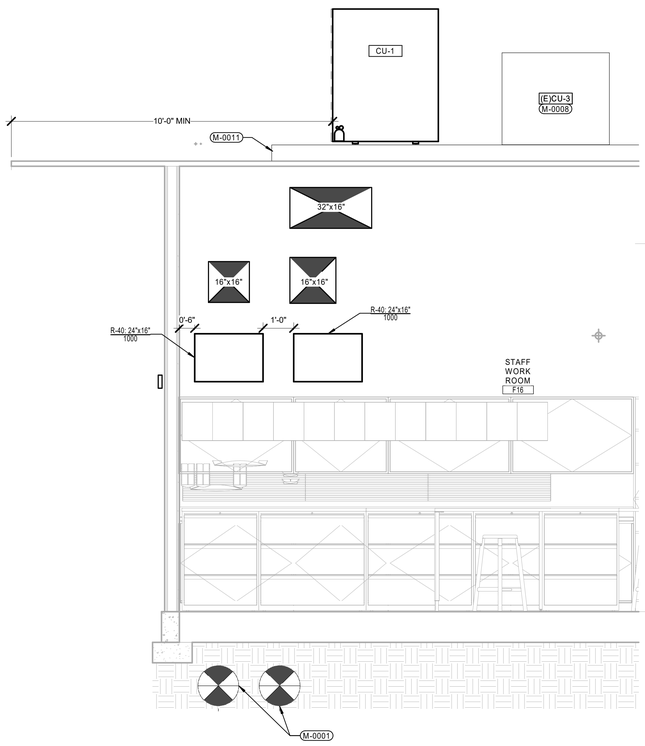
Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

MECHANICAL PIPING & CONTROLS PLANS

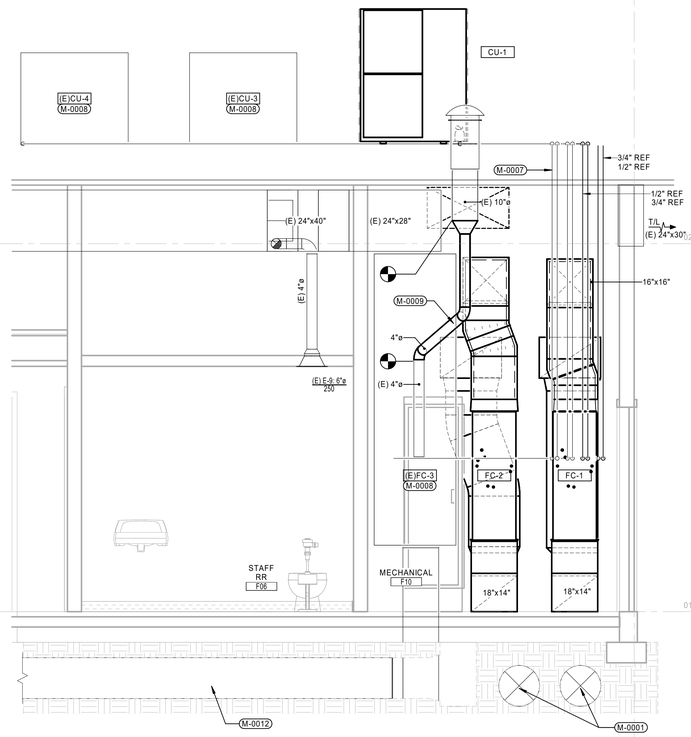
2MF2.10



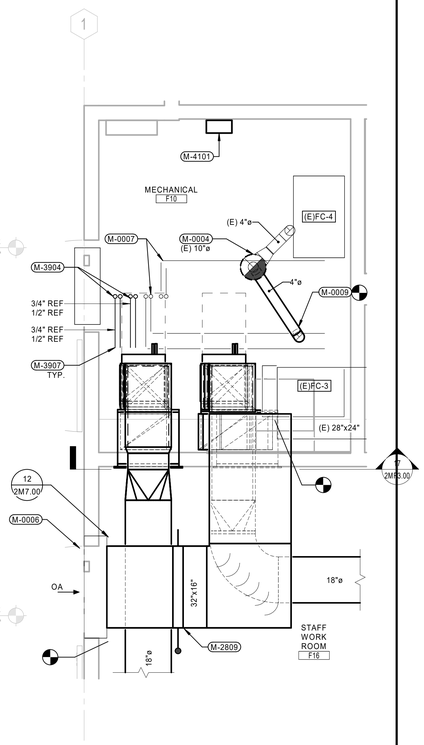
MECH RM & FAN COIL DISTRIBUTION | 1/2" = 1'-0" | 07



DUCT PENETRATIONS INTO STAFF WORKROOM - FACING NORTH | 1/2" = 1'-0" | 17



BLDG F MECH RM SECTION VIEW | 1/2" = 1'-0" | 09



BLDG F MECHANICAL ROOM | 1/2" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
M-0001	(E) UNDERFLOOR DUCT TO BE ABANDONED IN PLACE
M-0004	(E) EXHAUST FLUE ROOF JACK TO REMAIN IN PLACE
M-0006	EXISTING OUTSIDE AIR INTAKE LOUVER.
M-0007	PROTECT EXISTING REFRIGERANT PIPING & SUPPORTS IN PLACE DURING WORK. IF PIPING
M-0008	(E) UNIT SHOWN FOR REFERENCE. PROTECT IN PLACE DURING DURATION OF WORK.
M-0009	PROVIDE NEW 4"Ø FROM (E) FC-3 TO (E) 10"Ø EA FLUE RISER. INSPECT & PROVIDE NEW COLLAR CONNECTIONS TO FC IF NECESSARY
M-0010	CONNECT NEW OSA DUCT TO (E) LOUVER
M-0011	(E) ROOF CURB
M-0012	(E) UNDERFLOOR DUCT TO REMAIN IN PLACE
M-0015	PROVIDE NEW 4"Ø FROM (E) FC-3 TO (E) 10"Ø EA FLUE RISER. CONTRACTOR TO COORDINATE UNIT SHUTDOWNS WITH CAMPUS DURING WORK.
M-2800	PROVIDE CLEAR DUCT SEALANT AT ALL EXPOSED JOINTS AND SEAMS (TYP). APPLY PER MANUFACTURER'S RECOMMENDATIONS FOR A NEAT, TRANSPARENT FINISH.
M-2802	PROVIDE 1" DUCT LINING FOR SOUND ATTENUATION
M-2809	BACKDRAFT DAMPER
M-3900	PROVIDE INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES, SIZE PER MANUFACTURERS RECOMMENDATIONS
M-3904	INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES UP THRU ROOF
M-3907	INSTALL NEW REFRIGERANT PIPING SUCH THAT PIPING DOES NOT OBSTRUCT FAN COIL SERVICE ACCESS
M-4101	PROVIDE NEW PELICAN REPEATER POWERED FROM 120V OUTLET. CONFIRM FINAL LOCATION WITH OWNER. SEE DETAIL 15/2MS.10.

LEGEND

NOT IN SCOPE OF WORK

DEMOLITION

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIN WILLIAMS
MILLER
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

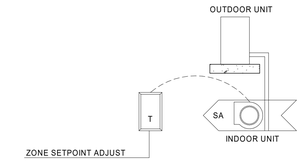
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

MECHANICAL SECTIONS

2MF3.00

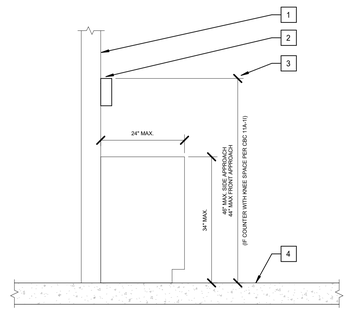


SEQUENCE OF OPERATION

RUN CONDITIONS - ALL HOURS:
THE SYSTEM SHALL BE CONTROLLED BY STANDALONE PROGRAMMABLE THERMOSTAT.

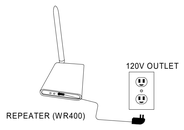
THE AIR CONDITIONING UNIT WILL BE OPERATED ON 24 HOURS PER DAY, 7 DAYS PER WEEK TIME SCHEDULE (ADJ.).

SPLIT SYSTEM COOLING UNIT, ELECTRONIC CONTROLS — NTS — 04

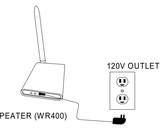


1. WALL
2. THERMOSTAT OR ZONE TEMPERATURE SENSOR
3. TOP OF THERMOSTAT, SWITCH, OUTLET, OR CONTROL SENSOR
4. FINISHED FLOOR

THERMOSTAT MOUNTING OVER OBSTRUCTION — NTS — 03



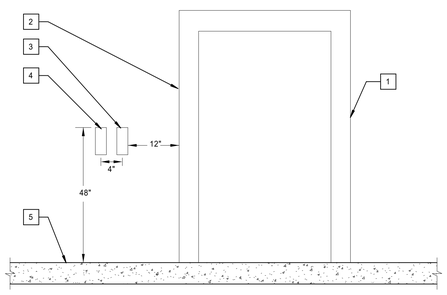
LOCATE IN BUILDING A ROOM A06



LOCATE IN BUILDING F MECHANICAL F10

NOTE:
1. ALL DEVICES WILL COMMUNICATE OVER EXISTING AUTOMATED & ISOLATED PELICAN WIRELESS MESH NETWORK
2. CONTRACTOR TO COORDINATE LOCATION OF REPEATER LOCATION WITH NEARBY OUTLET LOCATIONS.

PELICAN NETWORK COMPONENTS — NTS — 15

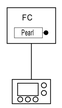


1. DOOR JAMB
2. STRIKE SIDE OF JAMB
3. CONTROL DEVICE
4. ADDITIONAL CONTROL DEVICE
5. FINISHED FLOOR

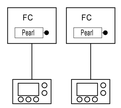
NOTE:
1. PROVIDE MIN. 30"x48" CLEAR FLOOR SPACE FOR PERPENDICULAR APPROACH AT EACH LOCATION.

THERMOSTAT MOUNTING HEIGHT DETAIL — NTS — 02

NOTE:
1. ALL DEVICES WILL COMMUNICATE OVER EXISTING AUTOMATED & ISOLATED PELICAN WIRELESS MESH NETWORK
2. SEE DETAILS 01/2M5.10 & 04/2M5.10 FOR CONTROL DIAGRAMS

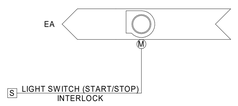


BUILDING A



BUILDING F

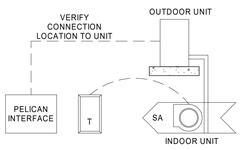
PELICAN NETWORK COMPONENTS — NTS — 09



THE FAN SHALL RUN ANYTIME THE LIGHT SWITCH IS ENABLED.

TIMER DELAY SHALL BE ADJ.

EXHAUST FAN, INTERLOCK WITH LIGHT CIRCUIT — NTS — 05



SEQUENCE OF OPERATION

RUN CONDITIONS - ALL HOURS:
THE SYSTEM SHALL BE CONTROLLED BY BMS THROUGH BACNET INTERFACE.

THE AIR CONDITIONING UNIT WILL BE OPERATED ON 24 HOURS PER DAY, 7 DAYS PER WEEK TIME SCHEDULE (ADJ.).

THE UNIT CONTROLLER THROUGH A PELICAN INTERFACE SHALL MONITOR AND ALARM THE UNIT STATUS AND THE ZONE TEMPERATURE

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN 80°F (ADJ.)
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN 60°F (ADJ.)

SPLIT SYSTEM COOLING UNIT, DDC — NTS — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ERIK WILLIAM MEYER — MEP/FP — EXP. 6/30/2027 — MECHANICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	NTS

MECHANICAL CONTROL DIAGRAMS

2M5.10

23-8000 FAN (EXHAUST) SCHEDULE

TAG	UNIT MFR	UNIT MODEL	SERVICE	LOCATION	TYPE	AIRFLOW (CFM)	FAN RPM	EXT STATIC PRESSURE (IN-WG)	MOTOR DATA WATTS	MOTOR DATA RPM	SOUND POWER (SONES / dBA)	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	UNIT SIZE (L"xW"xH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	SPECIFICATION SECTION	REMARKS
EF-1	GREENHECK	SP-LP0810W	F17 RR	F17 RR	CEILING	100	894	0.3	7	894	1.6 / 38.0	115 V	1	13 x 13 x 4	10	03 / 2M7.00	05 / M5.10	233423	1, 2, 3
EF-2	GREENHECK	SP-LP0810W	A06 MDF	CEILING	100	894	0.3	7	894	1.6 / 38.0	115 V	1	13 x 13 x 4	10	03 / 2M7.00	05 / M5.10	233423	1, 2, 3

REMARKS:
1. MOUNTING: PROVIDE ROOF JACK PER DETAIL 09/2M-7.00
2. POWER: PROVIDE NEMA 1 DISCONNECT FOR ALL INCLUDING MOTOR STARTER & DISCONNECTS
3. CONTROLS: EXHAUST FANS SHALL BE STAND ALONE SYSTEM & RUN PER 05/2M5.10

23-8000 SPLIT SYSTEM (MINI) OUTDOOR UNIT SCHEDULE

TAG	SERVICE	UNIT MFR	UNIT MODEL	LOCATION	NOMINAL CAPACITY (TONS)	SUMMER / WINTER (F)	COOLING CAPACITY (MBH)	COOLING SEER (SEER2)	HEATING CAPACITY (MBH)	HEATING COP (HSPF)	REFRIGERANT TYPE	REFRIGERANT SAFETY GROUP (CMC 1103.1.1)	REFRIGERANT CLASSIFICATION (CMC 1103.2)	ELECTRICAL VOLT	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	FIRE ALARM SHUTDOWN	UNIT SIZE (L"xW"xH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	SPECIFICATION SECTION	REMARKS
(E)CU-3	(E)FC-3	LENNOX	PUZ-AK48NL	ROOF	-	-	-	-	-	-	R-22	-	-					-	-	-	-	-	-	6
(E)CU-4	(E)FC-4	LENNOX	PUZ-AK48NL	ROOF	-	-	-	-	-	-	R-22	-	-					-	-	-	-	-	-	6
CU-1	FC-1	MITSUBISHI	PUZ-AK48NL	ROOF	4	105 / 47	48	(18.1)	60	3.1	R-454B	A2L	LOW PROBABILITY	208 V	1	38 A	67 A	YES	42 x 14 x 53	265	01 / 2M7.00	04 / 2M5.10	238126	1, 2, 3, 4, 5
CU-2	FC-2	MITSUBISHI	PUZ-AK48NL	ROOF	4	105 / 47	48	(18.1)	60	3.1	R-454B	A2L	LOW PROBABILITY	208 V	1	38 A	67 A	YES	42 x 14 x 53	265	01 / 2M7.00	04 / 2M5.10	238126	1, 2, 3, 4, 5

REMARKS:
1. MOUNTING: CONDENSING UNITS SHALL BE MOUNTED & ANCHORED PER MECHANICAL DETAILS 01/2M7.00
2. CONTROLS: FCU SHALL BE INTEGRATED TO PELICAN CONTROL SYSTEM
3. POWER: PROVIDE NEMA 3R DISCONNECTS FOR ALL OUTDOOR UNITS
   - CU-3 SHALL PROVIDE POWER TO DEDICATED INDOOR FCU & CONDENSATE PUMP
4. REFRIGERANT: CONTRACTOR TO VERIFY ALL REFRIGERANT PIPE SIZES, LINE LENGTHS, ROUTING, FILTERS, Y-STRAINERS, SHUT OFF VALVES & ACCESSORIES WITH MANUFACTURER. REFRIGERANT VOLUME SHALL BE FINALIZED BY MANUFACTURER AFTER CONFIRMING CONTRACTOR APPROVED LAYOUTS & TRUE LENGTHS
5. COIL: PROVIDE COIL WITH PROTECTIVE COATING FROM FACTORY
6. UNIT NOT IN SCOPE OF WORK & SHOWN FOR REFERENCE ONLY

23-8000 SPLIT SYSTEM (MINI) INDOOR UNIT SCHEDULE

TAG	CU	UNIT MFR	UNIT MODEL	SERVICE	TYPE	NOMINAL CAPACITY (TONS)	AIRFLOW (CFM)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	REFRIGERANT TYPE	POWERED FROM OUTDOOR	ELECTRICAL VOLT	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	FIRE ALARM SHUT DOWN	UNIT SIZE (L"xW"xH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	SPECIFICATIO N SECTION	REMARKS
(E)FC-3	(E)CU-3	LENNOX	CR16-51-2FF	-	VERTICAL FAN COIL	-	-	-	-	R-22	-					-	-	-	-	-	-	-
(E)FC-4	(E)CU-4	LENNOX	C16-31-1FF	-	VERTICAL FAN COIL	-	-	-	-	R-22	-					-	-	-	-	-	-	-
FC-1	CU-1	MITSUBISHI	PVA-AA48NL	F16 STAFF WORK ROOM	VERTICAL FAN COIL	4	1,250	48	60	R-454B	NO	208 V	1	14 A	40 A	YES	25 x 22 x 60	175	04 / 2M7.00	04 / 2M5.10	238126	1, 2, 3, 4, 5, 6
FC-2	CU-2	MITSUBISHI	PVA-AA48NL	F11 RECEPTION	VERTICAL FAN COIL	4	1,250	48	60	R-454B	NO	208 V	1	14 A	40 A	YES	25 x 22 x 60	175	04 / 2M7.00	04 / 2M5.10	238126	1, 2, 3, 4, 5, 6

REMARKS:
1. MOUNTING: FCU'S SHALL BE INSTALLED PER DETAILS INDICATED
2. POWER: INDOOR UNITS SHALL BE ENERGIZED BY OUTDOOR UNITS. CONTRACTOR TO PROVIDE LOCAL DISCONNECTS INTERRUPTING POWER AT ALL INTERIOR FCU LOCATIONS.
3. CONTROLS: FCU SHALL BE INTEGRATED TO PELICAN CONTROL SYSTEM. FCU SHALL ALARM & SHUT OFF BASED UPON CONDENSATE PUMP FAILURE OR CONDENSATE OVERFLOW SENSOR ALARM.
4. THERMOSTAT: PROVIDE CONCEALED WIRED LOW VOLTAGE SENSOR
5. CONDENSATE: FOR PIPE ROUTING SEE PLUMBING PLANS
6. FILTRATION: PROVIDE FCU MANUFACTURER FILTER BOX FOR 2" FILTERS FROM MFG. PROVIDE WITH 2" MERV 13 FILTERS.

23-3000 AIR TERMINAL SCHEDULE

EQUIPMENT TAG	MFR	MODEL	SERVICE	TYPE	FINISH	MATERIAL	REMARKS
S-1: 8"ø	PRICE	SPD	1-SUPPLY	24x24 CEILING DIFFUSER	WHITE	STEEL	1, 2, 3, 4, 5
S-25: 14"x10"	PRICE	SDGE	1-SUPPLY	SPIRAL DUCT GRILLE - EXTRUDED ALUMINUM	METALLIC GRAY	STEEL	1, 2, 3, 4, 5
S-40: 18"x10"	PRICE	SDGE	1-SUPPLY	SUPPLY DIFFUSER - SIDEWALL	CUSTOM	STEEL	1, 2, 3, 4, 5
R-1: 22"x22"	PRICE	510	2-RETURN	24x24 CEILING RETURN	WHITE	STEEL	1, 2, 3, 4, 5
R-40: 12"x08"	PRICE	510	2-RETURN	RETURN GRILL - SIDEWALL	CUSTOM	STEEL	1, 2, 3, 4, 5
R-40: 24"x16"	PRICE	510	2-RETURN	RETURN GRILL - SIDEWALL	CUSTOM	STEEL	1, 2, 3, 4, 5

REMARKS:
1. CEILING & WALL COMPATIBILITY: FURNISH WITH BORDER STYLES COMPATIBLE WITH ADJACENT CEILING & WALL SYSTEMS SPECIFICALLY MANUFACTURED TO FIT INTO CEILING MODULE WITH ACCURATE & ADEQUATE SUPPORT. REFER TO ARCHITECTURAL DRAWINGS & SPECIFICATIONS FOR TYPES OF CEILING SYSTEMS.
2. COLOR COMPATIBILITY: PROVIDE MANUFACTURER STANDARD WHITE UNLESS OTHERWISE NOTED. FINAL COLOR TO BE CONFIRMED BY ARCHITECT. REFER TO ARCHITECTURAL DRAWINGS FOR CUSTOM COLOR & SPECIFICATIONS FOR TYPES OF COLORING SCHEME.
3. PROVIDE RECTANGULAR TO ROUND ADAPTOR AS REQUIRED, & VICE VERSA.
4. REFER TO SPECIFICATION SECTION 233700 FOR MORE INFORMATION
5. CONTRACTOR TO VERIFY EXACT QUANTITIES

DUCT INSULATION SCHEDULE

LOCATION	SERVICE OSA	SERVICE SA	SERVICE RA	SERVICE TA
INDOOR - CONCEALED	FIBERGLASS DUCT WRAP - 1.5" R=4.2, k-0.29, 0.75 LBS/ CF FSK OR ASJ JACKET		NONE	
INDOOR - EXPOSED	NONE			
DUCT LINER (WHERE INDICATED)	POLYESTER - 1" R=5, k-0.23, 1.6 LBS/ CF			

NOTES:
1. EXHAUST DUCT: NO INSULATION
2. REFER TO SPECIFICATION SECTION 230713 DUCT INSULATION FOR FURTHER INFORMATION

23-0700 PIPE INSULATION SCHEDULE

	INSULATION	JACKET	REMARKS
REFRIGERANT			
ALL SIZES INDOOR	ELASTOMERIC 1.5" THICK	PVC	-
ALL SIZES OUTDOOR	ELASTOMERIC 2.0" THICK	ALUMINUM 0.024 WITH ALUMINUM ELBOWS	-

NOTES:
1. REFER TO SPECIFICATION SECTION 230719 INSULATION FOR FURTHER INFORMATION

23-2013 PIPE MATERIAL SCHEDULE

	MATERIAL	CONNECTION	REMARKS
REFRIGERANT			
ALL SIZES	ACR TYPE L **HARD DRAWN**	BRAZED	-

NOTES:
1. REFER TO SPECIFICATION SECTION 232300 REFRIGERANT PIPING FOR FURTHER INFORMATION

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ERIC WILLIAM MAY 18170 EXP. 6/30/2027 MECHANICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

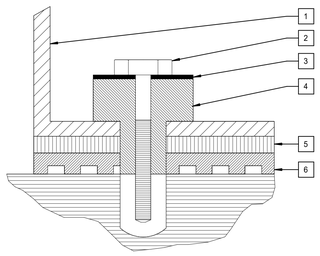
Revision / Date

Submittal / Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/4" = 1'-0"

MECHANICAL SCHEDULES

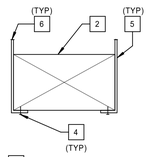
2M6.00

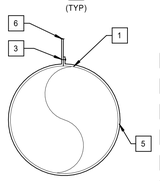


1 EQUIPMENT SUPPORT PER MANUFACTURER
2 ANCHOR BOLT (SEE NOTE #1)
3 STEEL WASHER
4 NEOPRENE GROMMET
5 LOAD DISTRIBUTING PLATE (3/16" MIN. STEEL)
6 NEOPRENE RIBBED PAD (5/16" MIN.)

NOTE:
1. SEE STRUCTURAL DETAIL 09/2S9.01 FOR PLATFORM AND ANCHORAGE DETAILS.

NEOPRENE PAD ISOLATOR — NTS — 19

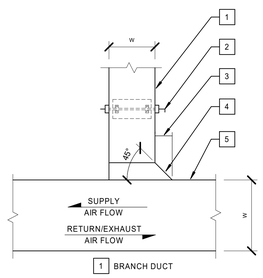




1 ROUND DUCT
2 RECTANGULAR DUCT
3 #10 SELF TAPPING SCREWS
4 SHEET METAL SCREW
5 1 1/2" x 18 GA. METAL STRAP
6 SECURE TO STRUCTURE ABOVE AND PROVIDE VERTICAL SUPPORT @ 4'-0" O/C MAX AND EACH END OF RUN (SEE NOTE # 1)

NOTE:
1. SEE STRUCTURAL DETAIL 04/2S9.01 FOR ATTACHMENT TO STRUCTURE.

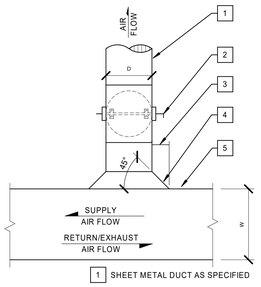
TYPICAL DUCT SUPPORT (<6.0 SF CROSS-SECTIONAL AREA) — NTS — 18



1 BRANCH DUCT
2 LOCKING QUADRANT VOLUME DAMPER
3 1/3W, 6" MINIMUM
4 CLINCH COLLAR
5 MAIN DUCT

NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

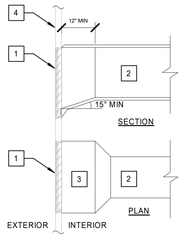
RECTANGULAR DUCT TAKEOFF — NTS — 21



1 SHEET METAL DUCT AS SPECIFIED
2 LOCKING QUADRANT VOLUME DAMPER
3 1/3W, 6" MINIMUM
4 CONICAL TAP
5 MAIN DUCT

NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

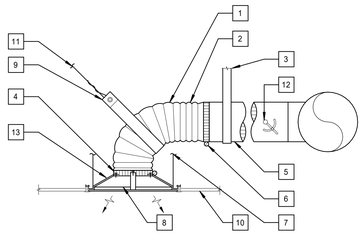
RECTANGULAR TO ROUND DUCT TAKEOFF — NTS — 17



NOTE:
1. CONNECT PLENUM BOX AIRTIGHT TO EXISTING LOUVER FRAME. FIELD-VERIFY EXISTING CONDITIONS PRIOR TO FABRICATION.
2. SECURE PLENUM BOX TO EXISTING LOUVER FRAME WITH SHEET METAL SCREWS & SEAL AIRTIGHT.

1 EXISTING LOUVER
2 DUCT, SEE FLOOR PLANS FOR SIZE
3 PLENUM BOX
4 EXISTING EXTERIOR WALL

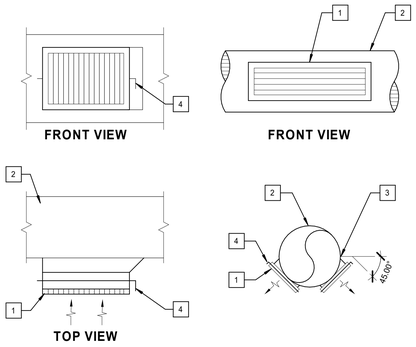
EXT. LOUVER-DUCT CONNECTION — NTS — 12



NOTE:
1. SEE STRUCTURAL DETAIL 04/2S9.01 AND 12/2S9.01 FOR UPPER ATTACHMENT TO WOOD STRUCTURE
2. PULL BACK JACKET & INSULATION FROM CORE DUCT COLLECT EXCESS INNER DUCT PAST COLLAR BEAD UNTIL FULLY STRETCHED, THEN WRAP AT LEAST TWICE AROUND WITH APPROVED TAPE AND SECURE WITH APPROVED CLAMP. PULL JACKET & INSULATION BACK OVER THE CORE. SECURE JACKET WITH TWO WRAPS OF TAPE OR AN APPROVED CLAMP. TUCK IN EDGE OF JACKET OR TAPE. FIBERS SHALL NOT BE EXPOSED. FACTORY FLEX DUCT METAL COLLARS MAY BE USED FOR RIGID CONNECTIONS IN LIEU OF BANDS.
3. CEILING MOUNTED AIR TERMINALS WEIGHING LESS THAN OR EQUAL TO 20 LBS SHALL HAVE ONE (1) #12 GA. SLACK SAFETY WIRE ATTACHED FROM THE TERMINAL TO THE STRUCTURE ABOVE.
4. IF GRILLE IS LESS THAN OR EQUAL TO 56 LBS, PROVIDE TWO #12 GAGE SLACK SAFETY WIRES AT DIAGONAL CORNERS. IF DIFFUSER IS MORE THAN 56 LBS, PROVIDE INDEPENDENT SUPPORT USING 4 TAUT #12 GAGE WIRES, ONE AT EACH CORNER, ATTACHED TO STRUCTURE ABOVE.
5. FOR ATTACHMENT TO CEILING GRID REFER TO 2AF9.20

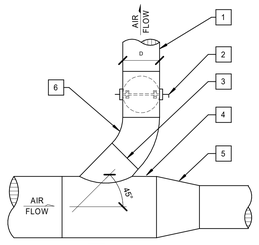
1 FLEX DUCT: MANUFACTUER SHALL BE CASCO SILENTFLEX, CASCO ACOUSTICAL FLEX DUCT (SF-181M), FLEXMASTER ACOUSTICAL FLEX OR THERMAFLEX ACOUSTICAL FLEXIBLE ONLY.
2 INSULATED FLEXIBLE DUCT INSTALLED WITH INNER DUCT STRETCHED TAUT (TAKE UP SLACK)
3 1-1/2" X 18 GA. SHEETMETAL HANGER STRAP EVERY 8'-0" & AT TURN IN DIRECTION. SECURE STRAP TO STRUCTURE ABOVE (SEE NOTE #1)
4 DUCT COLLAR (SEE NOTE #2)
5 ROUND DUCT
6 3/8" BAND ON DUCT COLLARS (TYP)
7 SECURE TO STRUCTURE ABOVE (SEE NOTES #3 & #4)
8 FACTORY MOUNTED SHEET METAL INLET COLLAR SECURE WITH CLAMPING DEVICE
9 1-1/2" x 18 GA SHEETMETAL STRAP
10 CEILING
11 SECURE WIRE TO STRUCTURE ABOVE (SEE NOTE #1)
12 LOCKING QUADRANT VOLUME DAMPER
13 1" 20 GAGE DUCT STRAP ONE PER SIDE (4 TOTAL). ATTACH TO GRID WITH 2 #8 SM SCREWS. PROVIDE RUBBER WASHER WHEN TAPPING INTO AIR TERMINAL DEVICE

AIR TERMINAL CONNECTION — NTS — 11



1 SUPPLY / RETURN / EXHAUST AIR GRILLE. SINGLE-DEFLECTION VANES
2 MAIN OR BRANCH SUPPLY/ EXHAUST/ RETURN DUCT (RECTANGULAR SIMILAR)
3 PROVIDE GRILLE EACH SIDE OF DUCT WHERE INDICATED ON PLANS
4 MANUAL VOLUME DAMPER. DAMPER SHALL BE INSTALLED BEHIND SUPPLY/RETURN/EXH GRILLE. PROVIDE NECK WITH DAMPER AS SHORT AS POSSIBLE

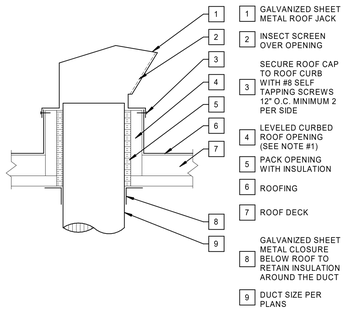
DUCT MOUNTED GRILLE — NTS — 10



1 SHEET METAL DUCT AS SPECIFIED
2 LOCKING QUADRANT VOLUME DAMPER
3 LATERAL TAP
4 MAIN DUCT
5 TRANSITION
6 INSIDE RADIUS = DIAMETER

NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

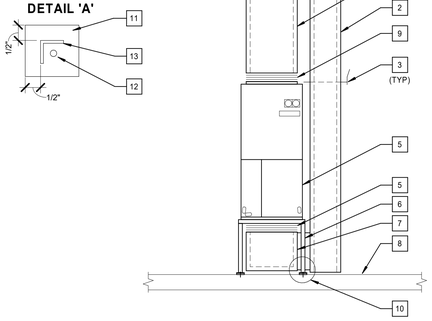
ROUND DUCT TAKEOFF — NTS — 13



1 GALVANIZED SHEET METAL ROOF JACK
2 INSECT SCREEN OVER OPENING
3 SECURE ROOF CAP TO ROOF CURB WITH #8 SELF TAPPING SCREWS 12" O.C. MINIMUM 2 PER SIDE
4 LEVELED CURBED ROOF OPENING (SEE NOTE #1)
5 PACK OPENING WITH INSULATION
6 ROOFING
7 ROOF DECK
8 GALVANIZED SHEET METAL CLOSURE BELOW ROOF TO RETAIN INSULATION AROUND THE DUCT
9 DUCT SIZE PER PLANS

NOTE:
1. SEE ARCHITECTURAL DETAIL 15/2AF2.03 FOR FLASHING & WEATHERPROOFING DETAILS.

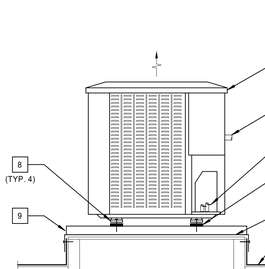
DUCT ROOF PENETRATION WITH ROOF JACK — NTS — 09



NOTE:
1. MAX HEIGHT 30". PROVIDE ANCHOR PLATE PER DETAIL 'A', AND WITH NEOPRENE PAD BELOW PLATE.

1 LINED SUPPLY AIR DUCT SIZE PER PLAN
2 LINED RETURN AIR DUCT SIZE PER PLAN
3 LOCKING QUADRANT VOLUME DAMPER
4 - NOT USED -
5 UPFLOW VERTICAL FAN COIL UNIT ON STAND (MAX WEIGHT 175 LBS)
6 FAN COIL SUPPORT STAND, 3x3x1/4". CONNECT FAN COIL TO ANGLE PLATFORM WITH (3) 1/4" SMS EACH SIDE OF UNIT. (SEE NOTE #1)
7 LINED MIXED AIR PLENUM SIZE PER UNIT RETURN OPENING
8 FINISHED FLOOR
9 FLEXIBLE CONNECTION
10 MOUNTING FOOT, SEE DETAIL 'A'
11 4"x4"x1/2" STEEL PLATE
12 (1) ANCHOR EACH PLATE, 3/8" DIA. KB-TZ2 W/ 2" EFFECTIVE EMBEDMENT INSTALLED PER ICC ESR-4266
13 1/4" FILLET WELD ALL AROUND AT ALL CONNECTIONS
14 - NOT USED -

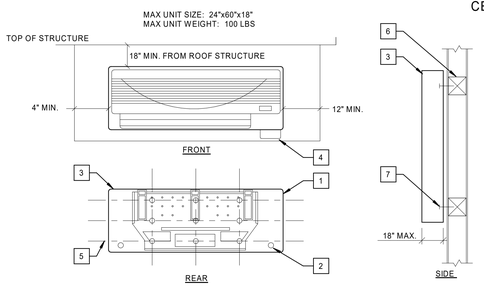
VERTICAL FAN COIL — NTS — 04



NOTE:
1. SEE STRUCTURAL DETAIL 03/2S9.01 FOR UPPER ATTACHMENT DETAIL.

1 CEILING EXHAUST FAN
2 3/8" THREADED ROD, TYP. 4 (SEE NOTE #1)
3 DOUBLE NUTS WITH LOCKWASHER AT TOP AND BOTTOM OF FLANGE. REFER TO AND FOLLOW MANUFACTURER INSTALLATION INSTRUCTIONS AND PROVIDE ALL NECESSARY HARDWARE.
4 CEILING ASSEMBLY
5 FLEXIBLE CONNECTION
6 EXHAUST DUCT SIZE AND ROUTING PER PLAN
7 TRANSITION TO MATCH DUCT OPENING
8 FAN MANUFACTURER'S MOUNTING ANGLE
9 CEILING GRILLE

CEILING EXHAUST FAN — NTS — 03



1 SECURE FACTORY MOUNTING BRACKET TO EXISTING WOOD STUD WALL SEE STRUCTURAL WALL MOUNTED DETAIL 02/2S9.01 FOR STUD WALLS
2 KNOCKOUT FOR REFRIGERANT, DRAIN, POWER AND SIGNAL LINES
3 UNIT OUTLINE
4 WALL MOUNTED CONDENSATE PUMP
5 WALL ANCHORS. SEE STRUCTURAL DETAIL 02/2S9.01
6 BLOCKING PLATE PER 02/2S9.01
7 1/4-14 HILTI KWIK-FLEX SCREWS (ICC ESR-3332)

NOTE:
1. CLEARANCES OF 18" ON TOP OF AND TO THE LEFT OF THE FAN COIL UNIT ARE ABSOLUTE MINIMINUM CLEARANCES AROUND UNIT FROM ANY OBSTRUCTIONS.
2. REFRIGERANT IS METERED BY CAPILLARY TUBES IN THE OUTDOOR UNIT. INSULATE BOTH REFRIGERANT LINES.
3. REFRIGERANT, DRAIN, AND POWER CONNECTIONS TO BE MADE IN THE REAR OF THE UNIT.
4. WALL MOUNTED CONDENSATE PUMP FOR DUCTLESS FAN COIL UNITS SHALL HAVE SEPARATE 120V CONNECTION FOR PUMP.

WALL MOUNTED FAN COIL DETAIL — NTS — 02

1 CONDENSING UNIT (MAX WEIGHT 265 LBS)
2 ELECTRICAL INLETS
3 REFRIGERANT PIPING, ROUTING PER PLANS SIZE PER MANUFACTURER'S RECOMMENDATIONS
4 NEOPRENE ISOLATOR PADS, MODEL SUPER W MASONWEST OR EQUAL (SEE DETAIL 19/2M7.00)
5 LEVEL BUILT UP PLATFORM WITH CAP (SEE NOTES #1 & #2)
6 EXISTING ROOFING
7 EXISTING ROOF DECK
8 ANCHORAGE TABS INTEGRAL TO CONDENSING UNIT. BOLT THRU TAB AND ISOLATOR PAD TO CONCRETE.
9 UNISTRUT P1000 (SEE NOTE #2)

NOTE:
1. SEE ARCHITECTURAL DETAILS FOR FLASHING AND WEATHERPROOFING DETAILS.
2. SEE STRUCTURAL DETAIL 09/2S9.01 FOR PLATFORM AND ANCHORAGE DETAILS.

CONDENSING UNIT ON PLATFORM — NTS — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ERIK WILLIAM MUSTIN — MECHANICAL — STATE OF CALIFORNIA — EXP. 6/30/2027

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

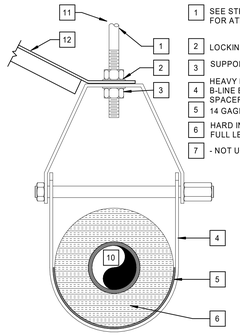
Revision
Date

Submittal
Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	Checker
Scale	NTS

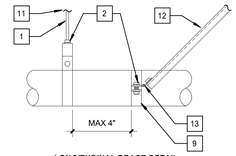
MECHANICAL DETAILS

2M7.00



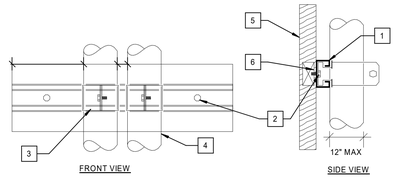
1 SEE STRUCTURAL DETAIL 03/2S9.01 FOR ATTACHMENT TO STRUCTURE
2 LOCKING NUT
3 SUPPORT NUT
4 HEAVY DUTY CLEVIS HANGER. B-LINE B3100 WITH CROSS BOLT SPACER AS SHOWN
5 14 GAGE ZINC COATED SADDLE
6 HARD INSULATION (1" THICK) FULL LENGTH OF SADDLE
7 - NOT USED -
8 -STRUT CLAMP OR U BOLT
9 PADDED PIPE CLAMP
10 PIPE (SEE PLANS FOR SIZES)
11 3/8" THREADED ROD, PROVIDE ROD STIFFENER PER DETAIL 01/2S9.02A SIM WHERE BRACE OCCURS
12 UNISTRUT P1000. AIR CRAFT CABLE ON BOTH SIDES CAN BE USED IN LIEU OF A RIGID SEISMIC BRACE. REFER TO 01/2S9.02B.
13 UNISTRUT P1354 EA END OF STRUT W/ 3/8" BOLT TO UNISTRUT BRACING
14 - NOT USED -

NOTES:
1. SUPPORT ADJACENT TO JOINT, NOT TO EXCEED 18" FROM JOINT.
2. SUPPORT AT EACH HORIZONTAL BRANCH CONNECTION.
3. HANGERS SHALL NOT BE PLACED ON THE COUPLING.
4. PROVIDE TRANSVERSE BRACING @ 8'-0"C MAX AND EA END OF RUN (2 MIN).
5. PROVIDE LONGITUDINAL BRACING AT 8'-0" O/C MAX AND EA END OF RUN



LONGITUDINAL BRACE DETAIL (PER NOTE #3)

REFRIGERANT PIPE HANGER — NTS — 04

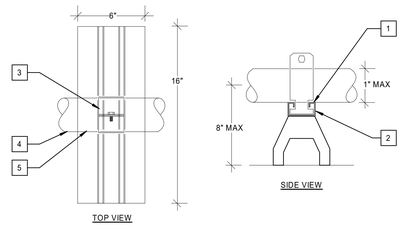


FRONT VIEW SIDE VIEW

1 UNISTRUT P1000 CHANNEL SIZED PIPE
2 3/8" DIAMETER x 2" LAG SCREWS @ 16" O/C
3 PROVIDE PRE-INSULATED PIPE CLAMP WITH CONTINUOUS NEOPRENE INSULATION. PRODUCT SHALL BE ASC ENGINEERED SOLUTIONS ANVIL-STRUT THERMA-KLOSE STRUT MOUNTED INSULATION COUPLING, MODEL ASCTK7, INSULATION THICKNESS PER SCHEDULE.
4 INSULATED PIPING, EXCLUDE INSULATION AT PIPE CLAMP LOCATIONS.
5 WOOD FRAME WALL
6 BACKING PER 08/2AF9.10

NOTE:
1. PROVIDE A MAXIMUM OF 6'-0" BETWEEN WALL SUPPORTS. ADDITIONALLY PROVIDE WALL SUPPORT WITHIN 2'-0" OF ANY CHANGE OF DIRECTION.

VERTICAL PIPE SUPPORT ON WALL — NTS — 03

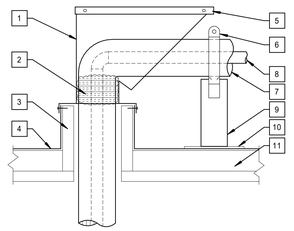


TOP VIEW SIDE VIEW

1 COOPER B-LINE DURA-BLOCK WITH INTEGRAL CHANNEL AND PIPE BRACKETS, SIZED FOR INSULATED PIPING
2 PROVIDE GAP BETWEEN INTEGRAL STRUT CHANNEL AND HARDWARE USED TO SECURE PIPE TO ALLOW FOR MOVEMENT OF SYSTEM
3 PROVIDE STANDARD STRUT CLAMPS
4 MAXIMUM 2 PIPES PER SUPPORT
5 PIPE JACKET

NOTE:
1. PROVIDE A MAXIMUM OF 6'-0" BETWEEN SUPPORT BLOCKS. ADDITIONALLY PROVIDE BLOCK WITHIN 2'-0" OF ANY CHANGE OF DIRECTION. REFER TO MANUFACTUER'S DATA FOR BLOCK SPACING OF MULTIPLE PIPES.
2. DETAIL APPLIES TO REFRIGERANT PIPING EQUAL TO OR LESS THAN 1" NOMINAL DIAMETER.
3. DETAIL DOES NOT APPLY TO GAS PIPING.

PIPE SUPPORT ON ROOF — NTS — 02



1 GALVANIZED SHEET METAL ROOF JACK WITH CAP
2 FILL OPENING WITH FOAM
3 FRAMED ROOF OPENING (SEE NOTE #1)
4 ROOFING
5 REMOVABLE COVER ATTACHED WITH 2 #8 SELF TAPPING SCREWS EACH SIDE
6 STRUT CLAMP
7 PIPE INSULATION TO BE INSTALLED CONTINUOUSLY AT SUPPORTS AND CLAMPS (SEE NOTE #2)
8 PIPE SIZE PER PLAN
9 PIPE SUPPORT (SEE NOTE #3)
10 WALK PAD HOT-WELDED TO ROOF MEMBRANE
11 ROOF DECK

NOTE:
1. SEE ARCHITECTURAL DETAILS FOR FLASHING AND WEATHERPROOFING DETAILS.
2. SEE PIPE INSULATION SCHEDULE ON DRAWING 2M6.00 FOR MATERIAL AND THICKNESS REQUIREMENTS.
3. SEE MECHANICAL DETAILS 02/2M7.01 FOR PIPE SUPPORT DETAILS.

PIPING ROOF JACK — NTS — 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ERIK WILLIAM MAY — M53726 — EXP. 6/30/2027 — MECHANICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	NTS

MECHANICAL DETAILS

2M7.01

A. GENERAL INFORMATION

01	Project Location (city)	Stockton	04	Total Conditioned Floor Area	1807
02	Climate Zone	12	05	Total Unconditioned Floor Area	205
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

● Office ● Support Areas

B. PROJECT SCOPE

This table Includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, §170.2(b) or §141.0(b)2 and §180.2(b)2 for alterations.

01	02	03
Air System(s)	Wet System Components	Dry System Components
☒ Heating Air System	☐ Water Economizer	☐ Air Economizer
☒ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
☒ Ventilation (including DOAS, ERV, HRV systems)	☒ System Piping	☒ Fan Systems
Mechanical Controls	☐ Cooling Towers	☒ Ductwork (existing to remain, altered or new)
	☐ Chillers	
☒ Mechanical Controls (existing to remain, altered or new)	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary §110.1, §110.2, §140.4, §170.2(c), §141.0(b), §180.2(b2)	AND	Pumps §140.4(k), §170.2(c)4I	AND	Fans/Economizers §140.4(c), §140.4(e), §140.4(p), §170.2(c)	AND	System Controls § 110.2, §120.2, §140.4(f), §140.4(r), §170.2(c)	AND	Ventilation §120.1, §160.2	AND	Terminal Box Controls §140.4(d), §170.2(c)4B	AND	Distribution §120.3, §140.4(l), §160.2, §160.3, §141.0(b)2D, §180.2(b)2Bi	AND	Cooling Towers §110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES with Exceptional Conditions
Mandatory Measures Compliance (See Table Q for Details)												COMPLIES			

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Transfer air is being used in at least one zone to meet minimum ventilation requirements. See Table J for details. Transfer air must be designed per §120.1(g) for air classification and recirculation limitations and be documented within construction documents.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
CU-1	1	Multi-zone	New	Office	☐
CU-2	1	Multi-zone	New	Office	☐
CU-3	1	Single zone	New	All Other Occupancies	☐

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
				Equipment Sizing per Mechanical Schedule (kBtu/h) §140.4(a&b), §170.2(c)1 & §170.2(c)2						
				Heating Output [2,3]			Cooling Output [2,3]		Load Calculations [3,4]	
Name or Item Tag	Equipment Category per Tables 110.2, §140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available [1] §140.4(a) and §170.2(c)1	Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
CU-1	Unitary Heat Pumps (no elec. resistance)	Air-cooled, split (1phase)	Yes	60	60	0	48	48	60	48
CU-2	Unitary Heat Pumps (no elec. resistance)	Air-cooled, split (1phase)	Yes	60	60	0	48	48	60	48
CU-3	Unitary Heat Pumps (no elec. resistance)	Air-cooled, split (1phase)	Yes	26	26	0	24	24	26	24

[1] *FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per §140.4(a) and §170.2(c)1. Healthcare facilities are excepted.*
[2] *It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.*
[3] *If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.*
[4] *Authority Having Jurisdiction may ask for load calculations used for compliance per §140.4(b) and §170.2(c).*

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09	10
		Heating Mode				Cooling Mode			
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Refrigerant Loop Heat Recovery	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
CU-1	<65,000		HSPF2	Federal Minimum	8.4		SEER2	FederalMinimum	18.1
CU-2	<65,000		HSPF2	Federal Minimum	8.4		SEER2	FederalMinimum	18.1
CU-3	<65,000		HSPF2	Federal Minimum	9.2		SEER2	FederalMinimum	21

Mechanical Heat Recovery§140.4(s)

01	02	03	04	05	06	07
Name or Item Tag	Coincident Peak Cooling Load of All High Load Spaces (kBtu/h)	Design Capacity of All Mechanical Cooling Systems[2] (kBtu/h)	Design Capacity of All Service Water Heating Systems[1] (kBtu/h)	Design Capacity for all space heating systems (kBtu/h)	Simultaneous Mechanical Heat Recovery	
CU-1, CU-2, CU-3	120	120	0	146	Not Required	

[1] *FOOTNOTES: Excluding systems expected to operate less than 5 hours per week.*
[2] *FOOTNOTES: If the design includes capacity for future cooling systems, then assume 20% of future systems serve high load spaces.*

G. PUMPS

This section does not apply to this project.

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in §140.4(c), §140.4(e), §140.4(m), §170.2(c)3, and §170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	EF-1	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units?	Not Serving Dwelling Units	Fan System Airflow (cfm)	100	Site Elevation	14	Economizer	NA: <=33 kBtu/h cooling
01	02	03	04			05		06	07	08	09			10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance (watt/cfm)	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Fan Electrical Input Power (kW)
EF-1	Exhaust	1	Fully ducted, or Systems that maintain pressure differential between rooms	100		0.116	0.116	Manufacturer provided		0.07
Supply Fan Base Allowance (watt/cfm)			Exhaust/Return/Relief/Transfer Fan Base Allowance(watt/cfm)			Fan System Allowance (kW)[3]		Fan System Electrical Input Power (kW)		0.07

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	FC-1	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units?	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,250	Site Elevation	14	Economizer	NA: Efficiency per Table 140.4-F
01	02	03	04			05		06	07	08	09			10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance (watt/cfm)	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Fan Electrical Input Power (kW)
FC-1	>=3 speeds	1	Filter (any MERV value)	100			0.162	Default per Table 140.4-D/141.0-D	<1	0.96
			Fully ducted, or Systems that maintain pressure differential between rooms	100						
Supply Fan Base Allowance (watt/cfm)			Exhaust/Return/Relief/Transfer Fan Base Allowance(watt/cfm)			Fan System Allowance (kW)[3]			Fan System Electrical Input Power (kW)	0.96

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	FC-2	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units?	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,250	Site Elevation	14	Economizer	NA: Efficiency per Table 140.4-F
01	02	03	04			05		06	07	08	09			10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance (watt/cfm)	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Fan Electrical Input Power (kW)
FC-2	>=3 speeds	1	Filter (any MERV value)	100			0.162	Default per Table 140.4-D/141.0-D	<1	0.96
			Fully ducted, or Systems that maintain pressure differential between rooms	100						
Supply Fan Base Allowance (watt/cfm)			Exhaust/Return/Relief/Transfer Fan Base Allowance(watt/cfm)			Fan System Allowance (kW)[3]			Fan System Electrical Input Power (kW)	0.96

[1] *FOOTNOTES: Fans serving spaces with design background noise goals below NC35*
[2] *Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.*
[3] *Fan system allowance includes fan system base allowance.*
[4] *Filter pressure loss can only be counted once per fan system.*
[5] *Complex Fan System means a fan system that combines a single cabinet fan system with other supply fans, exhaust fans, or both.*
[6] *Computer room economizers must meet requirements of §140.9(a) and will be documented on the NRCC-PRC-E document..*
[7] *Indoor fans meeting the requirements of 140.4(a)3D shall turn off when there is no demand for heating or cooling in the space. At 66% air flow the power draw shall be no more than 51% of the fan power at full fan speed and at 33% airflow the power draw shall be no more than 12% of the fan power at full fan speed.*

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11
Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per §140.4(q) & §170.2(c)4O	Exhaust Air Heat Recovery §140.4(q) & §170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass
EF-1			100	0		NA: Serving space not cooled and heated to <60 F				
FC-1			1,250	0		NA: Serving space not cooled and heated to <60 F				
FC-2			1,250	0		NA: Serving space not cooled and heated to <60 F				
FC-3			650	0		NA: Serving space not cooled and heated to <60 F				

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI
EF-1	<1.00 HP or 0.89 kW	
FC-1	<1.00 HP or 0.89 kW	
FC-2	<1.00 HP or 0.89 kW	
FC-3	<1.00 HP or 0.89 kW	

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ERIN WILLIAMS MILLER EXP. 6/30/2027 MECHANICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision Date

Submittal Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	Checker
Scale	

MECHANICAL ENERGY COMPLIANCE DOCUMENTATION

2M8.00

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in §110.2 and §120.2 and prescriptive controls in §140.4(f) and (n), §170.2(c)4D §170.2(c)4L or requirements in §141.0(b)2E §180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09	10	11
System Name	System Zoning	Conditioned Floor Area Being Served (ft^2)	Thermostats §110.2(b) & (c)[1], §120.2(a) §160.3(a)2A or §160.3(b)8 or §141.0(b)2E & §180.2(b)2	Shut-Off Controls §120.2(e) & §160.3(a) 2D	Isolation Zone Controls §120.2(g) & §160.3(a) 2F	Demand Response §110.12 §120.2(b) & §160.3(a)2B	Supply Air Temp. Reset §140.4(f) & §170.2(c) 4D	Window Interlocks per §140.4(n) & §170.2(c)4D	Direct Digital Control (DDC) per §120.2	Heat Pump Defrost per §160.3(b)7
FC-1	Multi-zone	<= 25,000 ft^2	Setback	NA: 7 day per §120.2(e) 1	NA: Serves < 25k ft^2	NA: PTAC, PTHP, Rm AC, HP	NA: Alteration	NA: Alteration Project	NA: Alteration in which no DDC is existing	NA Heat Pump not serving dwelling units
FC-2	Multi-zone	<= 25,000 ft^2	Setback	NA: 7 day per §120.2(e) 1	NA: Serves < 25k ft^2	NA: PTAC, PTHP, Rm AC, HP	NA: Alteration	NA: Alteration Project	NA: Alteration in which no DDC is existing	NA Heat Pump not serving dwelling units
FC-3	Single zone	<= 25,000 ft^2	Setback	NA: 7 day per §120.2(e) 1	NA: Serves < 25k ft^2	NA: PTAC, PTHP, Rm AC, HP	NA: Single Zone	NA: No operable windows	NA: Single Zone	NA Heat Pump not serving dwelling units

[1] FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in §120.1 § 120.2(e)3B § 140.4(p) and § 140.4(q) for all nonresidential and hotel/motel and d:\24refinolink/1160.2, §160.3(a)3D, §170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per §120.1(c)2.

Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems

04		05			06			07
System Name	EF-1	System Design OA CFM Airflow[1]		0	System Design Transfer Air CFM		100	Air Filtration per §120.1(c) §141.0(b)2 and §160.2(c)21 [2]
								NA: Not system type specified in footnote 2
08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per §120.1(c)[3] & §160.2(c)3				Exh. Ver §120.1(c)4 & §160.2(c)4			DCV or Sensor Controls per §120.1(d)3, §120.1(d)5, and §120.1(e)[3] §160.2(c)5D §160.2(c)5E §160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people [5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
F17 RR	Toilet, public	71	1	1	15		100	DCV: NA: Area < 150ft^2 or design occupancy < 10 people
								Occ Sensor: Provided per §120.1(d)5
17	Total System Required Min OA CFM				15	18	Ventilation for this System Complies?	Yes

[1] FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system

[2] Air filtration requirements apply to the following three system types per §120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.

[3] Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.

J. VENTILATION AND INDOOR AIR QUALITY

[4] See Standards Tables 120.1-A and 120.1-B.

[5] For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.

[6] Upon detection of sensor failure, the system shall provide a signal which resets to supply the minimum quantity of outside air to levels required by Section 120.1(c)3.

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in §120.3 and mandatory requirements found in §120.4(g) for duct sealing.

01	☒	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Mandatory Pipe Insulation

02	03	04	05	06	07	08	09	10	10a
System Type	Nominal Pipe Diameter (in)	Fluid Temperature Range (°F)	Conductivity Range (Btu-in per hr per ft^2 per °F)	Insulation Mean Rating Temp. (°F)	Min. Insulation Thickness Required per Table 120.3-A (in)	Min. Insulation Thickness Required per §120.3(c)2 & §160.3(c)1dii (in)	Insulation Thickness per Design (in)	Exception to §120.3 & §160.3(c) (if applicable)	Serving Res or NR Space?
Space cooling	<1	40-60	0.21 - 0.27	75	0.5		1.5	No exception taken	Nonresidential
Space heating	<1	105-140	0.22 - 0.28	100	1		1.5	No exception taken	Nonresidential

This section does not apply to this project.

M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-4

Form/Title
NRCI-MCH-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-4

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air	EF-1
NRCA-MCH-03-A - HVAC and Heat Pumps - Const Volume Single Zone HVAC	FC-3

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
		Plan sheet or construction document location
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	2M0.01 - MECHANICAL LEGENDS AND GENERAL NOTES

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Keeley Wandrocke	Documentation Author Signature:
Company: LPA, Inc.	Signature Date: 04/17/2026
Address: 5301 California Ave, Suite #100	CEA/AEA/ECC Certification Identification (if applicable):
City/State/Zip: Irvine, CA, 92617	Phone: 949-261-1001

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Person Name: Erik Ring	Responsible Person Signature:
Responsible Person Scope: Mechanical Engineer on Record	
Company: LPA, Inc.	Date Signed: 04/17/2026
Address: 5301 California Ave, Suite #100	License: M31731
City/State/Zip: Irvine, CA, 92617	Phone: 949-261-1001

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ERIK WILLIAM RING M31731 EXP. 6/30/2027 MECHANICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

MECHANICAL ENERGY COMPLIANCE DOCUMENTATION

2M8.01

PLUMB ANNOTATION SYMBOLS

DETAIL

DETAIL IDENTIFICATION

SEE 1/P8.01 TYP — OCCURRENCE

SHEET WHERE DETAIL IS DRAWN

ENLARGED PLAN

PLAN IDENTIFICATION

1/P4.01

SHEET WHERE PLAN IS DRAWN

CONTINUATION

PLAN IDENTIFICATION

SEE 1/P2.01 FOR CONT

SHEET WHERE PLAN IS DRAWN

FIXTURE OR EQUIPMENT IDENTIFICATION

FIXTURE IDENTIFICATION

RD-1 3", 900 SF — SPECIFIC INFORMATION

TYP OF 4 — OCCURRENCE

FOOD SERVICE SCHEDULE REFERENCE NO.

109 IW TO FS-1 — SPECIFIC INFORMATION

TYP OF 2 — OCCURRENCE

REVISION

1

CLOUD AROUND REVISED AREA OPTIONAL

KEYNOTE IDENTIFICATION

0101 1", 150 CFH — SPECIFIC INFORMATION

TYP OF 3 — OCCURRENCE

DEMOLITION KEYNOTE

0101 — DEMOLITION KEYNOTE IDENTIFICATION

TYP OF 4 — OCCURRENCE

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
	AV	ACID VENT PIPING
	AW	ACID WASTE PIPING ABOVE FINISHED FLOOR
	AW-U	ACID WASTE PIPING UNDERGROUND
	GV	GREASE VENT PIPING
	GW	GREASE WASTE PIPING ABOVE FINISHED FLOOR
	GW-U	GREASE WASTE PIPING UNDERGROUND
	V	SANITARY VENT PIPING
	SS	SANITARY SOIL OR WASTE PIPING ABOVE FINISHED FLOOR
	SS-U	SANITARY SOIL OR WASTE PIPING UNDERGROUND
	OD	OVERFLOW DRAIN PIPING
	SD	STORM DRAIN PIPING ABOVE FINISHED FLOOR
	SD-U	STORM DRAIN PIPING UNDERGROUND
	SSD	SUBSOIL DRAINAGE PIPING
	CD	CONDENSATE DRAIN PIPING
	OCD	OVERFLOW CONDENSATE DRAIN PIPING
	HBD	HOSE BIBB DRAINAGE PIPING
	RW	RECLAIMED WATER PIPING
	IRR	IRRIGATION PIPING
	ICW	INDUSTRIAL COLD WATER PIPING
	RO	REVERSE OSMOSIS BLENDED WATER PIPING
	CW	DOMESTIC COLD WATER PIPING
	HW	DOMESTIC HOT WATER PIPING
	HWR	DOMESTIC HOT WATER RETURN PIPING
	TW	DOMESTIC TEMPERED WATER PIPING
	TWR	DOMESTIC TEMPERED WATER RETURN PIPING
	SCW	DOMESTIC SOFT COLD WATER PIPING
	SHWR	DOMESTIC SOFT HOT WATER RETURN PIPING
	VAC	VACUUM PIPING
	CA	COMPRESSED AIR PIPING
	G	STANDARD PRESSURE GAS PIPING (8" W.C.)
	MPG	MEDIUM PRESSURE GAS PIPING (5 PSI)
	MPG-U	MEDIUM PRESSURE GAS PIPING UNDERGROUND (5 PSI)
	COMB AIR	WATER HEATER COMBUSTION AIR
	EXH. AIR	WATER HEATER EXHAUST AIR
	CVTR	WATER HEATER CONCENTRIC VENT THRU ROOF
	SOV IN CLG AP	SHUT-OFF VALVE IN CEILING ACCESS PANEL
	SOV IN YB	SHUT-OFF VALVE BELOW FINISHED GRADE IN YARD BOX
	SOV	SHUT-OFF VALVE ABOVE FINISHED GRADE
	SOV / SOC IN WALL AP	SHUT-OFF VALVE / SHUT-OFF COCK IN WALL ACCESS PANEL
	SOC	SHUT-OFF COCK ABOVE FINISHED GRADE
	SOC IN CLG AP	SHUT-OFF COCK IN CEILING ACCESS PANEL
	SOC IN YB	SHUT-OFF COCK BELOW FINISHED GRADE IN YARD BOX
	WHA IN WALL AP	WATER HAMMER ARRESTOR IN WALL ACCESS PANEL
	TP W/ SOV	TRAP PRIMER WITH SOV IN WALL ACCESS PANEL
	RHB	RECESSED HOSE BIBB
	HB	HOSE BIBB
	AP	ACCESS PANEL
	WB	WASHING MACHINE OUTLET BOX WITH 1/4 TURN VALVES
	IB	ICE MAKER OUTLET BOX WITH 1/4 TURN VALVE
	SV	SOLENOID VALVE
	GT	GAS TURRET
	GPR	GAS PRESSURE REGULATOR
	MV / TMV	MIXING VALVE / THERMOSTATIC MIXING VALVE
	WCO	WALL CLEANOUT
	FCO	FLOOR CLEANOUT
	COTG	CLEANOUT TO GRADE
	FD	FLOOR DRAIN OR AREA DRAIN
	FD	FLOOR DRAIN OR AREA DRAIN
	FS	FLOOR SINK
	DW	DRYWELL
	RR	ROOF RECEPTOR
	OD	OVERFLOW DRAIN (SPILL TO GRADE)
	OD	PIPE RISER DOWN (ELBOW)
		PIPE RISER UP (ELBOW)
		PIPE RISE OR DROP
		BRANCH LINE TOP CONNECTION
		BRANCH LINE BOTTOM CONNECTION
		CAP ON END OF PIPE
		UNION
		SLEEVE
		SEISMIC JOINT
		FLOW IN DIRECTION OF ARROW
		CONTINUATION OF PIPING
	BLV	BALANCING VALVE
	PRV	PRESSURE REDUCING VALVE
	TPV	TEMPERATURE AND PRESSURE RELIEF VALVE
	CV	CHECK VALVE
RPBP	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
[CS]	CS	CONTROL STATION
		STRAINER
		PUMP
P1		PRESSURE GAUGE
T1		TEMPERATURE GAUGE
FS		FLOW SWITCH
PS		PRESSURE SWITCH
		AQUASTAT
		HATCH INDICATES ITEM(S) TO BE DEMOLISHED

DSA STRUCTURAL NOTES

MEP COMPONENT ANCHORAGE NOTE

1. ALL MECHANICAL, PLUMBING, & ELECTRICAL COMPONENTS SHALL BE ANCHORED & INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE & DISPLACEMENT REQ PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 & ASCE 7-16 CHAPTERS 13, 26 AND 30:

   A. ALL PERMANENT EQUIPMENT & COMPONENTS.
   B. TEMPORARY, MOVEABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE
   C. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 LBS OR HAS A CENTER OF MASS LOCATED 4 FT OR MORE ABOVE THE ADJ FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQ TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

2. THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE W/ THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT & ASSOCIATED DUCTWORK, PIPING, & CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE & LONGITUDINAL DIRECTIONS:

   A. COMPONENTS WEIGHING LESS THAN 400 LBS & HAVE A CENTER MASS LOCATED 4 FT OR LESS ABOVE THE ADJ FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
   B. COMPONENTS WEIGHING LESS THAN 20 LBS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 LBS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

3. THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL & PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY & ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS & EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE W/ ABOVE REQ.

PIPING DUCTWORK & ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, & ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY W/ THE FORCES & DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; & 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 & 1617A.1.26.

THE METHOD OF SHOWING BRACING & ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING & ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (e.g. HCAI OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF & DURING THE HANGING & BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER & BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP☐ MD☐ PP■ E☐ — OPTION 1: DETAILED ON THE APPROVED DWG W/ PROJECT SPECIFIC NOTES & DETAILS.

MP☐ MD☐ PP☐ E☐ — OPTION 2: SHALL COMPLY WITH THE APPLICABLE PRE-APPROVAL (OPM# MASON WEST 0043-13), AS INCLUDED IN THESE DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

APPLICABLE CODES

BUILDING CODES: (APPLICABLE AS OF JANUARY 1, 2023)

2025 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.

2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.; (2024 INTERNATIONAL BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, WITH CALIFORNIA AMENDMENTS)

2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.; (2023 NATIONAL ELECTRICAL CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NFPA)

2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R.; (2024 UNIFORM MECHANICAL CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)

2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R.; (2024 UNIFORM PLUMBING CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)

2022 ENERGY CODE (CEC), PART 6, TITLE 24 C.C.R.;

2022 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.; (2024 INTERNATIONAL FIRE CODE OF THE INTERNATIONAL CODE COUNCIL)

2022 CALIFORNIA GREEN BUILDING CODE (CAL GREEN), PART 11, TITLE 24 C.C.R.

2022 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.

TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.

PARTIAL LIST OF APPLICABLE STANDARDS

2022 CALIFORNIA BUILDING CODE (FOR SFM) REFERENCED STANDARDS CH. 35

NFPA 13	AUTOMATIC SPRINKLER SYSTEMS (CALIFORNIA AMENDED)	2022 EDITION
NFPA 14	STANDPIPE SYSTEMS (CALIFORNIA AMENDED)	2016 EDITION
NFPA 17	DRY CHEMICAL EXTINGUISHING SYSTEMS	2017 EDITION
NFPA 17A	WET CHEMICAL EXTINGUISHING SYSTEMS	2017 EDITION
NFPA 20	STATIONARY PUMPS	2022 EDITION
NFPA 22	STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTION	2016 EDITION
NFPA 20	STATIONARY PUMPS	2022 EDITION
NFPA 24	PRIVATE FIRE SERVICE MAINS (CALIFORNIA AMENDED)	2022 EDITION
NFPA 72	NATIONAL FIRE ALARM AND SIGNALING CODE (CALIFORNIA AMENDED) (NOTE: SEE UL STANDARD 1971 FOR "VISUAL DEVICES")	2016 EDITION
NFPA 80	FIRE DOOR AND OTHER OPENING PROTECTIVES	2016 EDITION
NFPA 253	CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS	2019 EDITION
NFPA 2001	CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (CALIFORNIA AMENDED)	2015 EDITION

GENERAL NOTES

1. ALL CONSTRUCTION & MATERIALS SHALL BE AS SPECIFIED & IN ACCORDANCE W/ ALL APPLICABLE CODES, ORDINANCES, LAWS, PERMITS, & THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURATE PLACEMENT OF ALL NEW CONSTRUCTION ON THE SITE.
3. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS & DIMENSIONS, & EXACT LOCATIONS & ELEVATIONS OF PIPING BEFORE STARTING WORK. SHOULD A DISCREPANCY APPEAR IN THE CONTRACT DOCUMENTS, OR BETWEEN THE CONTRACT DOCUMENTS & EXG CONDITIONS, NOTIFY THE ARCHITECT AT ONCE FOR INSTRUCTION ON HOW TO PROCEED.
4. SEWER, WATER, & STORM DRAIN SYSTEMS INDICATED IN THESE DWGS SHALL EXTEND TO PLUMBING/CIVIL POINTS OF CONNECTION @ 5'-0" OUTSIDE OF THE BUILDING(S) UNO. CONTINUATION OF THESE PIPING SYSTEMS ARE INDICATED ON THE CIVIL DWGS W/ CORRESPONDING ASSOCIATED MATERIALS SPECIFIED UNDER A SEPARATE SECTION OF THE PROJECT SPECIFICATIONS. ALL SUCH PIPING SHALL BE INSTALLED IN A MANNER TO PROVIDE PROPER CONNECTION TO INVERT ELEVATIONS INDICATED ON CIVIL DWGS. WHERE SIZES DIFFER BETWEEN PLUMBING & CIVIL DWGS, CONTRACTOR SHALL PROVIDE TRANSITION FITTINGS AS NECESSARY TO ALLOW FOR PROPER CONNECTION.
5. TRAPS FOR ALL LAVATORIES & SINKS SHALL TRAP STRAIGHT BACK TO WALL W/ ALL REQ OFFSETS HAPPENING WITHIN THE WALL.
6. HORIZ SOIL, WASTE & TRAP PRIMER PIPING WITHIN THE BUILDING SHALL BE INSTALLED CONCEALED WITHIN WALLS, BELOW FINISH FLOOR, OR BELOW FINISH SLAB AS APPLICABLE UNO. ALL OTHER HORIZ PIPING WITHIN THE BUILDING SHALL BE INSTALLED CONCEALED ABOVE CLG OR WITHIN WALLS AS APPLICABLE UNO. ALL VERTICAL PIPING SHALL BE INSTALLED CONCEALED WITHIN WALLS UNO. NO PIPING SHALL BE INSTALLED IN EXPOSED LOCATIONS UNLESS SPECIFICALLY NOTED AS SUCH ON PLANS.
7. HORIZ SOIL & WASTE PIPING 4" & GREATER IN SIZE SHALL SLOPE AT 1/8" PER FOOT UNO. ALL SUCH PIPING 3" & LESS IN SIZE SHALL SLOPE AT 1/4" PER FT UNO.
8. HORIZ STORM DRAIN & OVERFLOW PIPING SHALL SLOPE AT 1/8" PER FT UNO.
9. HORIZ CONDENSATE PIPING SHALL SLOPE AT 1/8" PER FT UNO.
10. PRIOR TO COMMENCING ANY WORK VERIFY ALL EQUIPMENT LOCATIONS W/ THE GENERAL CONTRACTOR, OTHER TRADES, ARCHITECT & STRUCTURAL ENGINEER. EXACT ROUGH-IN LOCATIONS & REQS SHALL BE COORDINATED IN THE FIELD.
11. PIPING BETWEEN EA PLUMBING FIXTURE & THE NEAREST BRANCH OR MAIN PIPING RUN SHALL BE SIZED TO MATCH THE CORRESPONDING FIXTURE SCHEDULE CONNECTION SIZE AT A MIN UNO AS A LARGER SIZE ON PLANS. PIPE HEADERS IN WALLS SERVING BANKS OF FIXTURES SHALL BE FULL LINE SIZE FROM THE UPSTREAM END OF THE BRANCH LINE TO THE END TERMINAL UNO.
12. REFER TO ARCHITECTURAL DWGS FOR LOCATIONS, ROUGH IN DIMENSIONS, & MTG HEIGHTS OF ALL FIXTURES, EQUIPMENT, ACCESS PANELS, HOSE BIBBS, RECESSED HOSE BIBBS, OVERFLOW DRAIN TERMINATION POINTS, & OTHER EXPOSED PLUMBING ELEMENTS. WHERE DIMENSIONS ARE NOT INDICATED, SEEK ARCHITECT'S DIRECTION &/OR APPROVAL PRIOR TO INSTALLATION.
13. ACCESS PANELS
    A. WHERE POSSIBLE, USE SAME ACCESS PANEL FOR SHUT-OFF VALVES, MIXING VALVES, TRAP PRIMERS & WATER HAMMER ARRESTORS &/OR OTHER INTERDEPENDENT COMPONENTS WHEN LOCATED DIRECTLY ADJACENT IN SAME IMMEDIATE VICINITY. SEE ARCHITECTURAL DWGS FOR MTG HEIGHTS.
    B. SEE SPECIFICATIONS FOR ACCESS PANEL REQS.
    C. VALVES FOR SERVICE ACCESSIBILITY INSTALLED ABOVE CLG SHALL BE WITHIN 18" OF CLG.
14. CLEANOUTS.
    A. INTERIOR CLEANOUTS SHALL BE WALL CLEANOUTS RATHER THAN FLOOR CLEANOUTS UNO, SHALL BE READILY ACCESSIBLE, & SHALL BE CAREFULLY COORDINATED WITH CASEWORK, EQUIPMENT, & OTHER ITEMS TO AVOID CONFLICT. NOT ALL REQ CLEANOUTS ARE INDICATED ON PLANS. WALL CLEANOUTS IN FINISHED SPACES SHALL BE INSTALLED IN ACCESS PANELS.
    B. SEE SPECIFICATIONS FOR ACCESS PANEL REQS.
15. YARD BOX & CLEAN OUT COVERS SHALL BE CLEARLY STAMPED W/ "WATER", "GAS", OR "SEWER" AS APPLICABLE. VALVES SHALL BE INSTALLED & PROPERLY POSITIONED WITHIN YARD BOX TO ALLOW FOR FULL RANGE OF OPERATION, MAINTENANCE, REPAIR, & REPLACEMENT. ALL YARD BOXES & CLEAN OUT COVERS SHALL ALIGN WITH SCORED HARDSCAPE JOINTS PER L&SCAPE PLANS. YARD BOX COVERS SHALL BE CONCRETE. SEWER CLEAN OUT COVERS SHALL BE BRASS. REFER TO SPECIFICATIONS FOR ADDL INFO.
16. VERIFY EXACT LOCATIONS OF ALL MECHANICAL &/OR OTHER EQUIPMENT INSTALLED BY OTHERS & REQ PLUMBING CONNECTIONS PRIOR TO ORDERING OF MATERIALS OR INSTALLATION. COORDINATE EXACT ROUGH-IN LOCATIONS & REQS WITH OTHER INSTALLING CONTRACTORS AS APPLICABLE PRIOR TO INSTALLATION.
17. ADA LAVATORIES & SINKS SHALL BE PROVIDED WITH ADA INSULATED TRAP & SUPPLY COVERS AS SPECIFIED.
18. ADA WATER CLOSETS SHALL BE INSTALLED WITH FLUSH VALVE ACTUATOR HANDLE LOCATED ON THE WHEEL CHAIR ACCESS SIDE.
19. ALL VALVES, UNIONS, CLEANOUTS, ETC TO BE SAME SIZE AS PIPE UNO.
20. REFER TO MECHANICAL DWGS FOR MECHANICAL MANDATORY MEASURES & ASSOCIATED REQS.
21. REFER TO ARCHITECTURAL DWGS FOR LOCATIONS OF ALL FIRE RATED ASSEMBLIES. PROVIDE FIRESTOPPING AT PENETRATIONS THROUGH FIRE RETARDANT CONSTRUCTION IN ACCORDANCE W/ SPECIFICATIONS. PIPING THROUGH FIRE RATED WALLS SHALL BE PER UL FIRE RESISTANCE SYSTEM NO. W-L-1001. SEE ARCHITECTURAL PLANS FOR WALL LOCATIONS.
22. NO PIPING SHALL BE INCASED IN THE CONCRETE SLAB.
23. ALL VALVES, TRAP PRIMERS, WATER HAMMER ARRESTERS OR OTHER EQUIPMENT SHOWN IN WALLS OR ABOVE NON-ACCESSIBLE CLG SHALL BE INSTALLED BEHIND AN ACCESS PANEL.
24. ALL PLUMBING FIXTURES & EQUIPMENT SHALL BE CERTIFIED BY THE CALIFORNIA STATE ENERGY COMMISSION TO COMPLY WITH EFFICIENCY STANDARDS PER SECTION 2-5314(A) OF THE TITLE-24 REGULATIONS.
25. ALL EXG PIPING DAMAGED DURING EXCAVATION SHALL BE REPAIRED WITH MATERIALS TO MATCH EXG BY THE CONTRACTOR.
26. ALL UNDERGROUND IRON, COPPER OR STL PIPING LOCATED BOTH INSIDE & OUTSIDE OF BUILDING SHALL BE ENCASED WITHIN A MIN 10 MIL POLYETHYLENE PLASTIC SLEEVE SEALED WATER TIGHT W/ POLYVINYL CHLORIDE TAPE.
27. ALL POINTS OF CONNECTION SHALL BE COORDINATED WITH THE GC PRIOR TO BID.
28. ALL HORIZ PIPING LINES EXTENDED & CONNECTED TO EQUIPMENT SHALL BE RUN AT THE HIGHEST POSSIBLE ELEVATIONS & NOT LESS THAN 6" ABOVE THE FLOOR TO PROVIDE CLEARANCE FOR CLEANING. AT WALL OR COLUMN LOCATIONS, PIPING ROUGH-IN SHALL BE STUBBED IN WALLS WHENEVER POSSIBLE.
29. ALL CUTTING OF EXG PAVING, WALKS AND/OR FLOORS SHALL BE BY MACHINE SAW CUTTING. HOLES FOR PIPES IN CONCRETE WALLS OR FLOORS SHALL BE DONE BY CORE DRILLING EQUIPMENT.
30. ABOVE GROUND PIPING SYSTEMS SHALL BE MARKED IN ACCORDANCE W/ ASME A13.1.
31. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBERS SHALL BE CUT, DRILLED OR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER & THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.
32. ALL CONCEALED CONDENSATE DRAIN PIPING ABOVE CLG SHALL BE INSULATED WITH 3/4" CLOSED CELL FOAM. INSULATION SHALL BE EQ TO ARMACELL "ARMAFLEX".
33. VENT PIPING SHALL TERMINATE NOT LESS THAN 10 FT FROM, OR NOT LESS THAN 3 FT ABOVE, AN OPENABLE WINDOW, DOOR, OPENING, AIR INTAKE, OR VENT SHAFT.

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
&	AND
@	AT
ABV	ABOVE
AIC	AIR CONDITIONING
ACT	ACOUSTICAL CEILING TILE
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISH FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AP	ACCESS PANEL
APPROX	APPROXIMATELY
ARCH	ARCHITECT
ASD	AUTOMATIC SPRINKLER DRAIN
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AVTR	ACID VENT THRU ROOF
BEL	BELOW
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BFP	BACKFLOW PREVENTER
BLDG	BUILDING
BTUH	BRITISH THERMAL UNIT PER HOUR
CA	COMPRESSED AIR
CBC	CALIFORNIA BUILDING CODE, CURRENT EDITION
CD	CONDENSATE DRAIN
CEC	CALIFORNIA ELECTRICAL CODE, CURRENT EDITION
CFC	CALIFORNIA FIRE CODE, CURRENT EDITION
CFM	CUBIC FEET PER MINUTE
CFH	CUBIC FEET PER HOUR
CLG	CEILING
CMC	CALIFORNIA MECHANICAL CODE, CURRENT EDITION
CO	CLEANOUT
COMB	COMBUSTION
CONT	CONTINUATION
CONTR	CONTRACTOR
CPC	CALIFORNIA PLUMBING CODE, CURRENT EDITION
CVTR	CONCENTRIC VENT THRU ROOF
CWD	CAN WASH DRAIN
(D)	DEMOLISH
DET	DETAIL
DEPT	DEPARTMENT
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
Ø	DIAMETER
E	EAST
EA	EACH
EXIST	EXISTING
(E)	EXISTING
ELEC	ELECTRICAL
ENGR	ENGINEER
EOR	ENGINEER ON RECORD
ET	EXPANSION TANK
EXH	EXHAUST
F	FAHRENHEIT
FD	FLOOR DRAIN
FFE	FINISH FLOOR ELEVATION
FIN FLR	FINISH FLOOR
FIN GR	FINISH GRADE
FLR	FLOOR
FM	FACTORY MANUAL
FPS	FEET PER SECOND
FT	FOOT, FEET
FV	FLUSH VALVE
GA	GAUGE
GAL	GALLONS
GPM	GALLONS PER MINUTE
GVTR	GREASE VENT THRU ROOF
HDR	HEADER
HORIZ	HORIZONTAL
HBD	HOSE BIBB DRAINAGE
HP	HORSE POWER
HVAC	HEATING VENTILATION AND AIR CONDITIONING
HZ	HERTZ
ICW	INDUSTRIAL COLD WATER
IE	INVERT ELEVATION
IN	INCHES
IN WC	INCHES WATER COLUMN
INT	INTEGRAL
IRR	IRRIGATION
KW	KILOWATT
LBS	POUNDS
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MC	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
N	NORTH
NA	NOT APPLICABLE
NIC	NOT IN CONTRACT
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OCD	OVERFLOW CONDENSATE DRAIN
OD	OVERFLOW DRAIN, OUTSIDE DIAMETER
P	PUMP
PCD	PUMPED CONDENSATE DRAIN
PH	PHASE
PLBG	PLUMBING
POC	POINT OF CONNECTION
POD	POINT OF DISCONNECTION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
RO	REVERSE OSMOSIS
RPM	REVOLUTIONS PER MINUTE
RW	RECLAIMED WATER
S	SOUTH
SD	STORM DRAIN
SF	SQUARE FOOT
SHD	SHOWER DRAIN
SIM	SIMILAR
SPKLR	SPRINKLER
SCW	SOFT COLD WATER
SS	SANITARY SEWER
SST	STAINLESS STEEL
STD	STANDARD
STRUCT	STRUCTURAL
SYS	SYSTEM
TD	TRENCH DRAIN
TEMP	TEMPERATURE
THRU	THROUGH
T'STAT	THERMOSTAT
TYP	TYPICAL
UL	UNDERWRITER'S LABORATORY
UNO	UNLESS NOTED OTHERWISE
VA	VACUUM
V	VOLT
VBF	VENT BELOW FLOOR
VBG	VENT BELOW GRADE
VTR	SANITARY VENT THRU ROOF
W	WEST
W/	WITH
W/O	WITHOUT
WCO	WALL CLEANOUT
WC	WATER COLUMN
WT	WEIGHT
YB	YARD BOX

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ERIN WILLIAMS — MILTON — EXP. 6/30/2027 — MECHANICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

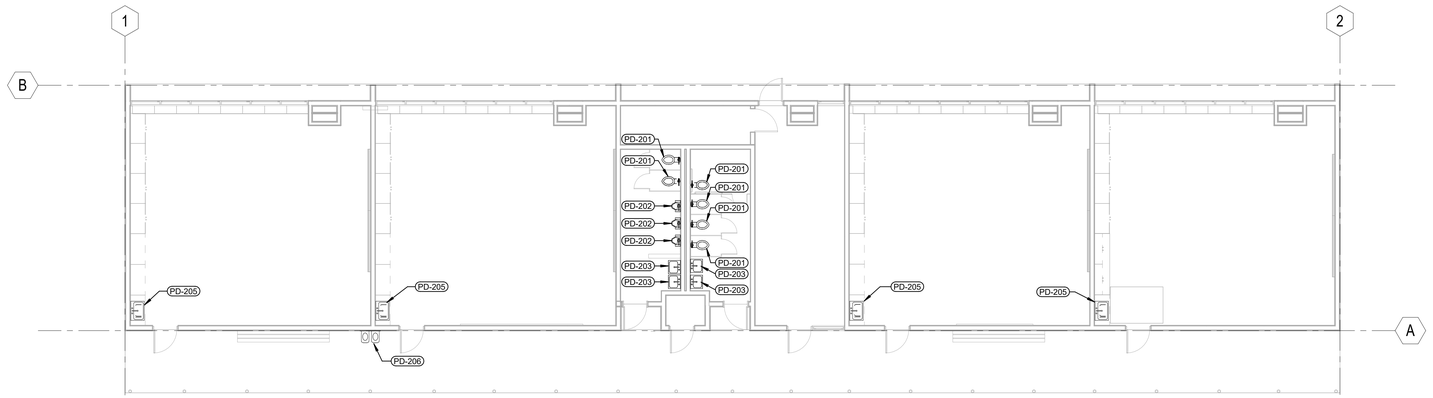
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

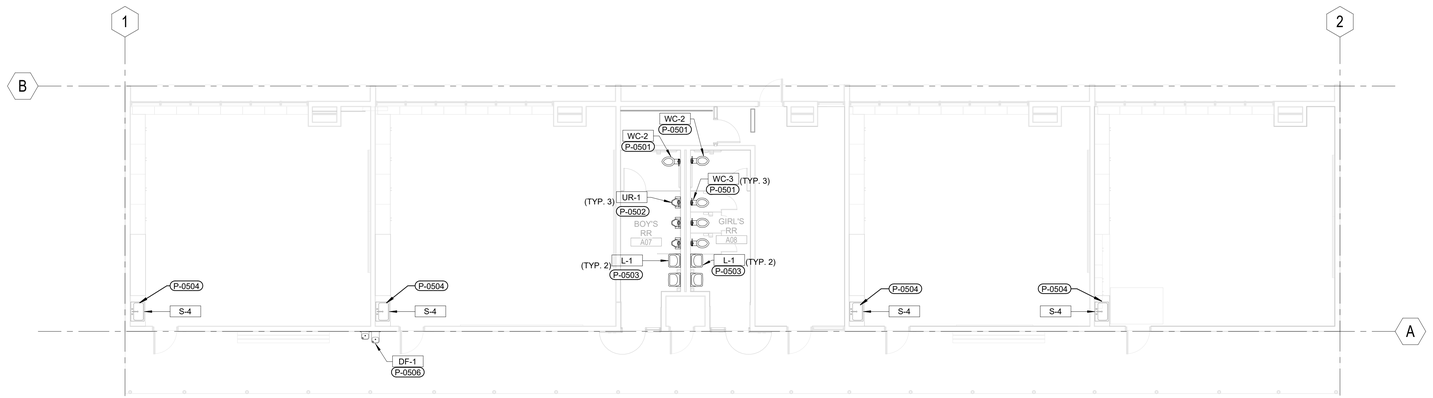
Job Number	31942
Checked By	Checker
Scale	As indicated

PLUMBING LEGENDS & GENERAL NOTES

2P0.00



1 - FLOOR - PLUMBING - DEMO | 1/8" = 1'-0" | 2



1 - FLOOR - PLUMBING | 1/8" = 1'-0" | 1

KEYNOTES

ITEM	DESCRIPTION
P-0501	ROUGH-IN AND CONNECT NEW WATER CLOSET TO EXISTING PLUMBING SERVICES.
P-0502	ROUGH-IN AND CONNECT NEW URINAL TO EXISTING PLUMBING SERVICES.
P-0503	ROUGH-IN AND CONNECT NEW LAVATORY TO EXISTING PLUMBING SERVICES.
P-0504	ROUGH-IN AND CONNECT NEW SINK TO EXISTING PLUMBING SERVICES.
P-0506	ROUGH-IN AND CONNECT NEW DRINKING FOUNTAIN TO EXISTING PLUMBING SERVICES.
PD-201	EXISTING WATER CLOSET TO BE REMOVED. CAP EXISTING WATER, WASTE, AND VENT FOR FUTURE USE.
PD-202	EXISTING URINAL TO BE REMOVED. CAP EXISTING WATER, WASTE, AND VENT FOR FUTURE USE.
PD-203	EXISTING LAVATORY TO BE REMOVED. CAP EXISTING WATER, WASTE, AND VENT FOR FUTURE USE.
PD-205	EXISTING SERVICE SINK TO BE REMOVED.
PD-206	EXISTING DRINKING FOUNTAIN TO BE REMOVED. CAP EXISTING WATER, WASTE, AND VENT FOR FUTURE USE.

LEGEND

NOT IN PLUMBING SCOPE OF WORK

SCOPE OF WORK

PLAN NOTES

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES TO THE ARCHITECT.
2. NO DEMOLITION TO BEGIN UNTIL PLANS INCLUDING DEMOLITION WORK HAVE BEEN APPROVED BY DSA.
3. EXISTING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONIDTION AND FINISHED TO MATCH ADJACENT SURFACES.
4. PROTECT ALL AREAS NOT SCHEDULED FOR DEMOLITION/MODIFICATION.
5. WHERE DEMOLITION OCCURS, PATCH, SAND, PREP, TEXTURE, AND REPAIR REMAINING CONSTRUCTION TO MATCH EXISTING FINISH.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM RINA
M31731
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

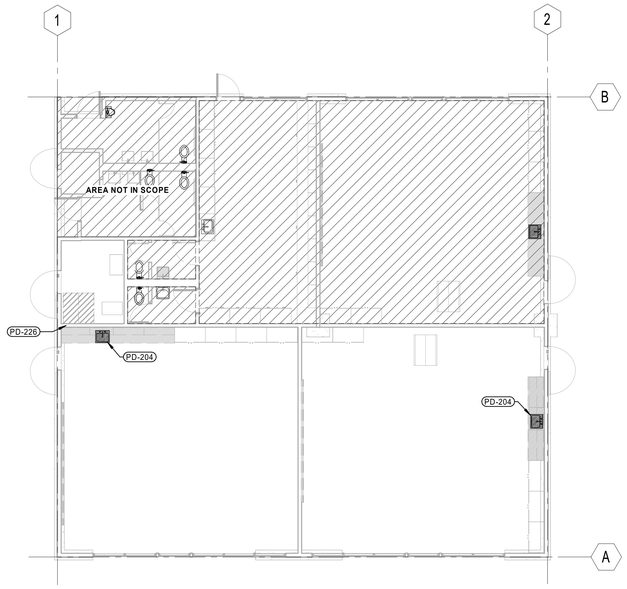
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

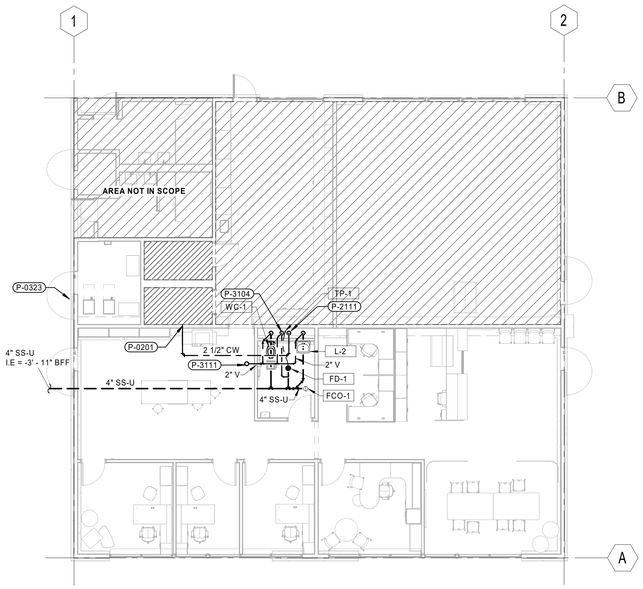
Job Number	31942
Checked By	Checker
Scale	As indicated

PLUMBING FLOOR PLANS - BLDG A

2PA2.20



1 - FLOOR - PLUMBING - DEMO | 1/8" = 1'-0" | 17



1 - FLOOR - PLUMBING | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
P-0201	POC NEW COLD WATER PIPING TO EXISTING COLD WATER PIPING ABOVE CEILING WITH SHUTOFF VALVE IN CEILING ACCESS PANEL.
P-0323	POC EXISTING CONDENSATE PIPING TO MECHANICAL UNIT WITH CONDENSATE PUMP. CONDENSATE PUMP PROVIDED BY MECHANICAL CONTRACTOR.
P-2111	COLD WATER DOWN IN WALL TO FULL SIZE HEADER WITH SHUT OFF VALVE BEHIND ACCESS PANEL.
P-3104	SANITARY VENT UP FROM BELOW FLOOR.
P-3111	SANITARY VENT UP TO 4" VENT THRU ROOF. CONTRACTOR SHALL FIELD VERIFY LOCATION TO BE CLEAR OF ANY EXISTING EQUIPMENT ON THE ROOF AND MAINTAIN A 10' DISTANCE FROM ANY MECHANICAL AIR INTAKE.
PD-204	EXISTING SINK TO BE REMOVED. CAP EXISTING WASTE, AND VENT BEHIND FINISHED SURFACE. REMOVE COLD WATER BACK TO ACTIVE MAIN AND CAP.
PD-226	DEMO ALL EXISTING GAS PIPE IN BUILDING. WATER TIGHT CAP AT BUILDING ENTRY AND ABANDON. FIELD VERIFY PRIOR TO WORK.

LEGEND

NOT IN PLUMBING SCOPE OF WORK

SCOPE OF WORK

PLAN NOTES

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES TO THE ARCHITECT.
2. NO DEMOLITION TO BEGIN UNTIL PLANS INCLUDING DEMOLITION WORK HAVE BEEN APPROVED BY DSA.
3. EXISTING CONDITIONS DAMAGED OR REMOVED AS A RESULT OF ALL WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONIDTION AND FINISHED TO MATCH ADJACENT SURFACES.
4. PROTECT ALL AREAS NOT SCHEDULED FOR DEMOLITION/MODIFICATION.
5. WHERE DEMOLITION OCCURS, PATCH, SAND, PREP, TEXTURE, AND REPAIR REMAINING CONSTRUCTION TO MATCH EXISTING FINISH.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

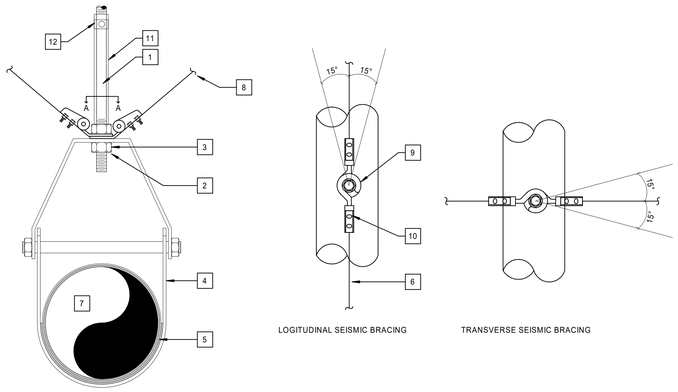
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	As indicated

PLUMBING FLOOR PLANS - BLDG F

2PF2.20



LOGITUDINAL SEISMIC BRACING

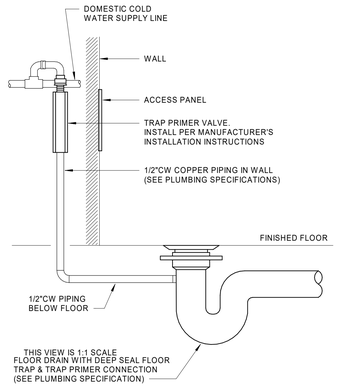
TRANSVERSE SEISMIC BRACING

1	THREADED ROD HANGER, (SEE NOTE #2)
2	LOCKING NUT, TYP
3	SUPPORT NUT, TYP
4	B-LINE B3100F CLEVIS HANGER
5	14 GAGE ZINC COATED SADDLE.
6	1/8"Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7 X 18 STRAND CORE, TYP.
7	PIPE. MAX DIAMETER OF PIPE TO BE 4"
8	FOR UPPER SEISMIC BRACING REFER TO STRUCTURAL DETAIL 12/2S9.01
9	MASON, OR EQUAL, SCBH CABLE BRACE, TYP OF 2
10	5/8"Ø BOLTS AND NUTS, TORQUE PER MFG'S INSTRUCTIONS. TYP OF 4
11	ROD STIFFENER, (SEE NOTE #3)
12	MASON, OR EQUAL, ROD STIFFENER CLAMP. PROVIDE AT 38" O.C. MAX

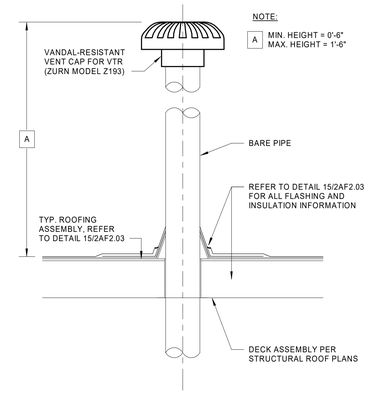
MINIMUM ROD DIAMETER (SINGLE RIGID ROD HANGERS)			
PIPE SIZE	DUCTILE IRON, STEEL, CAST IRON	PIPE SIZE	COPPER, GLASS OR PLASTIC PIPE
≤ 2"	3/8"Ø	≤ 2"	3/8"Ø
2 1/2-3 1/2"	1/2"Ø	2 1/2-5"	1/2"Ø
4-5"	5/8"Ø	6"	5/8"Ø
6-8"	3/4"Ø	8-12"	3/4"Ø

NOTES:
1. MAXIMUM HORIZONTAL HANGER SPACING FOR 1-1/4" PIPING AND SMALLER TO BE 5'-0" AND 1-1/2" PIPING AND LARGER TO BE 8'-0".
2. GRAVITY PIPE SUPPORT. NOT TO EXCEED 12" FROM UPPER ATTACHENT TO TOP OF PIPE IN HANGER.
3. PROVIDE ROD STIFFENER IF PIPE SUPPORT FROM STRUCTURE EXCEEDS 12" AS NOTED IN NOTE 2 ABOVE.
4. SEE STRUCTURAL DETAILS 3/2S9.01 & 4/2S9.01 FOR UPPER ROD HANGER ATTACHEMENT DETAILS.
5. REFER TO STRUCTURAL DETAILS AS NOTED FOR SPACING AND LOAD REQUIREMENTS.

SINGLE PIPE AND TRAPEZE HANGER | NTS | 12



TRAP PRIMER CONNECTION | NTS | 8



VENT THRU ROOF | NTS | 4

PIPE MATERIALS SCHEDULE

SERVICES	LOCATION	MATERIAL	JOINING METHOD	REMARKS
DOMESTIC COLD AND HOT WATER	UNDERGROUND	RIGID COPPER (TYPE K)	BRAZED	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	RIGID COPPER (TYPE L)	SOLDERED	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
SANITARY WASTE / SEWER GREASE WASTE	UNDERGROUND	CAST IRON SOIL PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	CAST IRON SOIL PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
ACID WASTE	UNDERGROUND	POLYPROPYLENE NO HUB PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	POLYPROPYLENE NO HUB PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
SANITARY VENT	UNDERGROUND	CAST IRON SOIL PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	CAST IRON SOIL PIPE & FITTINGS	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
LOW PRESSURE GAS & MEDIUM PRESSURE GAS	UNDERGROUND	PE PIPE AND FITTINGS	WELDED	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	SCHEDULE 40 BLACK STEEL, 2" AND SMALLER THREADED, LARGER WELDED	---	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
STORM DRAIN	UNDERGROUND	CAST IRON SOIL PIPE	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
	ABOVE GROUND	CAST IRON SOIL PIPE	HUBLESS	ALL PIPE PENETRATION SHALL BE PROVIDED WITH PIPE SLEEVES IN COMPLIANCE WITH IPC-2009
CONDENSATE/INDIRECT WASTE DRAIN	WITHIN BUILDING	TYPE 'L' HARD DRAWN COPPER TUBING ASTM B88, WITH WROUGHT COPPER SWEAT FITTINGS, ANSI B16.22. WITH 1" THICK MANVILLE MICRO-LOK HP INSULATION. EXPOSED OUTDOOR TO ATMOSPHERE, NO INSULATION.		

NOTES:
1. ALL BRAZED AND SOLDERED JOINTS SHALL BE LEAD FREE. EXPOSED VENT PIPE SHALL BE GALVANIZED PER SPECIFICATIONS.
2. ALL METALLIC PIPING BELOW GRADE SHALL BE ENCASED WITH 10 MIL MINIMUM POLYETHYLENE PLASTIC SLEEVE. ALL FITTINGS, VALVES, ETC. THAT ARE NOT ABLE TO BE ENCASED WITHIN SLEEVE SHALL PROVIDE HEAVY OF "HENRY'S" OIL BASE ROOF MASTIC OVER ENTIRE SURFACE AND WRAPPED ENTIRE COMPONENT BY 10 MIL FERGUSON POLYETHYLENE WRAP WITH OVERLAPPED 50% OF THE CIRCUMFERENCE. SECURE ENDS AND SEAMS BY 3M SCOTCH, 10 MIL, 2" WIDE PIPE WRAP SEALING TAPE.

PLUMBING FIXTURE SCHEDULE

ITEM	MANUFACTURER	MODEL NO.	FIXTURE TYPE	GPM/GPF	ROUGH-IN CONNECTION SIZES (in)				MOUNT	HARDWARE TYPE	DESCRIPTION	DETAIL REFERENCE
					WASTE	VENT	COLD WATER	HOT WATER				
DF-1	HAWS	1119.14	DRINKING FOUNTAIN									
EEW-1	HAWS	8356WCC	BARRIER-FREE EYE/FACE WASH COMBINES								EMERGENCY COMBINATION UNIT IS EQUIPPED WITH A STAINLESS STEEL DRAIN PAN.	
FCO-1	WATTS	CO-204-R									Floor Cleanout with Round Top	
FD-1	ZURN	Z-415-BZ1	FLOOR DRAIN		2"	1 1/2"	1/2"		FLOOR MOUNT		DURA-COASTED CAST IRON BODY WITH BOTTOM OUTLET, COMBINATION INVERTIBLE MEMBRANE CLAMP & ADJUSTABLE COLLAR WITH SEEPAGE SLOTS AND TOP ASSEMBLY. EZ1 DRAINAGE SERIES, TYPE "B" LIGHT DUTY, HEEL PROOF STRAINER - TO FINISHED FLOOR	
L-1	KOHLER	K-2005	LAVATORY		2"	1 1/2"	1/2"	1/2"	WALL MOUNT	CHICAGO "ECAST" MODEL No. 3400-ABCP-METERING	CW - (ADA), 0.5 GPM, MIFAB MODEL No. MC-41 FIXTURE CARRIER W/ CONCEALED ARMS. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMENTS	
L-2	KOHLER	K-2005	LAVATORY		2"	1 1/2"	1/2"	1/2"	WALL MOUNT	CHICAGO "ECAST" MODEL No. 2200-4E280SABCP	CW/HW - (ADA), 0.5 GPM, MIFAB MODEL No. MC-41 FIXTURE CARRIER W/ CONCEALED ARMS. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMENTS.	
S-1	JUST MFG.	SL-ADA-2231-A-GR	SINK								22"x31"x5-1/2" DEEP, 3-HOLE PUNCHED, SINGLE COMPARTMENT, 18 GUAGE TYPE 304 STAINLESS STEEL, SELF-RIMMING, COMPLETE WITH CHICAGO NO. 1006-ABCP LOOSE KEY WITH RIGID SUPPLIES, McGUIRE NO. PW1152WC DRAIN AND McGUIRE NO. PWV8090NCO P-TRAP.	
S-2	ELKAY	DRKAD2517552	SINGLE BOWLSINK		2"	1 1/2"	3/4"	0"	SLEF RIMMING	CHICAGO "E-CAST" MODEL No. 350-ABCP-317-FC-CP DECK MOUNTED FAUCET	CW - (ADA), CLASSROOM, 25"X17"X5-1/2" DEEP, McGUIRE MODEL No. 152 WIDE TOP SINK STRAINER, McGUIRE MODEL No. PW8089NCO 1-1/2" L.A PATTERN P-TRAP WITH PRE-WRAPPED TRAP AND SUPPLY COVERS, GALVANIZED NIPPLE TRAP ARM W/CHROMIUM PLATED BRASS CASING, & CHIGAGO "ECAST" MODEL No. 1017-ABCP LOOSE KEY STOPS WITH RIGID SUPPLY, CALIF. AB 1953 COMPLIANT. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMNTS.	
S-3	ELKAY	ELUHAD211555	SINGLE BOWLSINK		2"	1 1/2"	1/2"	1/2"	SLEF RIMMING	CHICAGO "E-CAST" MODEL No. 1100-317ABCP DECK MOUNTED FAUCET	CW/HW - (ADA), KITCHEN, 23-1/2"X18-1/4"X5-1/2" DEEP, McGUIRE MODEL No. 151 BRASS BASKET STRAINER, INSINKERATOT FOOD WASTE DISPOSER 3/4 HP/120V/8.1A AVG, McGUIRE MODEL No. PW8089NCO 1-1/2" L.A PATTERN P-TRAP WITH PRE-WRAPPED TRAP AND SUPPLY COVERS, GALVANIZED NIPPLE TRAP ARM W/CHROMIUM PLATED BRASS CASING, & CHIGAGO "ECAST" MODEL No. 1017-ABCP LOOSE KEY STOPS WITH RIGID SUPPLY, CALIF. AB 1953 COMPLIANT. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMNTS.	
S-4	JUST	CRAADA1923AAS-J	SINGLE BOWL SINK								Stainless Steel 22" x 19-1/2" x 4-1/2" Single Bowl Drop-in Classroom ADA Sink w/Left and Right Faucet Decks	
SS-1	KOHLER	K-6710	SERVICE SINK - CORNER		3"	2"	3/4"	3/4"	FLOOR MOUNT	T&S BRASS B-0665-BSTR		
TP-1	MIFAB	MR-500	TRAP PRIMER, SINGLE DRAIN				1/2"				CALIF. AB 1953 COMPLIANT, 1/2" MALE NPT INLET AND 1/2" FEMALE NPT OUTLET & REMOVABLE FILTER SCREEN. INSTALL COMPLETE W/ WALL ACCESS PANEL, SHUT-OFF VALVE, & 1/2" TYPE "L" COPPER DRAIN LINE FROM TRAP SEAL PRIMER OUTLET TO RECEPTOR CONNECTION POINT.	
UR-1	KOHLER	K-4904	UR-1		24"	1 1/2"	3/4"		WALL MOUNT	SLOAN "ROYAL" MODEL No. 186-0.125	MIFAB MODEL No. MC-32 CARRIER.	
WC-1	KOHLER	K-4405	WATERCLOSET		4"	2"	1"		FLOOR MOUNT	SLOAN "ROYAL" MODEL No. 111-1.28 - MANUAL	(ADA COMPLIANT) - OLSONITE MODEL No. 95SSCT "STA-TITE" (AS MANUFACTURED BY BEMIS) WHITE ELONGATED OPEN FRONT SEAT LESS COVER W/ STAINLESS STEEL CHECK HINGE.	
WC-2	KOHLER	K-4405	WATERCLOSET		4"	2"	1"		FLOOR MOUNT	SLOAN "ROYAL" MODEL No. 111-1.28 - MANUAL	(ADA COMPLIANT) - OLSONITE MODEL No. 95SSCT "STA-TITE" (AS MANUFACTURED BY BEMIS) WHITE ELONGATED OPEN FRONT SEAT LESS COVER W/ STAINLESS STEEL CHECK HINGE.	
WC-3	KOHLER	K-4406	WATERCLOSET		4"	2"	1"		FLOOR MOUNT	SLOAN "ROYAL" MODEL No. 111-1.28 - MANUAL	(ELEM. ADA COMPLIANT) SLOAN MODEL No. F-190 2" OFFSET FLUSH TUBE, & OLSONITE MODEL No. 95SSCT "STA-TITE" (AS MANUFACTURED BY BEMIS) WHITE ELONGATED OPEN FRONT SEAT LESS COVER W/ STAINLESS STEEL CHECK HINGE. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMENTS.	
WC-4	KOHLER	K-4325	WATERCLOSET		4"	2"	1"		WALL MOUNT	SLOAN "ROYAL" MODEL No. 111-1.28 - MANUAL	(ELEM. ADA COMPLIANT) - SLOAN MODEL No. EL 154 TRANSFORMER 120 V/24 VAC 50 VA, (OPERATES UP TO 10 WATER CLOSET OR URINAL FLUSHOMETER VALVES, PROVIDE QUANTITIES AS REQUIRED INSTALLED IN WALL ACCESS PANEL), SLOAN MODEL No. F-190 2" OFFSET FLUSH TUBE, & OLSONITE MODEL No. 95SSCT "STA-TITE" (AS MANUFACTURED BY BEMIS) WHITE ELONGATED OPEN FRONT SEAT LESS COVER W/ STAINLESS STEEL CHECK HINGE. INSTALL IN ACCORDANCE WITH ADA ACCESSIBILITY REQUIREMENTS.	
WC-5	KOHLER	K-4325	WATERCLOSET		4"	2"	1"		WALL MOUNT	SLOAN "ROYAL" MODEL No. 111-1.28 - MANUAL	(ADA COMPLIANT) - OLSONITE MODEL No. 95SSCT "STA-TITE" (AS MANUFACTURED BY BEMIS) WHITE ELONGATED OPEN FRONT SEAT LESS COVER W/ STAINLESS STEEL CHECK HINGE.	
WHA-1	MIFAB	MWH-A	WATER HAMMER ARRESTOR								PISTON OPERATED WATER HAMMER ARRESTOR WITH HARD DRAWN SEAMLESS "K" COPPER BODY, RYTON PPS PISTON WITH DOUBLE O-RINGS AND CDA 360 BRASS M.P.T. CONNECTION.	

FAN COIL CONDENSATE PUMP PIPING | NTS | 20

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ERIK WILLIAM MAY
M53735
EXP. 6/30/2027
MECHANICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

PLUMBING SCHEDULES & DETAILS

2P6.00

ABBREVIATIONS

4S/DP	4" SQUARE BY 2 1/8" DEEP BOX
ACT	ACOUSTICAL CEILING TILE
ADA	AMERICAN WITH DISABILITIES ACT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AWG	AMERICAN WIRE GAUGE
AMP, A	AMPERE
AIC	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)
AF/AT	AMP FRAME, AMP TRIP
AHJ	AUTHORITY HAVING JURISDICTION
AS/AF	AMP SWITCH, AMP FUSE
ATS	AUTOMATIC TRANSFER SWITCH
AVG	AVERAGE
BDF	BUILDING DISTRIBUTION FRAME
BR	BRANCH
BLDG	BUILDING
CEC	CALIFORNIA ELECTRICAL CODE
CIRC., CKT	CIRCUIT
CB	CIRCUIT BREAKER
CSFD	COMBINATION SMOKE FIRE DAMPER
C	CONDUIT
CO	CONDUIT ONLY, COMPLETE WITH PULLSTRING
CONN	CONNECTED
CPT	CONTROL POWER TRANSFORMER
CLCB	CURRENT LIMITING CIRCUIT BREAKER
CLF	CURRENT LIMITING FUSE
CT	CURRENT TRANSFORMER
(D)	EXISTING TO BE DEMOLISHED
DIA	DIAMETER
DISC	DISCONNECT
DIST	DISTRIBUTION
EC	ELECTRICAL CONTRACTOR
EMS	ENERGY MANAGEMENT CONTROL SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NON-METALLIC TUBING
EWC	ELECTRIC WATER COLLER
EPO	EMERGENCY POWER OFF
E-O-L	END-OF-LINE CIRCUIT TERMINATOR
EF	EXHAUST FAN
E/G	EQUIPMENT GROUND (GREEN)
EP	EXPLOSION PROOF
(E)	EXISTING EQUIP TO REMAIN
(ER*)	EXISTING EQUIP TO BE RELOCATED (*CORRESPONDS TO NEW LOCATION)
FT or '	FEET
FA	FIRE ALARM
FLA	FULL LOAD AMPS
GRD	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GEC	GROUNDING ELECTRODE CONDUCTOR
JBOX	JUNCTION BOX
K	DEGREE KELVIN
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERES
KW	KILOWATT
KWH	KILOWATT HOUR
HACR	HEATING AIR CONDITIONING REFRIGERATION
HOA	HAND-OFF-AUTO
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
H, W, D, L	HEIGHT, WIDTH, DEPTH, LENGTH
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
IN or "	INCHES
I/G	OSOLATED GROUND
IDF	INTERMEDIATE DISTRIBUTION FRAME
LCL	LONG CONTINUOUS LOAD
LF	LINEAR FEET
LTG, LTS	LIGHTING
LPS	LOW PRESSURE SODIUM
MAX	MAXIMUM
MDF	MAIN DISTRIBUTION FRAME
MOCP	MAXIMUM OVERCURRENT PROTECTION
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
MC	MECHANICAL CONTRACTOR
M	METER
M/M	METER MAIN
MV	MERCURY VAPOR
MH	METAL HALIDE
MIN	MINIMUM
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MFR	MANUFACTURER
MTD	MOUNTED
MW	MICROWAVE
(N)	NEW
NATS	NON AUTOMATIC DISCONNECT
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
NF	NON-FUSED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NL	NIGHT LIGHT
NO or #	NUMBER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
%Z	PERCENT IMPEDANCE
PH or ~	PHASE
PC	PHOTOCELL
PC	PLUMBING CONTRACTOR
P	POWER
PVC	POLY VINYL CHLORIDE
PDU	POWER DISTRIBUTION UNIT
PRIMARY	OVER 600 VOLTS
PROVIDE	FURNISH, INSTALL AND CONNECT
PT	POTENTIAL TRANSFORMER
PA	PUBLIC ADDRESS
RE	REPLACE EXISTING (IN-PLACE)
REC, RECEPT	RECEPTACLE
REF	REFRIGERATOR
RGS	RIGID GALVANIZED STEEL
RMS	ROOT MEAN SQUARE
SCC	SHORT CIRCUIT CURRENT
SCS	STRUCTURED CABLING SYSTEM
SFD	SMOKE FIRE DAMPER
SECONDARY	600 VOLTS AND LESS
SMACNA	SHEET MTL & AIR COND. CONTRACTORS' NATIONAL ASSOC.
SPD	SURGE PROTECTION DEVICE
SQ	SQUARE
TC	TIMECLOCK
TEL/DATA	TELEPHONE AND DATA
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UGPS	UNDERGROUND PULL SECTION
UNO	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTABLE POWER SYSTEM
VAV	VARIABLE AIR VOLUME
V	VOLTS
VA	VOLT AMPERES
VD	VOLTAGE DROP
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
W	WIRE
XFMR	TRANSFORMER
XX	EXISTING EQUIP TO BE DEMO'D

FLOOR BOX / SPECIALTY WALL BOX SYMBOLS

- SINGLE SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE SPECIFICATIONS FOR MORE INFO.
- TWO SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE SPECIFICATIONS FOR MORE INFO.
- THREE SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE SPECIFICATIONS FOR MORE INFO.
- FOUR SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE SPECIFICATIONS FOR MORE INFO.
- SIX SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE SPECIFICATIONS FOR MORE INFO.

ANNOTATIONS

- AC-2 — MECHANICAL EQUIPMENT CALLOUT, "AC" INDICATES UNIT TYPE & "2" INDICATES UNIT NUMBER. REFER TO MECHANICAL DWG FOR EXACT LOCATION & ELECTRICAL REQ.
- 3 / E-1 — DETAIL CALLOUT, "3" INDICATES DETAIL NUMBER "E-1" INDICATES SHEET NUMBER.
- XXXXXXXX — FEEDER SIZE DESIGNATION
- XXX-X — LIGHTING FIXTURE DESIGNATION
- XXX — KEYNOTE REFERENCE, REFER TO NOTES ON SHEETS, OR AS DIRECTED
- 1 — REVISION REFERENCE
- WYE CONFIGURATION
- GROUND
- DELTA CONFIGURATION

BRANCH CIRCUIT SYMBOLS

- A-1,3,5 — HOME RUN TO PANEL, LETTER DESIGNATES PANEL, NUMBERS INDICATE CIRCUITS. PROVIDE DEDICATED NEUTRAL WIRE FOR EA 'HOT' CIRCUIT IN CONDUIT RUN, #12 AWG MIN UNO
- CONCEALED CONDUIT OR BRANCH CIRCUIT UNO, 1/2" CONDUIT MIN, (2) #12 AWG CONDUCTORS MIN
- CONCEALED CONDUIT OR BRANCH CIRCUIT ROUTED IN FLOOR SLAB OR CONCRETE. COORDINATE INSTALLATION W/ GENERAL CONTRACTOR & SUPPORT AS REQ 1/2" CONDUIT (2) #12 AWG CONDUCTORS MIN
- CONDUIT OR BRANCH CIRCUIT CONCEALED BELOW GRADE. 3/4" CONDUIT MIN W/ (2) 12 AWG CONDUCTORS MIN & A CODE SIZED EQUIPMENT GROUND
- SURFACE-MTD CONDUIT OR BRANCH CIRCUIT UNO. 1/2" CONDUIT MIN, (2) #12 AWG CONDUCTORS MIN. CONDUIT SHALL BE PAINTED TO MATCH ADJ SURFACE. COORDINATE COLOR W/ ARCHITECT INTERIORS
- CONDUIT STUB OUT, CAP, MARK & RECORD ON AS-BUILT DWG
- CONDUIT CONTINUATION
- FLEXIBLE CONNECTION AS REQ. NUMBER OF CONDUCTORS AS REQ, VERIFY CONNECTION REQ W/ MFR PRIOR TO ROUGH-IN
- CONDUIT/ BRANCH CIRCUIT/FEEDER CONTINUATION DOWN WALL TO FLOOR BELOW
- CONDUIT/ BRANCH CIRCUIT/FEEDER CONTINUATION UP WALL TO FLOOR ABOVE
- X — X — EXG FEEDER, CONDUIT, WIRE TO BE DEMOLISHED
- —LV— LOW VOLTAGE DUCTBANK BELOW GRADE
- —P— POWER DUCTBANK BELOW GRADE, SEE FEEDER TAG(s) FOR QUANTITY & SIZE OF CONDUIT & WIRE
- -12KV- MEDIUM - HIGH VOLTAGE DUCTBANK BELOW GRADE, W/ VOLTAGE INDICATED. SEE FEEDER TAG(s) FOR QTY & SIZE OF CONDUIT & WIRE
- FLUSH MTD, LOCKABLE TERMINAL CABINET W/ TERMINAL STRIPS AS REQ
- SURFACE MTD, LOCKABLE TERMINAL CABINET W/ TERMINAL STRIPS AS REQ

LIGHTING SYMBOLS

- DECORATIVE PENDANT
- STRIP LIGHT (B.O.H.)
- DECORATIVE SURFACE MOUNTED LIGHT.
- SURFACE MOUNTED WRAPAROUND.
- RECESSED LENSED TROFFER
- RECESSED ARCHITECTURAL TROFFER
- RECESSED LINEAR OR PERIMETER WALLSLOT.
- PENDANT MOUNTED LINEAR.
- RECESSED LINEAR WALLWASH.
- RECESSED DOWNLIGHT.
- RECESSED WALLWASHER.
- RECESSED ADJUSTABLE ACCENT LIGHT.
- SURFACE MOUNTED DOWNLIGHT.
- WALL MOUNTED FIXTURE.
- TRACK LIGHT.
- SURFACE MOUNTED ADJUSTABLE LINEAR WALLWASHER.
- CONCEALED LINEAR LIGHT STRIP.
- RECESSED MULTI-LAMP ADJUSTABLE DOWNLIGHT.
- WALL STEP LIGHT.
- BOLLARD LIGHT.
- ABOVE-GRADE MOUNTED ADJUSTABLE ACCENT LIGHT.
- POLE MOUNTED LIGHT.
- EXIT SIGN.
- SURFACE MOUNTED EMERGENCY BATTERY PACK.
- "EM" SHADED OR HALF-SHADED CONNECTION POINT INDICATES FIXUTRE ON EMERGENCY POWER.

LIGHTING CONTROLS

- xx / ab — WALL MTD OCCUPANCY SENSOR. MTG HEIGHT PER ADA - UNO OR REQ. "xx" INDICATES THE FOLLOWING:
  - IO: INFRARED OCCUPANCY SENSOR
  - UO: ULTRASONIC OCCUPANCY SENSOR
  - DO: DUAL TECHNOLOGY OCCUPANCY SENSOR.
  - P: PHOTOCELL
  - OP: COMBINATION PHOTOCELL & DUAL TECHNOLOGY OCCUPANCY SENSOR

  LETTERS "ab" INDICATE ZONES CONTROLLED.
- (xx) / ab — CLG MTD SENSOR. PROVIDE W/ POWER PACK & RELAYS FOR PLUG LOAD & HVAC CONTROL. LETTERS "ab" INDICATE ZONES CONTROLLED. "xx" INDICATES THE FOLLOWING:
  - OS: DUAL TECHNOLOGY OCCUPANCY SENSOR
  - P: PHOTOCELL
  - OP: COMBINATION PHOTOCELL AND DUAL TECHNOLOGY OCCUPANCY SENSOR.
- ab — WALL MTD COMBINATION OCCUPANCY SENSOR & DIMMER SWITCH, MTG HEIGHT PER ADA - UNO OR REQ. LETTERS "ab" INDICATE ZONES CONTROLLED.
- V / ab — WALL MTD COMBINATION VACANCY SENSOR & DIMMER SWITCH, MTG HEIGHT PER ADA - UNO OR REQ. LETTERS "ab" INDICATES ZONES CONTROLLED. BOTH SWITCH LEGS TO BE CONFIGURED IN A "MANUAL ON" CONFIGURATION.
- SZ — LOW VOLTAGE MANUAL ON/OFF & SINGLE ZONE DIMMING CONTROL.
- MS-# / ab — LOW VOLTAGE MANUAL ON/OFF, DIMMING & MULTI BUTTON SCENE SELECT CONTROL STATION. "#" DENOTES NUMBER OF SCENE. LETTERS "ab" INDICATE ZONES CONTROLLED.
- MZ-# / ab — LOW VOLTAGE MANUAL ON/OFF, DIMMING & MULTI BUTTON ZONE SELECT CONTROL STATION. "#" DENOTES NUMBER OF ZONES. LETTERS "ab" INDICATE ZONES CONTROLLED.
- $K — SINGLE POLE SWITCH, MTG HEIGHT PER ADA, SUBSCRIPT "K" INDICATES KEY OPERATED SWITCH.
- MANUAL ON/OFF, DIMMING & GRAPHIC SCENE SELECT CONTROL STATION.

POWER SYMBOLS

- DUPLEX RECEPTACLE - MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED. "C" INDICATES CONTROLLED RECEPTACLE. MUST BE WITHIN 6'-0" OF UNCONTROLLED RECEPTACLE PER TITLE 24 REQ.
- DOUBLE DUPLEX RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED.
- DUPLEX, GFCI RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED. WP INDICATES WEATHERPROOF, REFER TO THE GENERAL PRODUCT SPECIFICATIONS.
- DOUBLE DUPLEX, GFCI RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED. WP INDICATES WEATHERPROOF, REFER TO THE GENERAL PRODUCT SPECIFICATIONS.
- DEDICATED 20A DUPLEX RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED.
- DUPLEX RECEPTACLE WITH USB CONNECTORS - MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED.
- DOUBLE DUPLEX RECEPTACLE WITH USB CONNECTORS, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED.
- EMERGENCY DUPLEX RECEPTACLE - MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED. NOTE: TICK MARKS SHOWN ON ANY DEVICE REPRESENTS RECEPTACLE CONNECTED TO EMERGENCY CIRCUIT (RED DEVICE) TYPICAL FOR ANY DEVICE IN LEGEND.
- SIMPLEX RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED.
- SPECIAL RECEPTACLE, MTG HEIGHT PER ADA DETAIL 19/E7.01 OR AS NOTED. REFER TO PLAN NOTES.
- DUPLEX RECEPTACLE FLUSH IN CLG - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL.
- DOUBLE DUPLEX RECEPTACLE FLUSH IN CLG - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL.
- SIMPLEX RECEPTACLE FLUSH IN CLG - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL.
- SPECIAL RECEPTACLE FLUSH IN CLG - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL.
- DUPLEX RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ.
- DOUBLE DUPLEX RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ.
- DUPLEX, GFCI RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ. WP INDICATES WEATHERPROOF, REFER TO THE GENERAL PRODUCT SPECIFICATIONS.
- DOUBLE DUPLEX, GFCI RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ. WP INDICATES WEATHERPROOF, REFER TO THE GENERAL PRODUCT SPECIFICATIONS.
- SIMPLEX RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ.
- SPECIAL RECEPTACLE MTD ABOVE COUNTER, MTG HEIGHT PER ADA DETAIL 19/E7.01 - UNO OR REQ.
- WALL MOUNTED JUNCTION BOX. MTG HEIGHT AS NOTED. 4S/DP MIN OR AS REQ BY NEC.
- JUNCTION BOX, MTD IN ACCESSIBLE CLG FOR APPLICATION DENOTED ON PLAN. 4S/DP MIN OR AS REQ BY NEC.
- SURFACE MTD MULTI-OUTLET ASSEMBLY. REFER TO GENERAL PRODUCT SPECIFICATIONS. PROVIDE ALL COMPONENTS NECESSARY FOR A COMPLETE INSTALLATION.
- 3 — EXHAUST FAN, OR MOTOR LOAD. REFER TO MECHANICAL, PLUMBING OR KITCHEN DWG FOR SPECIFIC LOAD REQ OR AS NOTED.
- FLUSH MTD ELECTRICAL PANELBOARD OR LOAD CENTER. REFER TO PANEL SCHEDULE.
- SURFACE MTD ELECTRICAL PANELBOARD OR LOAD CENTER. REFER TO PANEL SCHEDULE.
- DISTRIBUTION SWITCHBOARD. REFER TO SINGLE LINE DIAGRAM.
- T — TRANSFORMER, REFER TO SINGLE LINE DIAGRAM.
- F — FUSED DISCONNECT SWITCH, HP RATED, OR COMBINATION MOTOR STARTER/DISCONNECT SWITCH W/ FUSES PER EQUIPMENT MFR & WEATHERPROOF AS REQ. PROVIDE FINAL CONNECTION TO UNIT EQUIPMENT. SEE MOTORIZED EQUIPMENT SCHEDULE FOR DISCONNECT & STARTER SIZES.
- MOTOR STARTER COMBINATION SWITCH W/ HOA SELECTOR SWITCH, ON "RUNNING LIGHT" RESET & OVERLOAD PROTECTION.
- NON-FUSED DISCONNECT SWITCH, HP RATED & WEATHERPROOF AS REQ. PROVIDE FINAL CONNECTION TO UNIT EQUIPMENT. SEE MOTORIZED EQUIPMENT SCHEDULE FOR DISCONNECT SIZES.
- M / CT — UTILITY COMPANY METER. PROVIDE "CT's" & "PT's" AS REQ, REFER TO SINGLE LINE DIAGRAM.
- 1 / 150AF 150AT 3P — CIRCUIT BREAKER, LINE 1 REPRESENTS FRAME SIZE/RATING; LINE 2 REPRESENTS TRIP SIZE/RATING; LINE 3 REPRESENTS NUMBER OF POLES & LINE 4 REPRESENTS MISC BREAKER INFO. (SEE BELOW):
  - SHUNT = PROVIDE SHUNT TRIP MECHANISM.
  - HACR = PROVIDE HACR-RATED BREAKER.
  - GFP = GROUND FAULT PROTECTION
  - CLCB = CURRENT LIMITING CIRCUIT BREAKER
  - SS = PROVIDE SOLID STATE CIRCUIT BREAKER

  FUSIBLE SWITCH: LINE 1 REPRESENTS SWITCH SIZE/RATING; LINE 2 REPRESENTS NUMBER OF POLES; LINE 3 REPRESENTS FUSE SIZE/RATING; LINE 4 REPRESENTS FUSE TYPE; LINE 5 REPRESENTS MISC FUSE INFO. (SEE BELOW):
  - SHUNT= PROVIDE SHUNT TRIP MECHANISM.
  - GFP = GROUND FAULT PROTECTION
  - CLF = CURRENT LIMITING FUSE
- 60AS 3P / 50AF CLASS J — FUSIBLE SWITCH: LINE 1 REPRESENTS SWITCH SIZE/RATING; LINE 2 REPRESENTS NUMBER OF POLES; LINE 3 REPRESENTS FUSE SIZE/RATING; LINE 4 REPRESENTS FUSE TYPE; LINE 5 REPRESENTS MISC FUSE INFO. (SEE BELOW):
  - SHUNT= PROVIDE SHUNT TRIP MECHANISM.
  - GFP = GROUND FAULT PROTECTION
  - CLF = CURRENT LIMITING FUSE
- GROUND CONNECTION, SIZE AS INDICATED OR AS REQ.
- T — LOW VOLTAGE TRANSFORMER
- PB OR P — PULLBOX, SIZED PER NEC OR AS NOTED.
- RECESSED COMBINATION POWER OUTLET FOR IN FLOOR BOX PER PLAN FOR FLEXIBLE CONNECTION TO FURNITURE SYSTEM. VERIFY CONNECTION REQ W/ MFR PRIOR TO ROUGH-IN - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL.

  POWER OUTLET OUTLET, MTG HEIGHT PER ADA DEVICE MT REQ. FOR FLEXIBLE CONNECTION TO FURNITURE SYSTEM PROVIDE THE FOLLOWING:
  - IN A NON-RATED INSULATED WALL, OR NON-RATED UNINSULATED WALL, PROVIDE A 2-GANG MUD RING OR CADDY #RBS SERIES BOX MTG BRACKET (EQUAL BY B-LINE OR RAYCO) W/ (2) 1-1/4"CO W/ PULL STRING TO ACCESSIBLE CLG. PROVIDE 1-1/4" BUSHINGS @ CONDUIT ENDS. REFER TO ARCHITECTURAL PLANS FOR WALL CONSTRUCTION/TYPE & CLG CONDITIONS.
  - IN A RATED WALL, PROVIDE (1) 4S/DP BOX W/ (2) 1-1/4" CO & (1) 4S/DP BOX W/ (1) 1-1/4" CO W/ PULL STRINGS IN EA CONDUIT TO ACCESSIBLE CLG. PROVIDE 1-1/4" BUSHINGS @ CONDUIT ENDS. UTILIZE CADDY #RBS SERIES BOX MTG BRACKET TO MAINTAIN BOX ALIGNMENT. (EQUAL BY B-LINE OR RAYCO) UTILIZE FIRESTOPPING SYSTEM PADS RATED FOR USE ON THE INSIDE OR OUTSIDE OF THE BOX (ST) OR EQ) AS REQ TO MAINTAIN RATING OF WALL OR MEMBRANE. REFER TO ARCHITECTURAL PLANS FOR WALL CONSTRUCTION/TYPE & CLG CONDITIONS.
- GROUND BUS BAR

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ALDO GERARDO BATTISTI — 62235 — 3/31/26 — ELECTRICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL LEGENDS

2E0.01

LIGHTING GENERAL NOTES

1. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION & ELEVATION OF ALL LIGHTING FIXTURES & ALL DEVICES. ALL WALL-MTD DEVICE HEIGHTS SHALL BE VERIFIED WITH THE ARCHITECT PRIOR TO ROUGH-IN. IF ANY WALL MTD FIXTURES ARE PLACED WITHOUT VERIFICATION FROM THE ARCHITECT, CONTRACTOR SHALL RELOCATE FIXTURE TO APPROVED LOCATION AT NO ADDITIONAL COST.
2. VERIFY EXACT CLG CONSTRUCTION W/ ARCHITECTURAL REFLECTED CLG PLAN & PROVIDE LIGHTING FIXTURES W/ ALL NECESSARY MTG HARDWARE.
3. ALL RECESSED FIXTURES SHALL BE PROVIDED W/ ALL REQ STRUCTURAL SUPPORTS AS REQ BY THE CURRENTLY ADOPTED ISSUE OF THE CALIFORNIA BUILDING CODE, AS WELL AS ANY LOCAL CODES.
4. ALL COVE MTD FIXTURES SHALL EXTEND THE FULL LENGTH OF THE COVE. CONTRACTOR TO FIELD MEASURE COVE LENGTH & ORDER QTY OF FIXTURES AS REQ.
5. ALL DIMMING BRANCH CIRCUITS SHALL BE PROVIDED W/ A DEDICATED NEUTRAL CONDUCTOR FOR EACH ZONE/CHANNEL.
6. REFER TO ARCHITECTURAL REFLECTED CLG PLANS FOR EXIT SIGN CHEVRONS & NUMBER OF FACES PER EXIT SIGN.AND/ANY DISCREPANCIES BETWEEN EXIT SIGNS SHOWN ON THE ELECTRICAL & ARCHITECTURAL PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO ORDERING EXIT SIGNS.
7. WHEN EXPOSED CLG OR OPEN GRID CONDITIONS OCCUR, THE CONTRACTOR WILL NEED TO PROVIDE THE FOLLOWING ITEMS:
   A. ALL BRANCH CIRCUITS SHALL BE IN EMT.
   B. ALL BRANCH CIRCUITS SHALL BE ROUTED NEATLY TRAINED & IN PARALLEL TO STRUCTURES OR DUCT WORK. THE TERM "TRAINED" MEANS ALL PARALLEL CONDUITS SHALL MAINTAIN THE SAME SPATIAL RELATIONSHIP W/ EA OTHER FOR ENTIRE RUN TO INCLUDE RADIUS BENDS & SWEEPS.
   C. VISUALLY OBJECTIONABLE BRANCH CIRCUITS WILL BE REROUTED AT THE REQUEST OF THE ARCHITECT AT NO ADDL COST.
   D. SHOP DWG SHOWING LOCATION & PLACEMENT OF ALL CONDUITS.
8. RECESSED FIXTURES LOCATED IN A FIRE-RATED CLG OR WALL SHALL BE PROVIDED WITH A 5-SIDED RATED ENCLOSURE SO CONSTRUCTED AS TO ALLOW CODE & MFR-REQ CLEARANCES BETWEEN THE FIXTURE & THE ENCLOSURE.
9. REFER TO GENERAL POWER PLAN NOTES & COMMUNICATIONS PATHWAYS GENERAL NOTES FOR ADDITIONAL REQ WHEN POWER AND/OR DATA DEVICES ARE SHOWN ON THIS PLAN.
10. CONTRACTOR TO INCLUDE AN ALLOWANCE TO CORE & SEAL PENETRATIONS THROUGH STRUCTURAL CONCRETE WALLS. COORDINATE LOCATIONS & REQ W/ ARCHITECTURAL & STRUCTURAL DWGS.
11. COORDINATE ALL PENETRATIONS W/ STRUCTURAL PLANS & DETAILS. NO PENETRATIONS ARE PERMITTED UNLESS SPECIFICALLY NOTED ON STRUCTURAL DWGS.

POWER GENERAL NOTES

1. ALL RECEPTACLES ON COMMON WALLS SHALL BE SEPARATE BOXES & OFFSET 24" MIN.
2. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE PROTECTED FROM THE SPREAD OF FIRE W/ AN APPROVED FIRESTOP SYSTEM EQ OR GREATER THAN THE FIRE RATING OF THE WALL.
3. COORDINATE ALL MTG DIMENSIONS FOR ELECTRICAL DEVICES & SWITCHES W/ ARCHITECTURAL INT ELEVATIONS PRIOR TO ROUGH-IN.
4. ALL FURNITURE FEED LOCATIONS TO BE VERIFIED W/ ARCHITECT & FURNITURE VENDOR PRIOR TO ROUGH IN..
5. ALL FURNITURE WHIPS SHALL BE TRIMMED TO REDUCE EXCESS WHIP LENGTH
6. WHEN EXPOSED CLG OR OPEN GRID CONDITIONS OCCUR, THE CONTRACTOR WILL NEED TO PROVIDE THE FOLLOWING ITEMS:
   A. ALL BRANCH CIRCUITS SHALL BE IN EMT.
   B. ALL BRANCH CIRCUITS SHALL BE ROUTED NEATLY & IN PARALLEL TO STRUCTURES OR DUCT WORK.
   C. VISUALLY OBJECTIONABLE BRANCH CIRCUITS WILL BE REROUTED AT THE REQUEST OF THE ARCHITECT @ NO ADDITIONAL COST.
7. EXPOSED CABLE/CONDUCTORS INSTALLED IN A PLENUM SPACE SHALL CONFORM TO CEC WHERE ADOPTED, ARTICLE 300.22(C.
8. PROVIDE GFCI TYPE RECEPTACLE(S) WITHIN 6 FT OF ANY SINK.
9. CONTRACTOR TO INCLUDE AN ALLOWANCE TO CORE & SEAL PENETRATIONS THROUGH STRUCTURAL CONCRETE WALLS. COORDINATE LOCATIONS & REQ W/ ARCHITECTURAL & STRUCTURAL DWG.
10. COORDINATE ALL PENETRATIONS W/ STRUCTURAL PLANS & DETAILS. NO PENETRATIONS ARE PERMITTED UNLESS SPECIFICALLY NOTED ON STRUCTURAL DWG.
11. COORDINATE ALL KITCHEN CONDUIT & EQUIPMENT ROUGH-IN ON KITCHEN DWG

ROOF GENERAL NOTES

1. ELECTRICAL CONTRACTOR SHALL REFER TO MECHANICAL/PLUMBING & ARCHITECTURAL DWG FOR EXACT LOCATIONS & CHARACTERISTICS OF ALL EQUIPMENT LISTED IN SCHEDULE. ANY MODIFICATIONS AND/OR ADDITIONAL WORK NECESSARY SHALL BE INCLUDED IN THE BASE BID.
2. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL CONNECTION POINTS W/ THE EQUIPMENT INSTALLER PRIOR TO ROUGH-IN.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE LOCAL REMOTE DISCONNECTING MEANS FOR ALL ELECTRIC HEATING EQUIPMENT IF REQ BY THE LOCAL ELECTRICAL CODE.
4. ELECTRICAL CONTRACTOR SHALL COORDINATE THE ROUTING OF CONDUIT/WIRING TO ROOF-MTD EQUIPMENT W/ EQUIPMENT INSTALLER PRIOR TO ROUGH-IN. WHERE ROOF-MTD EQUIPMENT IS MFR TO BE FED FROM WITHIN MECHANICAL CURB ASSEMBLY - SEPARATE ROOF PENETRATIONS FOR WIRING CONNECTIONS SHALL NOT BE PERMITTED. ALL WIRING SHALL BE BELOW THE ROOF IN AN ACCESSIBLE CLG SPACE LOCATION.
5. ALL ROOF MTD EQUIPMENT SHALL BE NEMA 3R RATED.

MEP SYSTEMS COMPONENT ANCHORAGE & BRACING NOTES

MEP DISTRIBUTION SYSTEM BRACING NOTE FOR PIPING, DUCT WORK, AND ELECTRICAL CONDUIT

1. ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQS PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 & 30:
   A. ALL PERMANENT EQUIPMENT AND COMPONENTS.
   B. TEMPORARY, MOVEABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
   C. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 LBS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.
2. THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:
   A. COMPONENTS WEIGHING LESS THAN 400 LBS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
   B. COMPONENTS WEIGHING LESS THAN 20 LBS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 LBS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.
3. THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE W/ ABOVE REQ.

MEP DISTRIBUTION SYSTEM BRACING NOTE FOR PIPING, DUCTWORK, AND ELECTRICAL CONDUIT

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7 SECTION 13.3 AS DEFINED IN ASCE 7 SECTIONS 13.6.5, 13.6.6, 13.6.7, AND 13.6.8; AND 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. THE MEP DESIGN PROFESSIONAL ENGINEER RESPONSIBLE FOR CONTENT ON THESE SHEETS HAS VERIFIED THAT THE DESIGN METHODS IDENTIFIED BELOW ARE IN ACCORDANCE WITH DSA IR 16-13.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP	MD	PP	E	
☐	☐	☐	■	OPTION 1: PROJECT-SPECIFIC DESIGN.
☐	☐	☐	☐	OPTION 2: DESIGN BASED ON OSHPD OPM, WITHIN PROJECT SUBMITTAL.
☐	☐	☐	☐	OPTION 3: DESIGN BASED ON OSHPD OPM, DEFERRED SUBMITTAL.

SITE UTILITY PLAN GENERAL NOTES

THESE NOTES ESTABLISH MIN QUALITY LEVELS & COORDINATION REQ. RESPECTIVE UTILITY COMPANY PLANS & REQ TAKE PRECEDENCE OVER THESE NOTES WITH REGARD TO RESPECTIVE UTILITY COMPANY CONDUIT & UNDERGROUND STRUCTURE SYSTEMS.

1. CALL UNDERGROUND SERVICE ALERT (USA) AT 1 (800) 422-4133 OR APPLICABLE STATE & LOCAL DIG SAFE OR UNDERGROUND ALERT HOTLINES PRIOR TO CONSTRUCTION START.
2. COORDINATE ALL UNDERGROUND STRUCTURES & CONDUIT ROUTING W/ LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CRITICAL LANDSCAPE PLANTING/HARDSCAPE AREAS.
3. VAULTS, MAINTENANCE HOLES (MH's) & CONDUITS SHALL MAINTAIN A MIN COVER OF 24" BELOW FINAL SURFACE @ ALL CONDITIONS. INCLUDE ALL COSTS IN BASE BID TO MEET UTILITY COMPANY REQ WHICH MAY REQ GREATER MIN CONDUIT DEPTHS.
4. VAULTS, MH's & PULLBOXES (PB's) SHALL BE EQUIPPED WITH KNOCKOUT PANELS OR PRE-CAST INDIVIDUAL CONDUIT OPENINGS. CONDUITS SHALL ONLY ENTER & EXIT ON END/SHORT WALLS. CONDUITS MAY NOT ENTER & EXIT ON SIDE/LONG WALLS, CLG OR FLOORS UNO.
5. CUT DUCTS FLUSH W/ INTERIOR VAULT/MH/PB WALL.
6. GROUT AROUND DUCT ENTRANCES ON VAULT/MH/PB WALLS.
7. SLURRY BACKFILL AROUND DUCTS WITHIN 5 FT OF VAULT/MH/PB TO PREVENT SHEARING.
8. CONDUITS PASSING UNDER THE BUILDING PERIMETER SHALL BE ENCASED IN LIGHTWEIGHT CONCRETE OR WATER-IMPERVIOUS CLAY TO PREVENT WATER INFILTRATION. SEE ELECTRICAL SPECIFICATIONS FOR ADDL INFO.
9. CONDUIT BEND RADIUS FOR BUILDING ENTRANCES & AT POLES SHALL BE A MIN OF 24" FOR CONDUITS W/ LESS THAN 2" INTERNAL DIA AND A MIN OF 48" FOR CONDUITS W/ MORE THAN 2" INTERNAL DIA.
10. PREFERRED CONDUIT SWEEP RADIUS BETWEEN VAULTS IS 25 FT. UNDER NO CIRCUMSTANCES SHALL THE CONDUIT SWEEP RADIUS BE LESS THAN 12.5 FT. MAX OF 90° PER SWEEP & LIMITED TO NO MORE THAN (2) 90° WEEPS BETWEEN VAULTS.
11. VAULTS/MH's/PB's ARE TO BE EQUIPPED W/ RACKING, GROUNDING LUGS, & BOLT-DOWN LIDS UNO.
12. VAULTS & MH's TO BE EQUIPPED W/ ROUND COVERS, EXTENSION RINGS AS REQ, LADDERS & (3) SEGMENTS OF 6 FT HIGH CABLE RACKING PER EA LONG WALL.
13. LABEL ALL NON-UTILITY COMMUNICATION VAULT/MH/PB COVERS W/ "COMMUNICATIONS" UNO ON PLANS.
14. COORDINATE FINAL VAULT/MH/PB OPENING HEIGHT W/ GC PRIOR TO ROUGH-IN TO ENSURE FINAL GRADE DOES NOT SLOPE INTO VAULT/MH/PB OPENING.
15. CONTRACTOR TO PROVIDE A MIN OF 8" DEEP COMPACTED 1/2" DIA GRAVEL, UNDER ALL VAULTS, MH's OR PB's TO ENSURE UNIFORM DISTRIBUTION OF SOIL PRESSURE ON THE FLOOR & BE ABLE TO DISSIPATE WATER OUT OF THE VAULT, MH OR PB.
16. ALL VAULTS/MH's/PB's W/O GROUNDING LUGS SHALL HAVE AN 8' x 3/4" COPPER GROUND ROD DRIVEN THRU THE FLOOR TO ALLOW GROUNDING OF ITEMS WITHIN.
17. ALL VAULTS/MH's/PB's SHALL BE PROVIDED W/ TRAFFIC RATED COVERS WHEN LOCATED IN PAVED AREAS UTILIZED FOR VEHICLE TRAFFIC.
18. IF THE WATER OR MOISTURE BARRIER ON OR NEAR THE FOUNDATION OF A BUILDING IS DISTURBED IN ANY MANNER BY EXCAVATION OR OTHER CONSTRUCTION WORK. THE MOISTURE BARRIER MUST BE REPAIRED FOLLOWING THE RECOMMENDATIONS OF THE MFR OF THE ORIGINAL BARRIER PRODUCT.
19. THE CONTRACTOR SHALL INCLUDE IN BASE BID ALL COSTS TO COMPLY WITH ALL REQ FOR CONFINED SPACE ENTRY PER THE OSHA REQ 29 CFR-1910.146, 29 CFR-1910.268, ETC DURING ANY CONFINED SPACE ENTRY.
20. ANY DUCTS LEAVING A VAULT, MH OR PB ROUTED INTO A FACILITY SHALL BE PLUGGED AT EA END USING REMOVEABLE MECHANICAL PLUGS DESIGNED TO PREVENT WATER & GAS FROM ENTERING THE FACILITY.
21. SEE ELECTRICAL SPECIFICATIONS & PLAN DETAILS FOR ADDL REQ REGARDING UNDERGROUND CONDUITS & IN-GRADE VAULT/MH/PB/JUNCTION BOXES.
22. INSTALL MULE TAPE OR 3/8" PULL ROPE & TRUE-TAPE IN EA UTILITY CONDUIT.

DEMOLITION NOTES

1. THE ELECTRICAL DWG ARE DIAGRAMMATIC ONLY. DO NOT SCALE THE ELECTRICAL DWG TO DETERMINE THE LOCATION OF EQUIPMENT OR OUTLETS. SEE ARCHITECTURAL PLANS, WHERE PROVIDED ON PROJECT, FOR EXTENT OF DEMOLITION.
2. THE EXG CONDITIONS SHOWN ARE FROM AVAILABLE RECORD DWGS & SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY ACTUAL EXG CONDITIONS @ SITE PRIOR TO SUBMITTING BID. ALL DEMOLITION, ALTERATION, EXTENSION, RELOCATION, REHABILITATION WORK SHALL BE INCLUDED IN CONTRACT. NO ADDITIONAL ALLOWANCE OR CHANGE ORDERS WILL BE ACCEPTED.
3. CONTRACTOR IS RESPONSIBLE TO RELOCATE OR REMOVE FROM WALLS, CLGS, FLOOR SPACES, ETC. ANY EXG CONDUITS, WIRES, BOXES, FITTINGS, FIXTURES OR OTHER ELECTRICAL EQUIPMENT WHICH INTERFERES WITH PLANNED REMODEL WORK. PROVIDE CIRCUIT CONTINUATION REQ FOR ALL EXG OUTLETS, FIXTURES, EQUIPMENT, ETC SCHEDULED TO REMAIN.
4. NOTIFY THE ENGINEER IMMEDIATELY WHEREVER EXG EQUIPMENT IS ENCOUNTERED WHICH MUST BE RELOCATED DUE TO THE NEW CONSTRUCTION, OR NOT INDICATED ON "AS-BUILT" DWGS OR WAS BURIED UNDERGROUND OR EMBEDDED IN STRUCTURE WALLS.
5. CAREFULLY PROTECT ALL WALLS, TRIM, FLOORS, EQUIPMENT, UTILITY LINES & MATERIALS. WHEN WORKING ON FINISHED SURFACES, LIMIT DAMAGE TO THE SMALLER AREA IF POSSIBLE & RESTORE TO THE ORIGINAL CONDITION ALL SURFACES WHICH ARE DAMAGED BECAUSE OF THE INSTALLATION OF THIS WORK.
6. EQUIPMENT, MATERIALS & SUPPLIES TEMPORARILY REMOVED FOR PROTECTION SHALL BE REPLACED IN ORIGINAL LOCATIONS. ANY MATERIALS DAMAGED SHALL BE REPLACED WITH NEW MATERIALS OF LIKE KIND & QUALITY.
7. DEMOLITION WORK SHALL BE DONE IN A MANNER WHICH WILL NOT CAUSE UNNECESSARY INCONVENIENCE OR DANGER TO USERS OF THE PREMISES & ADJACENT SITE, & NOT INTERFERE WITH ITS OPERATION. ANY DEMOLITION WORK TO BE PERFORMED MUST BE PLANNED IN ADVANCE.
8. DO ALL DRILLING, CUTTING, ETC REQ TO DEMOLISH ELECTRICAL WORK AS INDICATED OR PROVIDE BLANK COVER PLATE ON ALL OUTLETS EXPOSED BY REMOVAL OF FIXTURE OF DEVICES.
9. RESEAL ALL PENETRATIONS OR OPENING THROUGH WALLS, CLG, FLOORS, ETC, TO MAINTAIN THE RATING OF STRUCTURE.
10. CONTRACTOR SHALL VERIFY EXG CONDUIT/CONDUCTOR RUNS ON CIVIL DEMOLITION PLAN, SHEET C1.01. REUSE AS REQ & REMOVE ALL UNUSED CONDUIT/CONDUCTORS. REMOVE CONDUIT BACK TO SCOPE OF WORK LIMIT LINE. AT EACH END OF FEEDER, TAG & LABEL CONDUIT. DOCUMENT DETAILED DIMENSIONS ON AS-BUILTS. REMOVE CONDUCTORS BACK TO SOURCE (VERIFY WITH OWNER). UNUSED CONDUIT IN INACCESSIBLE LOCATIONS (WALLS TO REMAIN) CAN BE ABANDONED IN PLACE.
11. CONTRACTOR SHALL FIELD VERIFY EXG CONDUIT/WIRING RUNS, REUSE AS REQ & REMOVED ALL UNUSED CONDUIT/WIRING. UNUSED CONDUIT IN INACCESSIBLE LOCATIONS (WALLS TO REMAIN) CAN BE ABANDONED IN PLACE. REMOVE UNUSED WIRING.
12. CONTRACTOR TO VERIFY CIRCUIT NUMBER & LOADS FOR ALL EXG EQUIPMENT PRIOR TO INSTALLATION OF NEW OR RELOCATED ELECTRICAL EQUIPMENT. REASSIGN CIRCUITS & LOADS ACCORDINGLY. PROVIDE COMPLETE "AS BUILT" DWGS & TYPEWRITTEN DIRECTORIES FOR PANELS.
13. WHERE NECESSARY TO SHUT OFF UTILITY SERVICES OR CAUSE INTERRUPTION TO POWER OR SIGNAL SYSTEMS WHILE A BUILDING IS OCCUPIED OR THAT EFFECT ADJACENT BUILDINGS, SCHEDULE OUTAGES OR INTERRUPTIONS WITH THE OWNER, BUILDING OCCUPANTS AND/OR ADJACENT BUILDING OWNER(S) & OCCUPANTS PRIOR TO CONDUCTING OUTAGE(S) OR INTERRUPTIONS.

GENERAL NOTES

1. THE ELECTRICAL CONTRACTOR (EC) SHALL INCLUDE & PROVIDE IN BID ALL LABOR & MATERIALS NECESSARY FOR A COMPLETE & OPERATIONAL INSTALLATION OF ALL ELECTRICAL SYSTEMS.
2. EC SHALL COORDINATE & OBTAIN ALL APPROVALS, PERMITS, & DOCUMENTS FROM REGULATORY AGENCIES & UTILITY COMPANIES.
3. ALL CONDUIT RACEWAY SYSTEMS ARE TO BE INSTALLED AS FOLLOWS:
   A. RIGID GALVANIZED STEEL IS TO BE INSTALLED IN ALL AREAS WHICH ARE EXPOSED TO WEATHER AND/OR PHYSICAL DAMAGE.
   B. FLEXIBLE METALLIC CONDUIT I S PERMITTED FOR SHORT CONNECTIONS TO LIGHT FIXTURES (6'-0" MAX).
   C. FLEXIBLE CONDUIT SHALL ALSO BE INSTALLED FOR EQUIPMENT REQ VIBRATION ISOLATION & HORIZONTAL RUNS IN WOODEN STUD WALLS. ELECTRICAL METALLIC TUBING (EMT) W/ COMPRESSION TYPE FITTINGS SHALL BE USED FOR BUILDING INTERIOR WORK.
   D. PVC CONDUIT SHALL BE USED FOR UNDERGROUND CONDUITS. ROUTE CODE SIZED GROUND WIRE INSIDE OF CONDUIT. CONDUIT RISERS & STUBS ABOVE GRADE SHALL BE IMC WITH HALF-LAPPED TAPE COVERING OR PVC COATING & UTILITY COMPANIES.
4. UNO OR REFERENCED ON THE DWG ALL NEW ELECTRICAL WIRING IS TO BE 600V RATED COPPER W/ TYPE "THHN/THWN" INSULATION.
5. ALL MTG HEIGHTS REFERENCED ON DWG ARE MEASURED FROM FINISHED FLOOR UNLESS OTHERWISE REFERENCED OR INDICATED ON THE DRAWINGS.
6. ALL ELECTRICAL EQUIPMENT LOCATIONS (LIGHTING, RECEPTACLE, FLOOR BOX, ETC) ARE TO BE VERIFIED WITH THE ARCHITECT AND/OR EQUIPMENT SUPPLIER PRIOR TO BEGINNING ANY ROUGH-IN.
7. ALL LIGHTING FIXTURES SHALL BE MTD & SUPPORTED IN ACCORDANCE W/ OSHA STANDARDS, & ALL STATE, LOCAL, SEISMIC, & CALIFORNIA ELECTRIC CODES.
8. THE DWG INCLUDED IN THIS DOCUMENT SET ARE DIAGRAMMATIC. THEY ARE REPRESENTATIVE OF THE ENGINEER OF RECORDS DESIGN INTENT FOR ALL ELECTRICAL DEVICES/EQUIPMENT & THE INDIVIDUAL POWER FEEDS THEY ARE TO BE CONNECTED TO. THE SELECTED EC SHALL BE RESPONSIBLE FOR PROVIDING ALL J-BOXES, CONDUIT, WIRING/CABLING, ETC AS REQ FOR A COMPLETE & OPERATIONAL ELECTRICAL INSTALLATION.
9. ALL ELECTRICAL EQUIPMENT (PANELS, RECEPTACLES, J-BOXES, ETC.) SHALL BE WEATHERPROOF AND/OR INSTALLED IN A NEMA 3R ENCLOSURE WHERE APPLICABLE OR INSTALLED OUTDOORS.
10. ALL ELECTRICAL WORK SHALL BE PERFORMED ACCORDING TO STATE, LOCAL, NATIONAL, & DISTRICT STANDARDS & CODES. COORDINATE SPECIFIC REQ W/ DISTRICT STANDARDS & AUTHORITY HAVING JURISDICTION.
11. ALL ELECTRICAL EQUIPMENT SHALL BE NEW & IS TO BE CLEARLY LABELED/IDENTIFIED AS UNDERWRITER LABORATORIES (UL) COMPLIANT UNO OR REFERENCED IN THE DWG OR SPECIFICATIONS.
12. EC IS RESPONSIBLE FOR SECURING ALL REQ BUILDING PERMITS & SHALL INCLUDE THE COST TO SECURE BUILDING PERMITS IN THEIR FINAL BID.
13. UNLESS OTHERWISE WRITTEN, STATED, OR REFERENCED IN DWG OR SPECIFICATIONS CONTRACTOR SHALL GUARANTEE THE COMPLETE ELECTRICAL INSTALLATION FOR A PERIOD OF 1-YEAR.
14. ALL ELECTRICAL DISTRIBUTION EQUIPMENT (PANELS, DISTRIBUTION BOARDS, TRANSFORMERS, ETC), FEEDERS (CONDUIT, CONDUCTOR SIZE, & QUANTITY), MECHANICAL EQUIPMENT, ELEVATORS, VARIABLE FREQUENCY DRIVES (VFD'S), ETC. MAY ONLY BE REFERENCED ON THE SINGLE-LINE DWG & NOT INDIVIDUAL PLAN SHEETS. EC SHALL REVIEW & VERIFY ALL REFERENCED INFORMATION ON THE SINGLE-LINE DWG.
15. EC SHALL BE RESPONSIBLE FOR ALL REQ SAW-CUTTING, CORE DRILLING, PATCHING, REFINISHING, ETC AS REQ FOR INSTALLATION OF ELECTRICAL EQUIPMENT & SYSTEMS. ANY PENETRATIONS OR OPENINGS MADE IN WALLS OR STRUCTURES SHALL BE PATCHED AND/OR SEALED AS REQ TO MAINTAIN THE INTEGRITY AND/OR RATING OF THE WALL OR STRUCTURE.
16. EC SHALL VISIT THE SITE PRIOR TO SUBMISSION OF THEIR FINAL BID TO VERIFY ALL EXG SITE CONDITIONS WHICH MAY AFFECT THE COMPLETION OF THE ELECTRICAL INSTALLATION. ALL METHODS & REQUIREMENTS FOR INSTALLATION SHALL BE DETERMINED PRIOR TO BID DATE. ELECTRICAL EC SHALL NOTIFY THE ENGINEER OF RECORD OF ANY REQ MODIFICATIONS WHICH ARE NOT REFERENCED ON THESE ELECTRICAL PLANS. SUBMITTAL OF THE EC'S BID DEMONSTRATES THE CONTRACTOR'S AWARENESS OF ALL SITE CONDITIONS & REQ WORK TO BE PERFORMED.
17. ALL CLGS & CLG SYSTEMS AS A RULE ARE CONSIDERED TO BE INACCESSIBLE. ALL ELECTRICAL DEVICES & EQUIPMENT INSTALLED ABOVE CLGS ARE TO BE MTD IN A LOCATION WHICH IS ACCESSIBLE. IN SITUATIONS WHERE ELECTRICAL DEVICES & EQUIPMENT MUST BE INSTALLED IN AN AREA WHICH IS INACCESSIBLE, EC SHALL INSTALL AN ADEQUATELY SIZED, CODE COMPLIANT ACCESS PANEL AS REQ BY CURRENT CODES - LOCATION OF THE REQ ACCESS PANEL SHALL BE COORDINATE W/ THE ARCHITECT & INTERIOR DESIGNER PRIOR TO ROUGH-IN.
18. EC IS RESPONSIBLE FOR COMPLETING ALL FINAL ELECTRICAL CONNECTIONS TO OWNER FURNISHED EQUIPMENT & SHALL PROVIDE ALL MOTOR START SWITCHES, DISCONNECTS, ETC AS REQ.
19. ALL ELECTRICAL EQUIPMENT CONNECTIONS, MOUNTING LOCATIONS, ELECTRICAL REQUIREMENTS, ETC ARE TO BE COORDINATED & VERIFIED PRIOR TO COMMENCEMENT OF ELECTRICAL ROUGH-IN.
20. EC TO SUBMIT SHOP DWG FOR THE APPROVAL OF THE ELECTRICAL ENGINEER OF RECORD FOR ALL ELECTRICAL EQUIPMENT & MATERIALS TO BE UTILIZED IN THE ELECTRICAL INSTALLATION. ALL APPROVALS BY THE ENGINEER OF RECORD MUST BE SECURED PRIOR TO COMPLETION OF ANY PURCHASE ORDERS OR ROUGH-IN WORK.
21. THESE ELECTRICAL DWG & ASSOCIATED SPECIFICATIONS ARE TO BE CONSIDERED CONTRACT DOCUMENTS FOR AGENCY REVIEW/APPROVAL & EC BIDDING PURPOSES.
22. THE COMPLETE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH CEC ARTICLE 250. ALL POWER & LIGHTING CIRCUITS SHALL BE INSTALLED WITH A MIN #12AWG CU GROUND WIRE UNO OR REFERENCED.
23. EC TO PROVIDE ENGRAVED PHENOLIC NAMEPLATES ON ALL DISCONNECT SWITCHES, DISTRIBUTION EQUIPMENT, J-BOXES ETC. W/ METALLIC COVERS. SEE GENERAL NOTES ON SINGLE-LINE DIAGRAM FOR SPECIFIC INFORMATION REGARDING NAME PLATE REQ.
24. ELECTRICAL & LIGHTING COVER PLATE COLOR, ENGRAVING & LABELING PER SPECIFICATIONS.
25. AT THE COMPLETION OF THE PROJECT THE EC SHALL PROVIDE THE OWNER WITH A COMPLETE SET OF AS-BUILT ELECTRICAL DWG.
26. ANY & ALL WORK THAT REQ AN INTERRUPTION TO A BUILDING(S) ELECTRICAL SERVICE MUST BE COORDINATED W/ THE DISTRICT A MIN OF 48 HOURS IN ADVANCE. ANY SERVICE DOWNTOWN SHALL NOT OCCUR DURING SCHOOL HOURS.
27. EC SHALL BE RESPONSIBLE FOR FOR ENSURING THAT ALL LOW VOLTAGE SYSTEMS ARE COMPATIBLE & ARE COMPLETE & OPERATIONAL.
28. EC SHALL PERMANENTLY TAG ALL CONDUCTORS IN EA ELECTRICAL & LOW VOLTAGE SYSTEM AS REFERENCED IN THE SPECIFICATIONS.
29. ANY SURFACE MTD EXPOSED CONDUIT IN VIEW OF THE PUBLIC SHALL BE PAINTED TO MATCH THE FINISH OF THE SURFACE TO WHICH IT IS MTD WITH TWO (2) COATS OF PAINT. ALL EXT SURFACE MTD EXPOSED CONDUITS ARE TO BE PAINTED W/ TWO (2) COATS OF WEATHERPROOF LATEX PAINT.
30. EC TO PROVIDE ALL CONDUIT ONLY (CO) INFRASTRUCTURE WITH A 3/16" NYLON PULL ROPE. LABEL PULL ROPE AT EACH END W/ THE LOCATIONS OF ORIGIN & TERMINATION.
31. IN INSTANCES WHERE A CONFLICT BETWEEN THE ELECTRICAL DWG & THE SPECIFICATIONS FOR THE PROJECT EXISTS, THE EC SHALL ADHERE TO THE MORE STRINGENT REQ.
32. ELECTRICAL DWG ARE DIAGRAMMATIC. AS SUCH, ALL ELECTRICAL EQUIPMENT LOCATIONS, CONDUIT ROUTING, ETC ARE NOT PRECISE & SHALL BE COORDINATED, VERIFIED, & DETERMINED IN THE FIELD. EC TO INSTALL ALL ELECTRICAL EQUIPMENT & ROUTE ALL CONDUITS IN LOCATIONS WHICH MEET CODE REQ FOR ACCESSIBILITY/MOUNTING & DO NOT INTERFERE W/ ANY BUILDING STRUCTURES, UTILITIES, OR OTHER TRADE EQUIPMENT.
33. ALL EXG SITE RELATED ELECTRICAL EQUIPMENT (I.E. UNDERGROUND UTILITIES, DUCTS, STRUCTURES, PULL BOXES, ETC.) LOCATIONS ARE DIAGRAMMATIC IN NATURE & ONLY REFLECT APPROXIMATE LOCATIONS, QUANTITIES, &/OR ROUTING INFORMATION. ALL REFERENCED INFO HAS EITHER BEEN SURVEYED, REPORTED BY THE OWNER/OWNERS REP, AND/OR REFERENCED ON AN AS-BUILT RECORD DOCUMENTS. ALL EXG ELECTRICAL EQUIPMENT REFERENCED ON THESE DWG IS TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF BY ACCEPTING THESE PLANS OR PROCEEDING WITH ELECTRICAL SCOPE OF WORK, AGREES TO ACCEPT LIABILITY & SHALL RENDER THE ENGINEER OF RECORD HARMLESS FOR ANY ELECTRICAL EQUIPMENT NOT REPORTED TO THE ENGINEER DURING THE DESIGN PROCESS. THE CONTRACT TO TAKE THE REQ PRECAUTIONARY MEASURES TO ENSURE ALL EXG ELECTRICAL EQUIPMENT IS PROTECTED IN PLACE.
34. ANY EXG BUILDING STRUCTURES OR SURFACES DAMAGED BY DEMOLITION OR DURING INSTALLATION ACTIVITIES SHALL BE REPAIRED, PATCHED, AND/OR REFINISHED TO THE SATISFACTION OF THE OWNER.
35. ALL EXG ELECTRICAL EQUIPMENT INDICATED TO BE DEMOLISHED SHALL BE REMOVED ENTIRELY & ALL AFFECTED SURFACES OR STRUCTURES SHALL BE REPAIRED, REPLACED, AND/OR REFINISHED TO MATCH THE ADJACENT SURFACES OR DAMAGED ITEM(S).
36. FOR CLARITY ONLY RECONSTRUCTION OR NEW WORK RELATED ELEMENTS & SELECT EXISTING FACILITIES SPECIFICALLY REQ COORDINATION W/ ANY NEW WORK.
37. ALL CONDUITS, BOXES, SURFACE MTD RACEWAYS, SUPPORT DEVICES, & ASSOCIATED FITTINGS SHALL BE MTD IN CONCEALED LOCATIONS ABOVE CLG, DUCTS, TRUSSES, BEAMS, ETC IN AREAS WHERE A CONCEALED MTG LOCATION IS NOT AVAILABLE EQUIPMENT SHALL BE PAINTED TO MATCH THE ADJACENT SURFACES.
38. ANY PENETRATIONS BY CONDUITS OR OTHER ELECTRICAL EQUIPMENT THROUGH A FIRE RATED WALL - WHETHER EXG OR NEW - SHALL MAINTAIN THE APPROPRIATE FIRE RATING BY SEALING THE PENETRATION W/ THE APPROPRIATE UL-LISTED FIRE-STOP MATERIAL/SYSTEM.
39. ELECTRICAL CONTRACTOR SHALL PREPARE & SUBMIT THE FOLLOWING CALIFORNIA ENERGY COMMISSION T-24 CERTIFICATE OF ACCEPTANCE LTG-1-1, PARTS 1, 2, & 3; LIGHTING CONTROL LTG-2-A; AND/OR AUTOMATIC DAYLIGHTING CONTROL LTG-3-A, AS THEY APPLY TO THE BUILDING DEPARTMENT PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.
40. LEED COMMISSIONING NOTE: ELECTRICAL CONTRACTOR TO COORDINATE & PROVIDE ASSISTANCE FOR COMPLETE COMMISSIONING OF ALL SYSTEMS IDENTIFIED IN COMMISSIONING AGENT'S DOCUMENTS, INCL BUT NOT LIMITED TO LIGHTING CONTROLS, ELECTRONIC METERING, ETC.

ADDITIONAL NOTES

1. ALL INFO REFERENCED IS PRELIMINARY IN NATURE & DOES NOT REPRESENT FINAL DESIGN DOCUMENTS. ALL INFO & REQ RELATIVE TO UTILITY INFRASTRUCTURE SHALL BE COORDINATED, VERIFIED, & INSTALLED PER FINAL UTILITY COMPANY DESIGN DOCUMENTS.
2. ROUTING OF ALL CONDUIT SHALL BE COORDINATED IN THE FIELD & CONFIRMED BY ENGINEER & ARCHITECT.
3. COORDINATE ALL CONDUIT ROUTING, ELECTRICAL DEVICE LOCATIONS, PULL BOX LOCATIONS, ETC W/ LANDSCAPE PLANTING PLANS TO AVOID CONFLICTS W/ TREES, SHRUBS, ETC.
4. ALL CONDUCTOR & CABLE RUNS ARE TO BE CONTINUOUS. NO CONDUCTORS OR LOW VOLTAGE CABLING TO BE INSTALLED AS PART OF INCREMENT ONE. ALL CONDUCTORS & LOW VOLTAGE CABLING TO BE INSTALLED AS PART OF INCREMENT TWO & TERMINATED INSIDE OF THE BUILDING.
5. ALL CONDUIT SHALL BE PROVIDED W/ PROPERLY SIZED PULL STRING PER UTILITY COMPANY STANDARDS.
6. ALL EQUIPMENT MTD OUTDOORS SHALL BE INSTALLED IN A WEATHERPROOF NEMA 3R ENCLOSURE.
7. SEE ARCHITECTURAL/LANDSCAPE ARCHITECTURAL PLANS FOR EXACT LOCATIONS OF FIXTURES, PULL BOXES, MANHOLES, OTHER ELECTRICAL DEVICES, ETC. COORDINATE ALL UNDERGROUND STRUCTURES & CONDUIT ROUTING W/ LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CRITICAL LANDSCAPE PLANTING/HARDSCAPE AREAS.
8. PROVIDE CONCRETE ENCASEMENT FOR ALL TRENCHES W/ MORE THAN THREE (3) CONDUITS. ALL UTILITY CONDUIT SHALL BE ENCASED PER UTILITY COMPANY REQUIREMENTS.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BACUZZI
E22215
3/31/28
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL GENERAL NOTES

2E0.02

REMODEL ELECTRICAL SITE PLAN | 1" = 20'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
E-1101	NEW CONDUCTORS IN EXISTING CONDUIT.

GENERAL NOTES

1. REFER TO SHEET 2E0.02 FOR SITE GENERAL NOTES.
2. REFER TO SHEET 2E5.00 FOR ELECTRICAL SINGLE LINE DIAGRAM.
3. REFER TO SHEET 2E5.00 FOR FEEDER INFORMATION.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BATTISTA
62235
3/31/26
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL SITE PLAN

2E1.01

KEYNOTES

ITEM	DESCRIPTION
E-1402	REFER TO DETAIL 09/2E7.00 FOR EQUIPMENT ANCHORAGE DETAIL AND MORE MOUNTING INFORMATION.
E-1403	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM CONTROL PANEL. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1404	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM AMPLIFIER. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1405	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM POWER SUPPLY. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1406	120V TYPE 5-20R RECEPTACLE.
E-1407	208V TYPE L5-30R RECEPTACLE.
E-1604	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO DDC PANEL. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.

LEGEND

NOT IN SCOPE OF WORK

SCOPE OF WORK

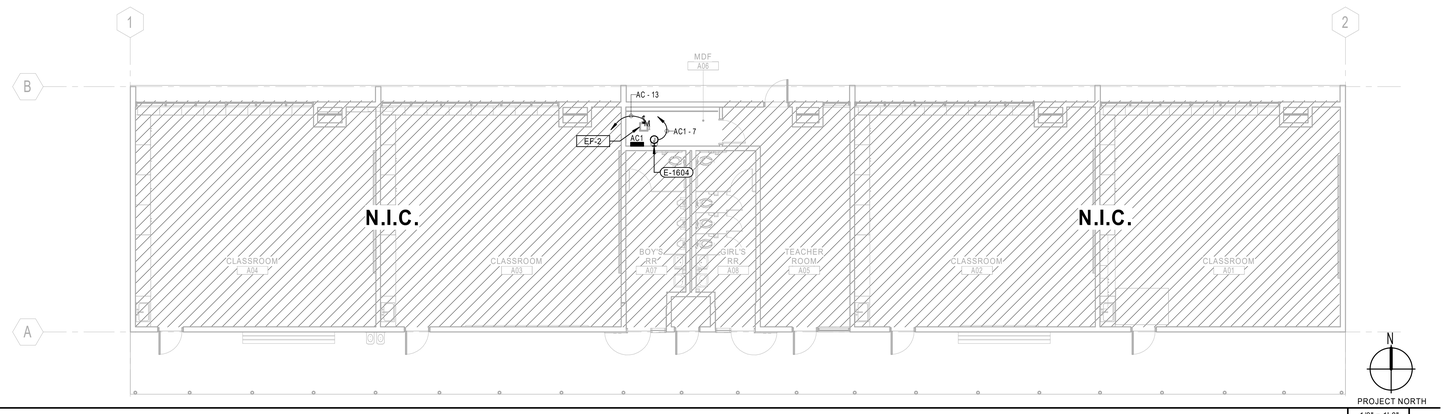
(E) GYP. TO REMAIN IN PLACE

2 X 4 ACT CLG

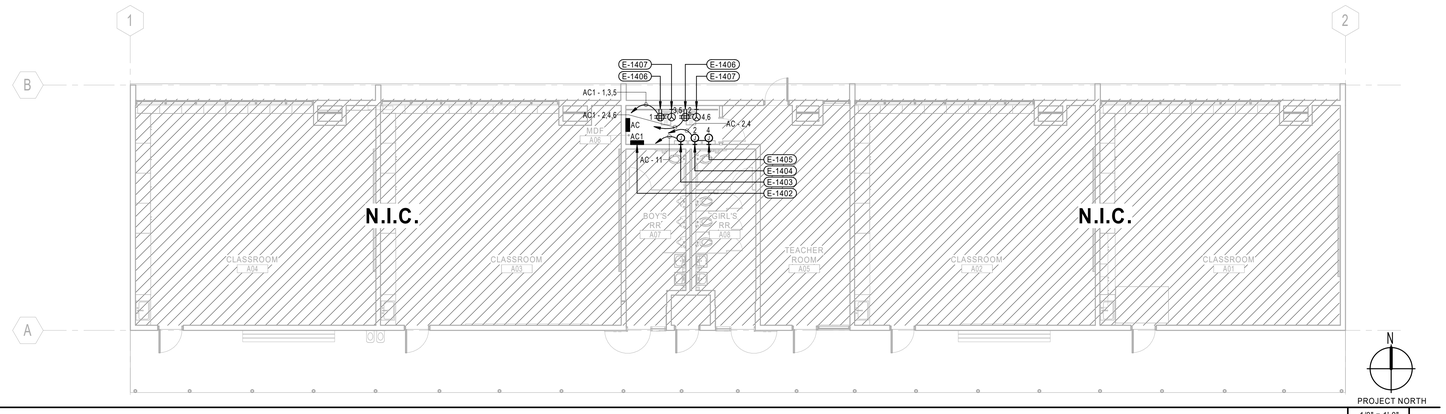
2' x 2' BLACK ACT CLG

GENERAL NOTES

1. REFER TO SHEET E0.02 FOR GENERAL NOTES



BUILDING A - 1 - FLOOR - POWER / MECH 1/8" = 1'-0" 06



BUILDING A - 1 - FLOOR - POWER 1/8" = 1'-0" 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BACIZZI
E22215
3/31/28
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL REMODEL PLANS - BLDG A

2EA2.10

KEYNOTES

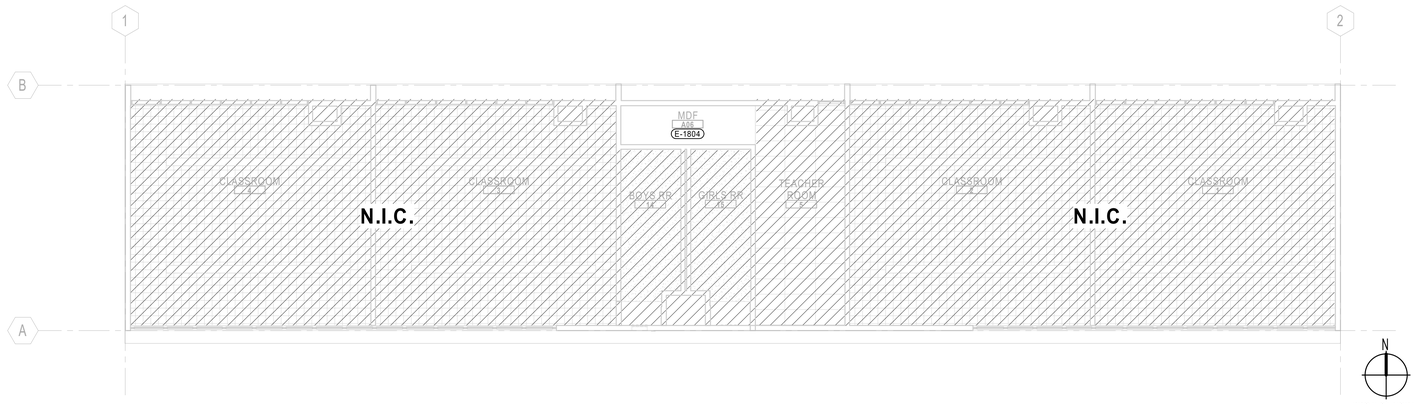
ITEM	DESCRIPTION
E-1304	CONNECT NEW LIGHT FIXTURE TO THE EXISTING LIGHTING CIRCUIT CURRENTLY FEEDING STORAGE A06.
E-1804	EXISTING LIGHT FIXTURE WITHIN SPACE TO BE DEMOLISHED. EXISTING LIGHTING CIRCUIT TO BE PROTECTED FOR RECONNECTION TO NEW LIGHT FIXTURE.

LEGEND

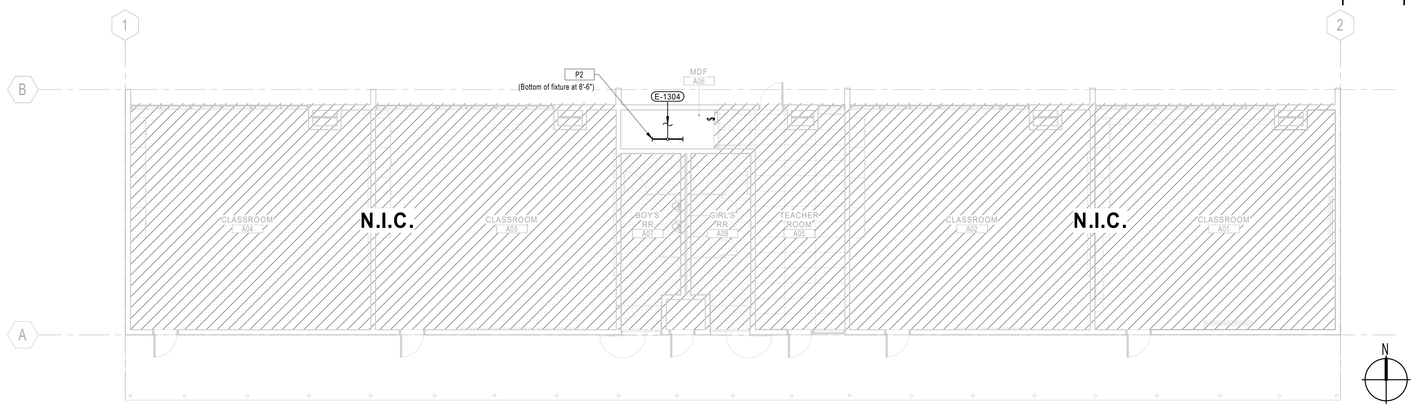
- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. REFER TO SHEET 2E0.02 FOR GENERAL NOTES.



BUILDING A - 1 - FLOOR - LIGHTING - DEMO 1/8" = 1'-0" 06



BUILDING A - 1 - FLOOR - LIGHTING - REMODEL 1/8" = 1'-0" 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BAGUZZI
E22215
3/31/28
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

LIGHTING DEMO & REMODEL REFLECTED CEILING PLANS - BLDG A

2EA2.20

KEYNOTES

ITEM	DESCRIPTION
E-1404	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM AMPLIFIER. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1405	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM POWER SUPPLY. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1406	120V TYPE 5-20R RECEPTACLE.
E-1407	208V TYPE L5-30R RECEPTACLE.

LEGEND

NOT IN SCOPE OF WORK

SCOPE OF WORK

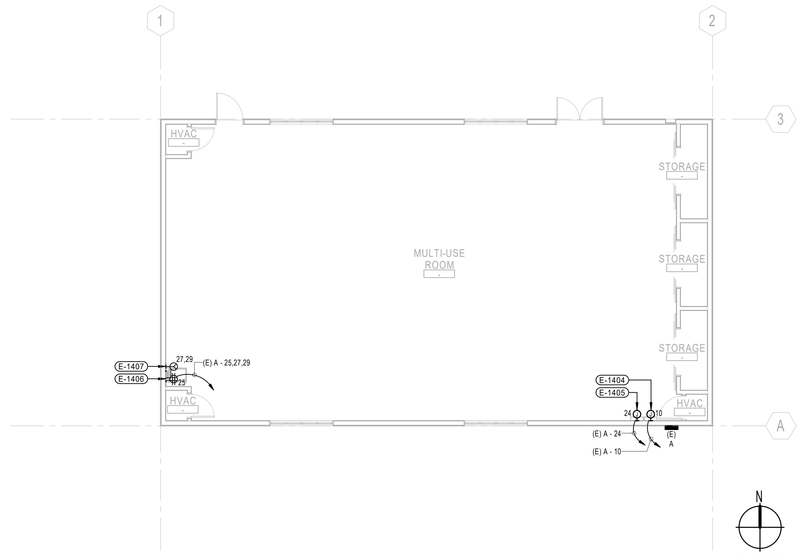
(E) GYP. TO REMAIN IN PLACE

2 X 4 ACT CLG

2' x 2' BLACK ACT CLG

GENERAL NOTES

1. REFER TO SHEET 2E0.02 FOR GENERAL NOTES.



BUILDING E - 1 - FLOOR - POWER | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BACUZZI
E22215
3/31/28
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

Primary Project Name

PROJECT ADDRESS

Developed for
CLIENT NAME

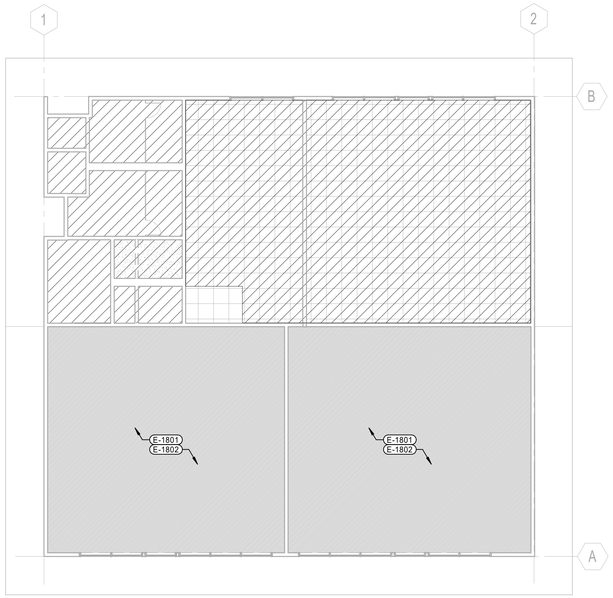
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	Primary Project #
Checked By	Checker
Scale	1/8" = 1'-0"

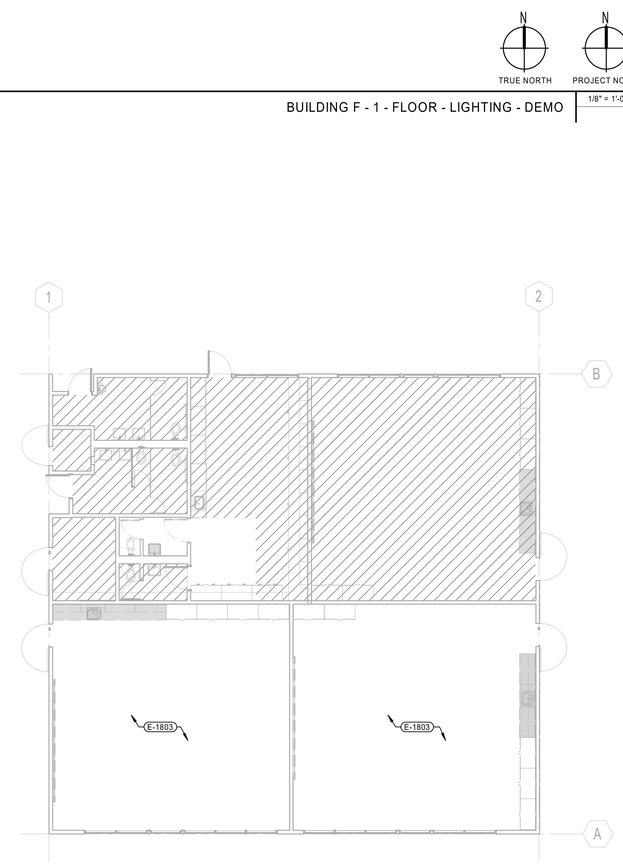
ELECTRICAL POWER PLAN - BLDG E

2EE2.01



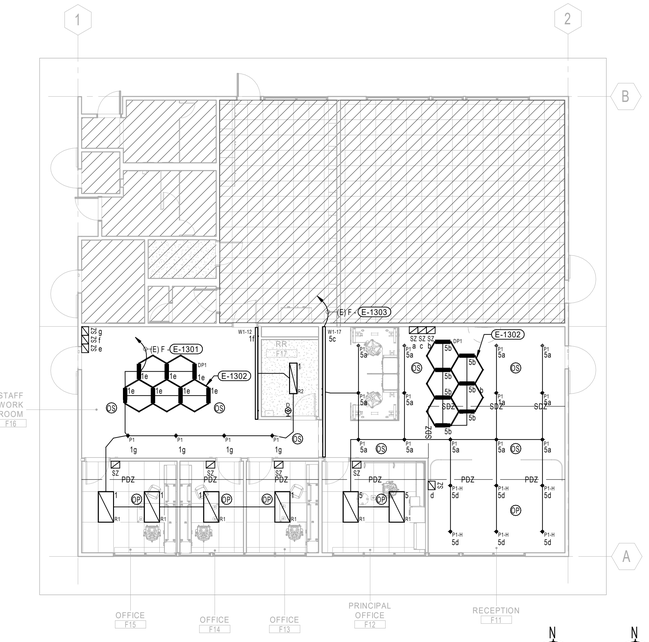
TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - LIGHTING - DEMO | 1/8" = 1'-0" | 19



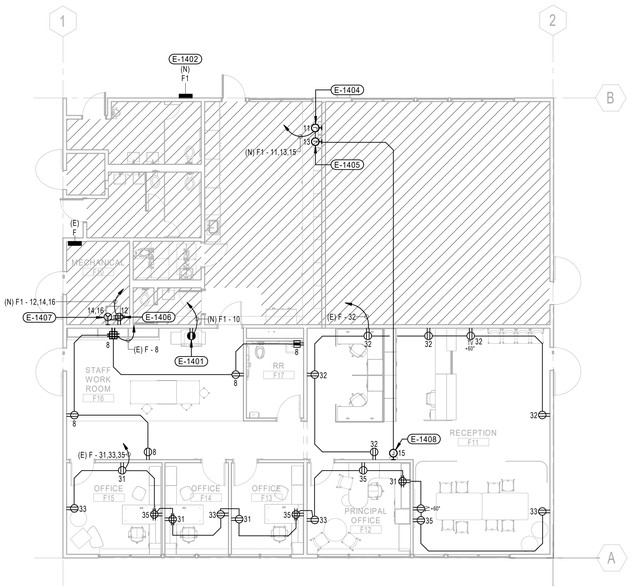
TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - POWER - DEMO | 1/8" = 1'-0" | 17



TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - LIGHTING | 1/8" = 1'-0" | 07



TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - POWER | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
E-1301	ANY EXISTING LIGHTING REMOVED FOR CEILING WORK TO BE REINSTALLED IN PLACE. RECONNECT TO EXISTING LIGHTING CIRCUIT.
E-1302	REMOTE DRIVER LOCATED IN ADJACENT ACT CEILING
E-1303	CONNECT NEW LIGHT FIXTURES TO EXISTING CIRCUIT #5 FROM EXISTING PANEL "F". EXISTING PANEL "F" IS LOCATED IN MECHANICAL ROOM #10.
E-1401	WALL MOUNTED 120V DUPLEX RECEPTACLE FOR DEDICATED POWER CONNECTION TO COPY MACHINE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.
E-1402	REFER TO DETAIL 09/2E7.00 FOR EQUIPMENT ANCHORAGE DETAIL AND MORE MOUNTING INFORMATION.
E-1404	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM AMPLIFIER. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1405	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM POWER SUPPLY. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1406	120V TYPE 5-20R RECEPTACLE.
E-1407	208V TYPE L5-30R RECEPTACLE.
E-1408	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO FIRE ALARM ANNUNCIATOR. MOUNTED AT +42" A.F.F. COORDINATE EXACT LOCATION WITH FIRE ALARM DRAWINGS PRIOR TO ROUGH-IN.
E-1801	EXISTING LIGHT FIXTURES WITHIN SPACE TO BE DEMOLISHED. EXISTING LIGHTING CIRCUIT WITHIN SPACE IS TO BE PROTECTED AND USED FOR RE-CONNECTION TO NEW LIGHT FIXTURES.
E-1802	EXISTING LIGHTING CONTROLS WITHIN SPACE TO BE DEMOLISHED. EXISTING LIGHTING CONTROLS CONDUIT/WIRING TO BE DEMOLISHED BACK TO SOURCE.
E-1803	EXISTING ELECTRICAL DEVICES WITHIN SPACE TO BE DEMOLISHED. EXISTING CONDUIT AND BRANCH CIRCUITING TO BE DEMOLISHED BACK TO SOURCE PANEL.

LEGEND

- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. REFER TO SHEET 2E0.02 FOR GENERAL NOTES.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO GERARDO BATTISTA ELECTRICAL STATE OF CALIFORNIA
E22235
3/31/26

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

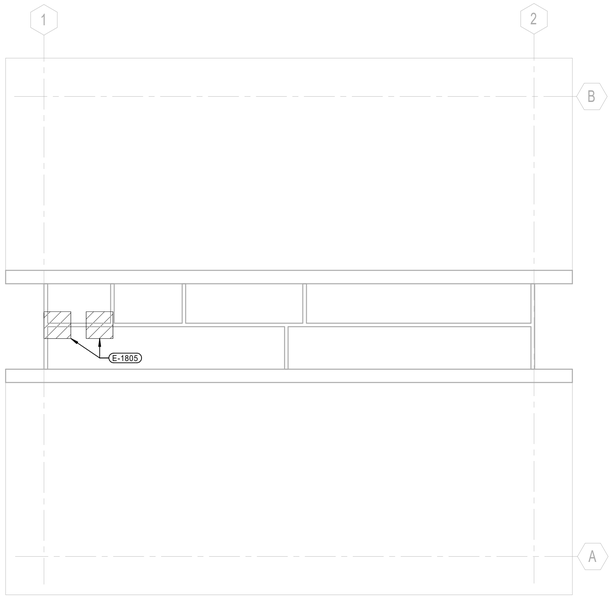
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

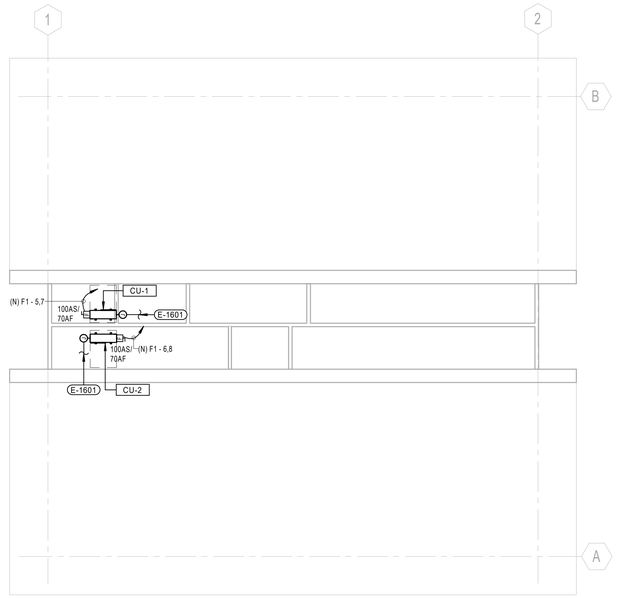
ELECTRICAL LIGHTING & POWER PLANS - BLDG F

2EF2.00



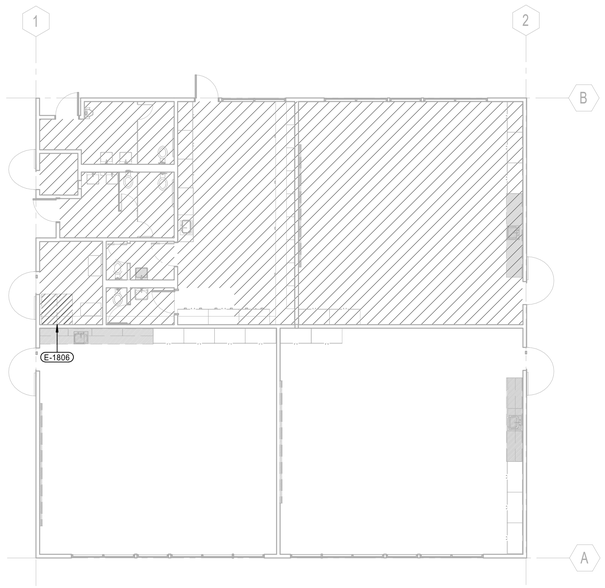
TRUE NORTH PROJECT NORTH

BUILDING F - R - ROOF - POWER / MECH - DEMO 1/8" = 1'-0" 19



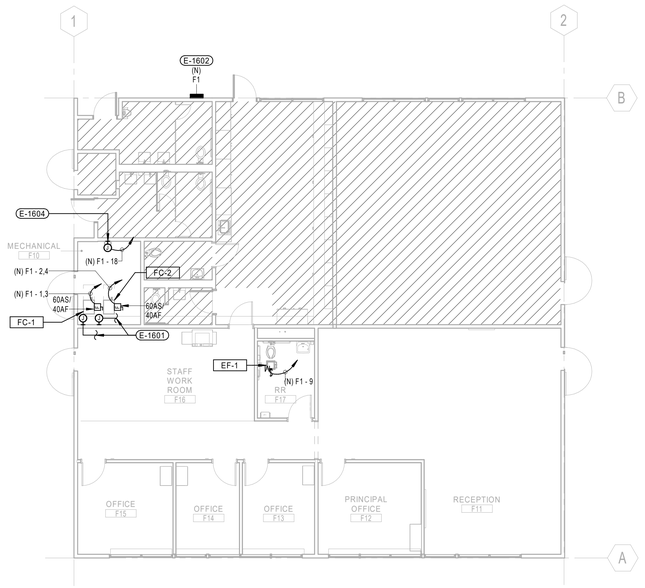
TRUE NORTH PROJECT NORTH

BUILDING F - R - ROOF - POWER / MECH 1/8" = 1'-0" 07



TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - POWER / MECH - DEMO 1/8" = 1'-0" 17



TRUE NORTH PROJECT NORTH

BUILDING F - 1 - FLOOR - POWER / MECH 1/8" = 1'-0" 05

KEYNOTES

ITEM	DESCRIPTION
E-1601	PROVIDE 3/4" C.O. WITH PULL STRINGS TO THERMOSTAT FOR CONTROL WIRING CONNECTION. REFER TO MECHANICAL DRAWINGS FOR THERMOSTAT LOCATION. CONDUIT PATHWAY PROVIDED BY MECHANICAL CONTROLS CONTRACTOR. JUNCTION BOX TO BE MOUNTED AT +78" A.F.F.
E-1602	INTERCONNECT TO CORRESPONDING "CU" UNIT ON ROOF. MOTOR RATED TOGGLE SWITCH TO BE MOUNTED ABOVE CEILING AT +77" A.F.F.
E-1604	WALL MOUNTED JUNCTION BOX FOR 120V POWER CONNECTION TO DDC PANEL. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
E-1805	EXISTING HEAT PUMP TO BE DEMOLISHED. EXISTING ELECTRICAL CONNECTIONS, CONDUIT, WIRING, AND CONTROLS TO BE DEMOLISHED BACK TO SOURCE.
E-1806	EXISTING FAN COIL TO BE DEMOLISHED. EXISTING ELECTRICAL CONNECTIONS, CONDUIT, WIRING, AND CONTROLS TO BE DEMOLISHED BACK TO SOURCE.

LEGEND

- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. REFER TO SHEET 2E0.02 FOR GENERAL NOTES.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO GERARDO BACUZZI E22315 3/31/28 ELECTRICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL POWER/MECHANICAL PLANS - BLDG F

2EF2.20

Branch Panel: (E) A

LOCATION: BLDG. E EXTERIOR
SUPPLY FROM: MSB
MOUNTING: SURFACE
ENCLOSURE: NEMA 3R

VOLTS: 120/208V
PHASES: 3
WIRES: 4

A.I.C. RATING: EXISTING
MAINS TYPE: MCB
BUS RATING: 225 A
MCB RATING: 200 A

NOTES:

CKT	CIRCUIT DESCRIPTION	TRIP	P	A		B		C		P	TRIP	CIRCUIT DESCRIPTION	CKT
1	EXISTING RECEPTACLES	20 A	1	0 VA	0 VA					1	20 A	EXISTING LIGHTS	2
3	EXISTING RECEPTACLES	20 A	1			0 VA	0 VA			1	20 A	EXISTING LIGHTS	4
5	EXISTING RECEPTACLES	20 A	1					0 VA	0 VA	1	20 A	EXISTING LIGHTS	6
7	EXISTING REFRIGERATOR	20 A	1	0 VA	0 VA					1	20 A	EXISTING RECEPTACLES	8
9	EXISTING KITCHEN RECEPTACLE	20 A	1			0 VA	200 VA			1	20 A	NEW FA AMPLIFIER*	10
11	EXISTING RECEPTACLES	20 A	1					0 VA	0 VA	1	20 A	EXISTING EXTERIOR LIGHTS	12
13	EXISTING RECEPTACLES	20 A	1	0 VA	0 VA					1	20 A	EXISTING FURNACE	14
15	EXISTING FURNACE	20 A	1			0 VA	0 VA			2	40 A	EXISTING CONDENSING UNIT	16
17	EXISTING CONDENSING UNIT	40 A	2					0 VA	0 VA	--	--	--	18
19	--	--	--	0 VA	0 VA					1	20 A	EXISTING KITCHEN RECEPTACLE	20
21	EXISTING CONDENSING UNIT	40 A	2			0 VA	0 VA			1	20 A	EXISTING WATER HEATER	22
23	--	--	--					0 VA	200 VA	1	20 A	NEW FA POWER SUPPLY*	24
25	NEW IDF RACK MULTI-USE ROOM	20 A	1	360 VA	--					1	--	Space	26
27	NEW IDF RACK MULTI-USE ROOM	20 A	2			1100 VA	0 VA			2	20 A	EXISTING LOAD	28
29	--	--	--					1100 VA	0 VA	--	--	--	30
		TOTA...		360 VA		1300 VA		1300 VA					
		TOTA...		3 A		12 A		12 A					

LEGEND:

LOAD CLASSIFICATION	CONNECTED...	DEMAND...	ESTIMATED...	PANEL TOTALS	
_CONTINUOUS LOADS	400 VA	125.00%	500 VA		
_KITCHEN LOADS	0 VA	0.00%	0 VA	TOTAL CONN. LOAD:	2960 VA
_LIGHTING LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAND	3060 VA
_MOTOR LOADS	0 VA	0.00%	0 VA	TOTAL CONN....	8 A
_NON CONTINUOUS LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAN...	8 A
_RECEPTACLE LOADS	2560 VA	100.00%	2560 VA		

NOTES:
* = CIRCUIT BREAKER TO BE RED IN COLOR AND PROVIDED WITH LOCK-ON DEVICE.

Branch Panel: AC1

LOCATION: MDF A06
SUPPLY FROM: AC
MOUNTING: SURFACE
ENCLOSURE: NEMA1

VOLTS: 120/208V
PHASES: 3
WIRES: 4

A.I.C. RATING: 10kAIC
MAINS TYPE: MLO
BUS RATING: 30 A
MCB RATING: MLO

NOTES:

CKT	CIRCUIT DESCRIPTION	TRIP	P	A		B		C		P	TRIP	CIRCUIT DESCRIPTION	CKT
1	MDF RACK RECEPTACLE STORAGE RM. A06	20 A	1	360 VA	360 VA					1	20 A	MDF RACK RECEPTACLE STORAGE RM. A06	2
3	MDF RACK RECEPTACLE STORAGE RM. A06	30 A	2			1100 VA	1100 VA			2	30 A	MDF RACK RECEPTACLE STORAGE RM. A06	4
5	--	--	--					1100 VA	1100 VA	--	--	--	6
7	DDC PANEL	20 A	1	200 VA	--					1	--	Space	8
9	Space	--	1			--	--			1	--	Space	10
11	Space	--	1					--	--	1	--	Space	12
		TOTA...		920 VA		2200 VA		2200 VA					
		TOTA...		8 A		20 A		20 A					

LEGEND:

LOAD CLASSIFICATION	CONNECTED...	DEMAND...	ESTIMATED...	PANEL TOTALS	
CONTINUOUS LOADS	200 VA	125.00%	250 VA		
KITCHEN LOADS	0 VA	0.00%	0 VA	TOTAL CONN. LOAD:	5320 VA
LIGHTING LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAND	5370 VA
MOTOR LOADS	0 VA	0.00%	0 VA	TOTAL CONN....	15 A
NON CONTINUOUS LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAN...	15 A
RECEPTACLE LOADS	5120 VA	100.00%	5120 VA		

NOTES:

Branch Panel: (N) F1

LOCATION: BLDG. F EXTERIOR
SUPPLY FROM: (E) F
MOUNTING: SURFACE
ENCLOSURE: NEMA 3R

VOLTS: 120/208V
PHASES: 3
WIRES: 4

A.I.C. RATING: 22kAIC
MAINS TYPE: MCB
BUS RATING: 225 A
MCB RATING: 100 A

NOTES:

CKT	CIRCUIT DESCRIPTION	TRIP	P	A		B		C		P	TRIP	CIRCUIT DESCRIPTION	CKT
1	INDOOR SPLIT SYSTEM "FC-1"	40 A	2	1456 VA	1456 VA					2	40 A	INDOOR SPLIT SYSTEM "FC-2"	2
3	--	--	--			1456 VA	1456 VA			--	--	--	4
5	OUTDOOR SPLIT SYSTEM "CU-1"	70 A	2					3952 VA	3952 VA	2	70 A	OUTDOOR SPLIT SYSTEM "CU-2"	6
7	--	--	--	3952 VA	3952 VA					--	--	--	8
9	EXHAUST FAN "E1-1"	20 A	1			100 VA	1200 VA			1	20 A	COPY MACHINE RM. F16	10
11	FA AMPLIFIER*	20 A	1					200 VA	360 VA	1	20 A	IDF RACK RECEPTACLE MECHANICAL RM...	12
13	FA POWER SUPPLY*	20 A	1	200 VA	1100 VA					2	30 A	IDF RACK RECEPTACLE MECHANICAL RM...	14
15	FA ANNUNCIATOR*	20 A	1			200 VA	1100 VA			--	--	--	16
17	Space	--	1					--	200 VA	1	20 A	DDC PANEL MECHANICAL RM. F10	18
19	Space	--	1	--	--					1	--	Space	20
21	Space	--	1			--	--			1	--	Space	22
23	Space	--	1					--	--	1	--	Space	24
25	Space	--	1	--	--					1	--	Space	26
27	Space	--	1			--	--			1	--	Space	28
29	Space	--	1					--	--	1	--	Space	30
		TOTA...		12116 VA		5512 VA		8664 VA					
		TOTA...		105 A		46 A		76 A					

LEGEND:

LOAD CLASSIFICATION	CONNECTED...	DEMAND...	ESTIMATED...	PANEL TOTALS	
CONTINUOUS LOADS	800 VA	125.00%	1000 VA		
KITCHEN LOADS	0 VA	0.00%	0 VA	TOTAL CONN. LOAD:	26292 VA
LIGHTING LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAND	26492 VA
MOTOR LOADS	21732 VA	100.00%	21732 VA	TOTAL CONN....	73 A
NON CONTINUOUS LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAN...	74 A
RECEPTACLE LOADS	3760 VA	100.00%	3760 VA		

NOTES:
* = CIRCUIT BREAKER TO BE RED IN COLOR AND PROVIDED WITH LOCK-ON DEVICE.

Branch Panel: AC

LOCATION: MDF A06
SUPPLY FROM: MSB
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTS: 120/208V
PHASES: 3
WIRES: 4

A.I.C. RATING: Existing
MAINS TYPE: MCB
BUS RATING: 225 A
MCB RATING:

NOTES:

CKT	CIRCUIT DESCRIPTION	TRIP	P	A		B		C		P	TRIP	CIRCUIT DESCRIPTION	CKT
1	EXISTING COMPUTER PLUGS (EAST)	20 A	1	0 VA	200 VA					1	20 A	NEW FA AMP*	2
3	EXISTING COMPUTER PLUGS (WEST)	20 A	1			0 VA	200 VA			1	20 A	NEW FA POWER SUPPLY*	4
5	SPARE	20 A	1					0 VA	0 VA	1	20 A	EXISTING FAN	6
7	EXISTING COMPUTER A/C	60 A	2	0 VA	0 VA					2	60 A	EXISTING RM #3 A/C	8
9	--	--	--			0 VA	0 VA			--	--	--	10
11	NEW FACP*	20 A	1					200 VA	0 VA	2	60 A	EXISTING RM #3 A/C	12
13	NEW EF-2	20 A	1	180 VA	0 VA					--	--	--	14
15	Space	--	1			--	920 VA			3	30 A	NEW AC1	16
17	EXISTING LOAD	20 A	1					0 VA	2200 VA	--	--	--	18
19	EXISTING LOAD	60 A	3	0 VA	2200 VA					--	--	--	20
21	--	--	--			0 VA	--			1	--	Space	22
23	--	--	--					0 VA	--	1	--	Space	24
25	EXISTING LOAD	60 A	3	0 VA	0 VA					3	60 A	EXISTING RM #2 A/C	26
27	--	--	--			0 VA	0 VA			--	--	--	28
29	--	--	--					0 VA	0 VA	--	--	--	30
		TOTA...		2580 VA		1120 VA		2400 VA					
		TOTA...		23 A		9 A		22 A					

LEGEND:

LOAD CLASSIFICATION	CONNECTED...	DEMAND...	ESTIMATED...	PANEL TOTALS	
CONTINUOUS LOADS	800 VA	125.00%	1000 VA		
KITCHEN LOADS	0 VA	0.00%	0 VA	TOTAL CONN. LOAD:	6100 VA
LIGHTING LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAND	6300 VA
MOTOR LOADS	180 VA	100.00%	180 VA	TOTAL CONN....	17 A
NON CONTINUOUS LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAN...	17 A
RECEPTACLE LOADS	5120 VA	100.00%	5120 VA		

NOTES:
* = CIRCUIT BREAKER TO BE RED IN COLOR AND PROVIDED WITH LOCK-ON DEVICE.

Branch Panel: (E) F

LOCATION: MECHANICAL 11
SUPPLY FROM: MSB
ENCLOSURE: NEMA 1

VOLTS: 120/240V
PHASES: 1
WIRES: 3

A.I.C. RATING: 10kAIC
MAINS TYPE: MCB
BUS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	CIRCUIT DESCRIPTION	TRIP	P	A		B		P	TRIP	CIRCUIT DESCRIPTION	CKT
1	INT. LTG. RM. F13, F14, F15, F16 & F17	20 A	1	346 VA	0 VA			2	20 A	EXISTING LOAD	2
3	EXISTING LOAD	20 A	1			0 VA	0 VA	--	--	--	4
5	INT. LTG. RM. F11,12,13,14,15,16,17	20 A	1	433 VA	0 VA			1	20 A	EXISTING LOAD	6
7	EXISTING LOAD	20 A	1			0 VA	1080 VA	1	20 A	RECEPTACLES RM. F16 & F17	8
9	EXISTING LOAD	20 A	1	0 VA	0 VA			1	20 A	EXISTING LOAD	10
11	EXISTING LOAD	20 A	1			0 VA	0 VA	1	20 A	EXISTING LOAD	12
13	EXISTING LOAD	20 A	1	0 VA	0 VA			2	20 A	EXISTING LOAD	14
15	EXISTING LOAD	20 A	1			0 VA	0 VA	--	--	--	16
17	EXISTING LOAD	20 A	1	0 VA	0 VA			1	20 A	EXISTING LOAD	18
19	EXISTING LOAD	20 A	1			0 VA	0 VA	1	20 A	EXISTING LOAD	20
21	EXISTING LOAD	30 A	2	0 VA	0 VA			2	20 A	EXISTING LOAD	22
23	--	--	--			0 VA	0 VA	--	--	--	24
25	EXISTING LOAD	20 A	2	0 VA	0 VA			1	20 A	EXISTING LOAD	26
27	--	--	--			0 VA	0 VA	1	20 A	EXISTING LOAD	28
29	EXISTING LOAD	20 A	1	0 VA	0 VA			1	20 A	EXISTING LOAD	30
31	RECEPTS. RM. F12, F13, F14 & F15	20 A	1			1080 VA	1080 VA	1	20 A	RECEPTACLES RM. F11	32
33	RECEPTS. RM. F11, F12, F14 & F15	20 A	1	900 VA	0 VA			2	100 A	EXISTING MAIN BREAKER	34
35	RECEPTS. RM. F11, F12, F13 & F15	20 A	1			1080 VA	0 VA	--	--	--	36
		TOTAL...		1678 VA		4320 VA					
		TOTAL...		14 A		36 A					

LEGEND:

LOAD CLASSIFICATION	CONNECTED...	DEMAND...	ESTIMATED...	PANEL TOTALS	
CONTINUOUS LOADS	0 VA	0.00%	0 VA		
KITCHEN LOADS	0 VA	0.00%	0 VA	TOTAL CONN. LOAD:	5998 VA
LIGHTING LOADS	778 VA	125.00%	973 VA	TOTAL EST. DEMAND	6193 VA
MOTOR LOADS	0 VA	0.00%	0 VA	TOTAL CONN....	25 A
NON CONTINUOUS LOADS	0 VA	0.00%	0 VA	TOTAL EST. DEMAN...	26 A
RECEPTACLE LOADS	5220 VA	100.00%	5220 VA		

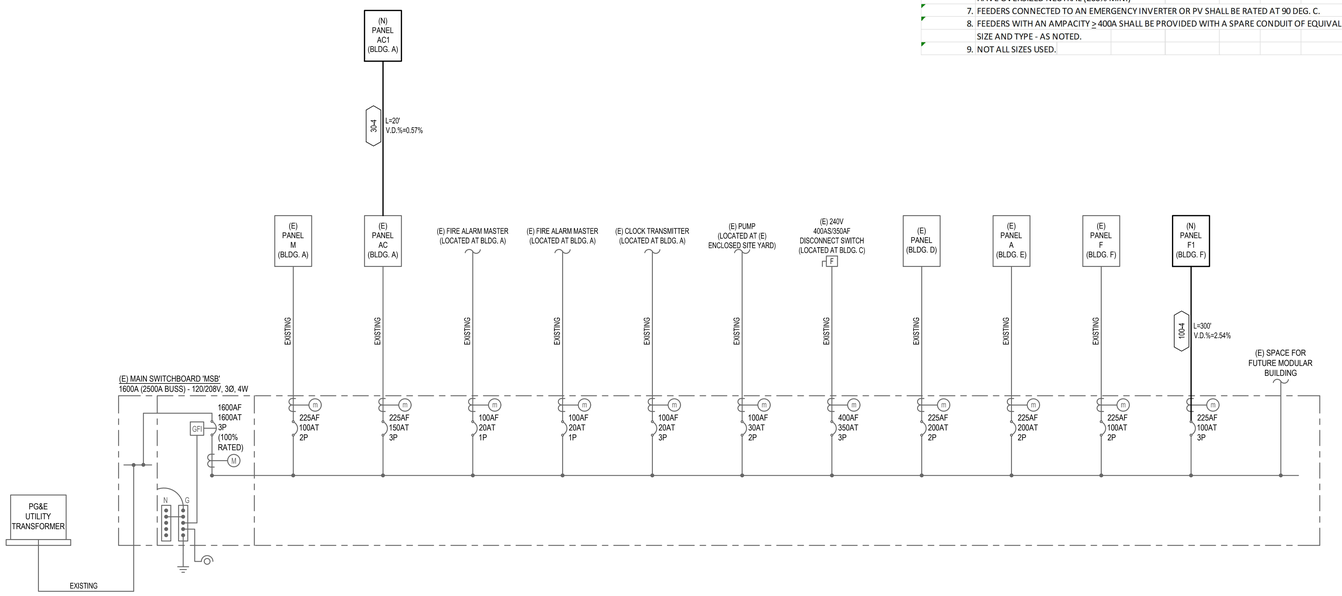
NOTES:

COPPER FEEDER SCHEDULE

MARK (AMPACITY)	CONDUITS # SETS	CONDUITS SIZE	CONDUCTORS PER SET Φ & N	CONDUCTORS PER SET GND	MARK (AMPACITY)	CONDUITS # SETS	CONDUITS SIZE	CONDUCTORS PER SET Φ	CONDUCTORS PER SET GND
30-4	1	3/4"	(4)10	10	---	---	---	---	---
100-4	1	2"	(4)2/0	6	---	---	---	---	---

FEEDER SIZING NOTES

1. CONDUCTOR AND CONDUITSIZE SHOWN IN THIS SCHEDULE ARE BASED ON COPPER WIRE AND INSULATION TYPE (THHN/THWN) AT ONE HUNDRED (100') FEEDER LENGTH.
2. "+" IN FEEDER TAGS SHOWN ON PLANS INDICATES A FEEDER UPSIZED DUE TO VOLTAGE DROP.
3. CONDUIT SIZES CALLED OUT ON PLANS SUPERSEDE THIS SCHEDULE.
4. "S" INDICATES A FEEDER COMING FROM A SEPARATELY DERIVED SYSTEM.
5. NOMINAL AMPACITIES GREATER THAN 100 AMPS ARE FOR 75 DEG. C TERMINALS.
6. FEEDERS CONNECTED TO THE SECONDARY OF A K-4 OR HIGHER XFMR SHALL HAVE OVERSIZED NEUTRAL (200% MIN.)
7. FEEDERS CONNECTED TO AN EMERGENCY INVERTER OR PV SHALL BE RATED AT 90 DEG. C.
8. FEEDERS WITH AN AMPACITY ≥ 400A SHALL BE PROVIDED WITH A SPARE CONDUIT OF EQUIVALENT SIZE AND TYPE - AS NOTED.
9. NOT ALL SIZES USED.



GENERAL NOTES

1. ALL EQUIPMENT TO BE SQUARE D OR EQUAL BY SIEMENS, CUTLER-HAMMER, G.E., OR RSC-SIERRA.
2. ALL ELECTRICAL EQUIPMENT SHALL BE PROVIDED WITH SPECIFIED AND APPROPRIATE UL LISTING BASED ON THE ENVIRONMENT IN WHICH THE EQUIPMENT IS TO BE MOUNTED.
3. ALL ELECTRICAL EQUIPMENT SHALL BE PROVIDED WITH AND BRACED FOR REQUIRED FAULT CURRENT RATINGS BASED ON THEIR VOLTAGE AND LOCATION WITHIN THE SYSTEM. SHOP DRAWINGS TO INCLUDE FAULT CURRENT RATINGS FOR ALL ELECTRICAL EQUIPMENT. ALL EQUIPMENT SHALL BE FULLY RATED, NO SERIES RATING SHALL BE ALLOWED.
4. ALL TERMINATIONS AND ENCLOSURES SHALL BE RATED FOR USE WITH 75 DEGREES CELSIUS CONDUCTORS.
5. ALL SERVICE ENTRANCE EQUIPMENT/DISTRIBUTION BOARDS/SWITCHBOARDS RATED AT 600A OR GREATER SHALL BE PROVIDED WITH A SOLID STATE MAIN OVER-CURRENT PROTECTIVE DEVICE AND BUSSING RATED AT 100% OPERATION.
6. ALL SWITCH/DISTRIBUTION BOARDS SHALL BE PROVIDED WITH:
   a. TIN-PLATED ALUMINUM BUSSING WITH RECTANGULAR CROSS SECTION. HORIZONTAL AND VERTICAL BUSSING SHALL BE FULL LENGTH AND HAVE PROVISIONS FOR FUTURE EXTENSIONS WERE APPLICABLE. ALL BUSSING SHALL HAVE A MINIMUM WITHSTAND RATING EQUAL TO AVAILABLE FAULT CURRENT INDICATED ON THE AIC CALCULATION. ALL VERTICAL AND HORIZONTAL BUSSING SHALL BE RATED AT FULL CAPACITY IN ALL SWITCHBOARD AND DISTRIBUTION BOARD ASSEMBLIES. PROVIDE 100% NEUTRAL BUSSING MINIMUM - UNLESS OTHERWISE NOTED. PROVIDE FULL LENGTH GROUND BUSS, AND WHERE INDICATED ON PLANS, ISOLATED GROUND BUSSING. PROVIDE REAR WIRE WAY IN ALL SWITCHBOARD SECTIONS - UNLESS OTHERWISE NOTED OR REQUIRED.
   b. LUGS SHALL BE SUITABLE FOR USE WITH BOTH COPPER AND ALUMINUM CONDUCTORS AND 75 DEGREE CELSIUS AMPACITY CONDUCTORS.
   c. PERMANENT PLACARDS(S) MARKED PER THE SPECIFICATIONS AND PER CEC - WHERE ADOPTED SECTIONS 225.37, 230.2(E), 690.56(B) & (C), 692.56, 700.8, 701.9, AND 702.8 DENOTING PRESENCE OF ADDITIONAL SERVICES, PHOTOVOLTAIC SYSTEMS, FUEL EMERGENCY OR STAND-BY POWER SOURCES, ETC. AS APPLICABLE.
7. CONTRACTOR SHALL PROVIDE SWITCHBOARD SHOP DRAWINGS TO SERVING UTILITY COMPANY PRIOR TO FABRICATION OF EQUIPMENT. CONTRACTOR SHALL SECURE CONFIRMATION PROPOSED SWITCHBOARD COMPLIES WITH ELECTRICAL UTILITY COMPANY REGULATIONS.
8. ELECTRICAL EQUIPMENT SUBMITTALS SHALL BE ACCOMPANIED BY A 1/4" = 1'-0" SCALED DRAWING WHICH REFERENCES ALL ELECTRICAL EQUIPMENT ROOMS AND EQUIPMENT. DRAWING SHALL CLEARLY IDENTIFY ADEQUATE SPACE IS PROVIDED IN ELECTRICAL ROOMS TO ACCOMMODATE THE INSTALLATION OF ELECTRICAL EQUIPMENT WHILE MAINTAINING ALL REQUIRED CODE CLEARANCES. ALL SUBMITTALS NOT ACCOMPANIED BY SCALED DRAWING WILL BE REJECTED AS INCOMPLETE.
9. EC SHALL CONDUCT, WITH ASSISTANCE OF SWITCHGEAR MANUFACTURER, AN ELECTRICAL HAZARD ANALYSIS CONSISTING OF AN ARC FLASH, SHORT CIRCUIT, AND COORDINATION STUDY TO DETERMINE APPROPRIATE LEVELS OF PERSONNEL PROTECTIVE EQUIPMENT (PPE) AS REQUIRED BY NFPA 70E AND IEEE STD 1584, AND TO ENSURE PROPER COORDINATION (INCLUDING GROUND FAULT COORDINATION) EXISTS BETWEEN ALL OVER- CURRENT PROTECTIVE DEVICES SHOWN ON SINGLE-LINE DIAGRAM. ADDITIONALLY:
   a. STUDY SHALL INCLUDE ALL PORTIONS OF ELECTRICAL SINGLE-LINE DIAGRAM, NORMAL SYSTEM CONNECTIONS AND THOSE THAT RESULT IN MAXIMUM FAULT CONDITION SHALL BE ADEQUATELY COVERED IN THE STUDY. PERFORM STUDY WITH THE AID OF A COMPUTER PROGRAM, SKM CAPTOR, OR EQUAL. STUDY SHALL IDENTIFY SELECTIVE COORDINATION SUCH WILL TRIP FIRST. GROUND FAULT PORTION OF THE STUDY DEMONSTRATE COORDINATION OF MAIN BREAKER AND ANY FEEDER GROUND FAULT DEVICES WITH DOWNSTREAM CIRCUIT BREAKERS 30A AND LESS.
   b. EC SHALL BE RESPONSIBLE TO RECOMMEND SETTINGS OF ALL DEVICES AND TO NCLUDE GROUND FAULT SETTINGS NECESSARY TO ACHIEVE SYSTEM COORDINATION. CONTRACTOR SHALL FIELD ADJUST DEVICES ACCORDINGLY UTILIZING A QUALIFIED MANUFACTURER'S REPRESENTATIVE.
   c. DURING THE CONSTRUCTION PHASE OF THE PROJECT ALL GROUND FAULT RELAYS SHALL BE SET AT SHORTEST AVAILABLE TIME DELAY.
   d. RESULT OF COORDINATION STUDY SHALL BE SUBMITTED AS PART OF OVERALL SWITCHGEAR SUBMITTAL AND SHALL INCLUDE PROTECTIVE DEVICE TIME VERSUS CURRENT COORDINATION CURVES, GROUPING APPROPRIATE DEVICES TOGETHER, TABULATIONS OF RELAY AND CIRCUIT BREAKER TRIP SETTINGS, FUSE SELECTION, AND COMMENTARY REGARDING SAME.
   e. A GROUND FAULT SYSTEM TEST SHALL BE CONDUCTED BY AN INDEPENDENT TESTING AGENCY PER CEC - 230.95(C). GROUND FAULT SYSTEM TEST SHALL BE PERFORMED IN PRESENCE OF LOCAL AHJ. VERIFICATION OF DEVICE SETTINGS PER THE COORDINATION STUDY SHALL BE PERFORMED BY SAME INDEPENDENT TESTING AGENCY. GROUND FAULT TEST RESULTS SHALL BE DELIVERED TO ENGINEER OF RECORD.
   f. PERFORM ARC FLASH ANALYSIS TO DETERMINE FALSH BOUNDARY, FLASH HAZARD CATEGORY, PPE REQUIREMENTS, AND MINIMUM ARC RATING (CAL/SQUARE CM). ABOVE INDICATED AT EACH ARC FLASH SOURCE ON A CEC COMPLIANT ARC FLASH HAZARD LABEL(S) AS MANUFACTURED BY BRADY.
10. GROUND ALL ELECTRICAL EQUIPMENT, BRANCH CIRCUITS, FEEDERS, PANEL AND DISTRIBUTION BOARDS, ELECTRICAL SERVICES, ETC. PER ADOPTED CEC ARTICLE 250.
11. FEEDER SPECIFICATIONS ARE BASED ON USE OF COPPER CONDUCTORS AND SHALL BE PROVIDED WITH A CODE SIZED COPPER GROUNDING CONDUCTOR.
12. ALL MAIN SWITCHBOARDS, PANELBOARDS, DISTRIBUTION BOARDS, ETC SHALL BE PROVIDED WITH A COPPER BUSS RATED AT SPECIFIED AMPACITY. ALL SWITCHBOARDS AND DISTRIBUTION BOARDS SHALL ALIGN IN FRONT. ALL PANELBOARDS SHALL BE PROVIDED WITH BOLT-ON BREAKERS, DEADFRONT COVERS WITH LOCKABLE DOORS, FACTORY INSTALLED MAIN CIRCUIT BREAKERS (IF APPLICABLE), AND PANEL DIRECTORY PER THESE DOCUMENTS.
13. TRANSIENT VOLTAGE SURGE PROTECTION SHALL BE PROVIDED IN ALL MAIN SWITCHGEAR AND DISTRIBUTION BOARD UNLESS OTHERWISE NOTED OR IDENTIFIED ON DRAWINGS. COORDINATE WITH LOCAL UTILITY COMPANY.
14. ALL PANELBOARDS INSTALLED IN GARAGES OR AREAS COMPLYING WITH ARTICLE 500, 511, AND/OR 514 SHALL BE INSTALLED 18" ABOVE FLOOR LINE TO BOTTOM OF PANEL AND SHALL BE IN MULTIPLE PANELS AS REQUIRED WITH TOP MOST BREAKER NO HIGHER THAN 6'-7" A.F.F. PER ARTICLE 380.
15. ALL ELECTRICAL EQUIPMENT (I.E. SWITCHGEAR, TRANSFORMERS, DISTRIBUTION BOARDS, PANELBOARDS, DISCONNECT SWITCHES, ETC.) SHALL BE PROVIDED WITH A PHENOLIC NAMEPLATE WITH ENGRAVED WHITE LETTERS REFERENCING FOLLOWING INFORMATION:

    LINE 1 - "EQUIPMENT NAME"
    LINE 2 - "FED FROM ..."
    LINE 3 - "VOLTAGE, AMPACITY, PHASE"
    LINE 4 - "DATE INSTALLED"

    NAMEPLATES SHALL BE SIZED BASED ON FOLLOWING:

    SWITCHBOARDS, DISTRIBUTION BOARDS, TRANSFORMERS:
    * LINE 1 = 1/2" LETTERS, LINES 2, 3, & 4 = 1/4" LETTERS

    PANELBOARDS, MOTOR CONTROL CENTERS, DISCONNECTS, STARTERS, ETC:
    * LINE 1 = 3/8" LETTERS, LINES 2, 3, & 4 = 1/4" LETTERS

    NAMEPLATE COLORS SHALL BE AS FOLLOWS:

    BLACK = NORMAL POWER
    RED = LIFE SAFETY/EMERGENCY POWER
    BLUE = STANDBY POWER
    GREEN = INVERTOR POWER

    ALL NAMEPLATES SHALL BE FASTENED WITH A MINIMUM OF TWO (2) MACHINE SCREWS. NO SELF ADHESIVE NAMEPLATES ARE ALLOWED.
16. ELECTRICAL DESIGN COMPUTES VOLTAGE DROP BASED ON FEEDER LENGTHS REFERENCED ON SINGLE-LINE DIAGRAM. EC TO NOTIFY ENGINEER OF RECORD IN EVENT FIELD CONDITIONS CAUSE A SUBSTANTIAL INCREASE IN OVERALL FEEDER LENGTH.
17. ANY FLOOR-STANDING ELECTRICAL EQUIPMENT (I.E. INVERTERS, DISTRIBUTION BOARDS, SWITCHBOARDS, ATS SWITCHES, MOTOR CONTROL CENTERS, ETC.) WHICH ARE MOUNTED AT/BELOW GRADE AND/OR SUSCEPTIBLE TO WATER DAMAGE SHALL BE MOUNTED ON A MINIMUM 4" HIGH HOUSEKEEPING PAD WHICH EXTENDS 4" BEYOND EQUIPMENT IN ALL DIRECTIONS.
18. ALL MOTOR RELATED CIRCUITS ARE TO BE PROVIDED WITH PROTECTIVE RELAYS FOR PHASE FAILURE AND UNDER-VOLTAGE.
19. ELECTRICAL CONTRACTOR TO INCLUDE IN BID ALL ASSOCIATED COSTS FOR THIRD PARTY TESTING OF ELECTRICAL EQUIPMENT, GROUND FAULT, CONDUCTORS, ETC..

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ALDO GERARDO BARRIOS — 22293 — 3/31/26 — ELECTRICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Date
Revision

Submittal
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 01/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

ELECTRICAL SINGLE LINE DIAGRAM & PANEL SCHEDULES

2E5.00

26-8000 FAN (EXHAUST) SCHEDULE

TAG	SERVICE	LOCATION	MOTOR DATA	ELECTRICAL		DISCONNECT	CONDUIT/WIRE
			WATTS	VOLTAGE	PHASE		
EF-1	F17 RR	F17 RR	7	115 V	1	MOTOR RATED TOGGLE SWITCH	3/4"C. 2#12 + 1#12 GND.
EF-2	A06 MDF	A06 MDF	7	115 V	1	MOTOR RATED TOGGLE SWITCH	3/4"C. 2#12 + 1#12 GND.

26-8000 SPLIT SYSTEM (MINI) INDOOR UNIT SCHEDULE

TAG	SERVICE	POWERED FROM OUTDOOR	ELECTRICAL				FIRE ALARM SHUT DOWN	DISCONNECT	CONDUIT/WIRE
			VOLT	PHASE	MCA	MOCP			
(E)FC-3	-	-					-		
(E)FC-4	-	-					-		
FC-1	F16 STAFF WORK ROOM	NO	208 V	1	14 A	40 A	YES	60AS/2P/40AF	3/4"C. 3#10 + 1#10 GND.
FC-2	F11 RECEPTION	NO	208 V	1	14 A	40 A	YES	60AS/2P/40AF	3/4"C. 3#10 + 1#10 GND.

26-8000 SPLIT SYSTEM (MINI) OUTDOOR UNIT SCHEDULE

TAG	SERVICE	LOCATION	ELECTRICAL				FIRE ALARM SHUTDOWN	DISCONNECT	CONDUIT/WIRE
			VOLT	PHASE	MCA	MOCP			
(E)CU-3	(E)FC-3	ROOF					-	EXISTING	EXISTING
(E)CU-4	(E)FC-4	ROOF					-	EXISTING	EXISTING
CU-1	FC-1	ROOF	208 V	1	38 A	67 A	YES	100AS/2P/70AF NEMA 3R	1"C. 2#4 + 1#10 GND.
CU-2	FC-2	ROOF	208 V	1	38 A	67 A	YES	100AS/2P/70AF NEMA 3R	1"C. 2#4 + 1#10 GND.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BATTISTA
E22315
3/31/26
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

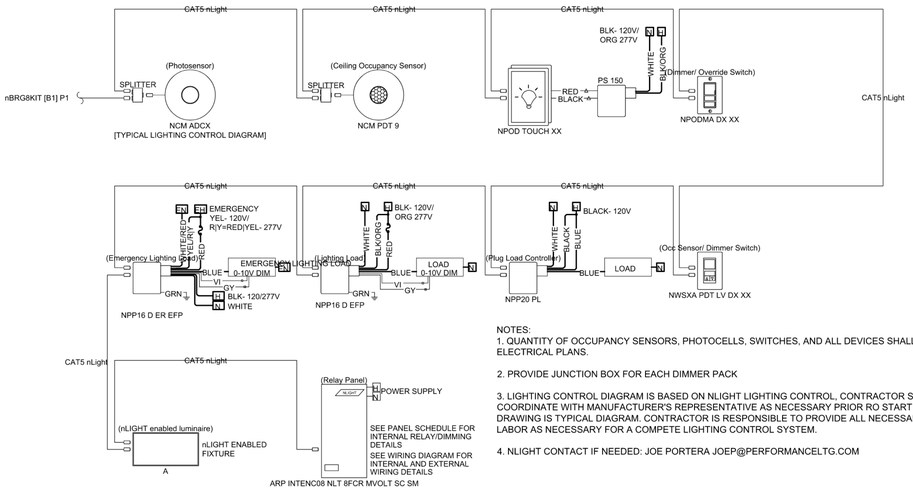
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

ELECTRICAL
MECHANICAL/POWER
SCHEDULES

2E5.01



NOTES:
1. QUANTITY OF OCCUPANCY SENSORS, PHOTOCELLS, SWITCHES, AND ALL DEVICES SHALL BE PER ELECTRICAL PLANS.

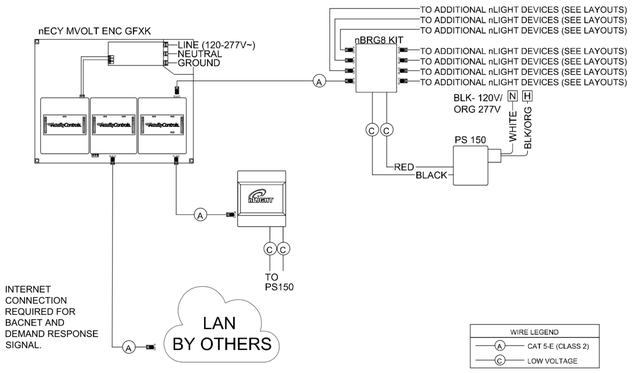
2. PROVIDE JUNCTION BOX FOR EACH DIMMER PACK

3. LIGHTING CONTROL DIAGRAM IS BASED ON NLIGHT LIGHTING CONTROL, CONTRACTOR SHALL CONTACT AND COORDINATE WITH MANUFACTURER'S REPRESENTATIVE AS NECESSARY PRIOR RO START OF WORK. DETAIL DRAWING IS TYPICAL DIAGRAM. CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL NECESSARY MATERIAL AND LABOR AS NECESSARY FOR A COMPETE LIGHTING CONTROL SYSTEM.

4. NLIGHT CONTACT IF NEEDED: JOE PORTERA JOEP@PERFORMANCELTG.COM

1 Design 1 - BG1 B1 Port 1 TYPICAL LIGHTING CONTROL DIAGRAM
NOT TO SCALE

FOR NETWORKED SYSTEM
REQUIRING TIME CONTROL, BACNET,
AUTOMATIC DEMAND RESPONSE, OR
SOFTWARE CONTROL.



TYPICAL WIRING DIAGRAM: nECY MVOLT ENC GFXK
N.T.S.

A Design 3
3/4" = 1'

nLight System Notes

EVERY NLIGHT ENABLED DEVICE (INCLUDING NLIGHT EANABLED FIXTURES) IS FURNISHED WITH (1) PERMANENTLY ADHERED ID TAG AND (1) MATCHING, PARTIALLY ADHERED ID TAG TO BE PLACED ON THE RISER DIAGRAM SHEET, OR THE LIGHTING CONTROL LAYOUT SHEET, PROVIDED AS PART OF AN NLIGHT SUBMITTAL. THIS SHALL BE DONE DURING INSTALLATION AND PRIOR TO FACTORY STARTUP. FAILURE TO COMPLY MAY RESULT IN STARTUP DELAYS AND ADDITIONAL COSTS AT THE CONTRACTOR'S EXPENSE. DO NOT PLACE DEVICE ID STICKERS ON FLOOR PLAN UNLESS REQUIRED TO EXECUTE NFLOORPLAN SERVICES, REFERENCE NFLOORPLAN SERVICE NOTES ON THIS SHEET FOR SPECIFIC REQUIREMENTS.

ONE RELAY PACK OR NLIGHT ENABLED FIXTURE IS NEEDED PER CIRCUIT/ZONE TO BE CONTROLLED AND CAN RESIDE WITHIN SENSORS, WALLPODS, OR RELAY PACKS. POWER PACK PLACEMENT ON DRAWINGS IS FOR COUNTING ONLY; FINAL PLACEMENT IS UP TO DISCRETION OF CONTRACTOR/ENGINEER. PLEASE RECHECK COUNTS TO VERIFY THE NUMBER OF RELAYS NEEDED TO SWITCH ALL DESIRED LOADS.

BRIDGES, RELAYS, POWER PACKS, WALLPODS, AND SENSORS ON DRAWINGS WERE PLACED WITH INFORMATION PROVIDED AT TIME OF DESIGN. ADDITIONAL BRIDGES AND/OR SENSORS MAY BE REQUIRED DEPENDING ON BUILDING CHANGES, FINAL PARTITION HEIGHT/PLACEMENT, FURNITURE PLACEMENT, EQUIPMENT HEIGHT/PLACEMENT AND SHELVING HEIGHT/PLACEMENT.

THE LAYOUT OF THE NETWORK BACKBONE (BRIDGES AND GATEWAYS) HAS BEEN PLACED IN A SEPARATE TREE DIAGRAM AND NOT ON THE ACTUAL LAYOUT. FINAL PLACEMENT OF THE BRIDGE(S) AND GATEWAY(S) DEVICES SHALL BE AT THE CONTRACTOR/ENGINEER DISCRETION.

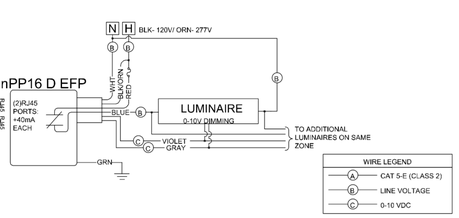
ALL DEVICES HAVE RJ-45 FEMALE PORTS. MAKING NETWORK CONTROL CABLES IS REQUIRED, T568B TERMINATIONS ARE RECOMMENDED. IT IS IMPERATIVE THAT ALL NETWORK CONTROL CABLES BE TESTED WITH A LAN CABLE TESTER TO VERIFY PROPER TERMINATIONS.

DAISY-CHAINED DEVICES SHOULD BE POWERED UP AND WORKING ON DEFAULT PROGRAMMING PRIOR TO CONNECTION TO BRIDGE OR GATEWAYS.

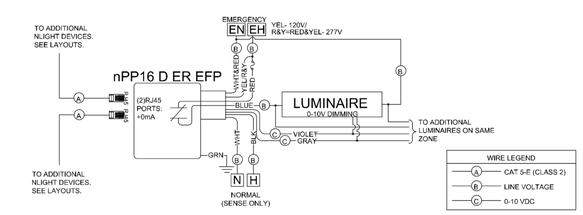
LOW VOLTAGE NETWORK CONTROL CABLE (CAT5/5E/6) RUNS FOR LOCAL ZONES, HOMERUNS AND BACKBONE SHOULD BE WHITE WITH CABLES LABELED.

CONTRACTOR TO VERIFY BLINK/DIAGNOSTIC CODES (VISIT HTTP://NLIGHTCONTROLS.COM/WP-CONTENT/UPLOADS/NLIGHT_POCKET_GUIDE.PDF) WHEN CONNECTING GATEWAYS/BRIDGES TO ZONES.

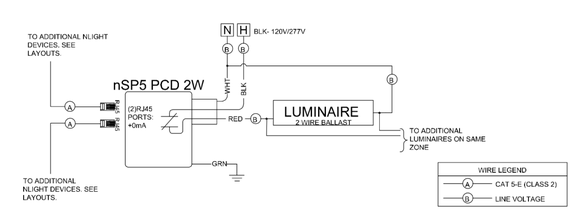
MAXIMUM CABLE LENGTH FROM START DEVICE TO END DEVICE IS 1500' INCLUDING HOMERUN TO BRIDGE DEVICE, IF PRESENT. MANUFACTURER IS NOT RESPONSIBLE FOR SYSTEMS EXCEEDING CABLING PARAMETERS.



TYPICAL WIRING DIAGRAM: NPP16 D EFP
N.T.S.

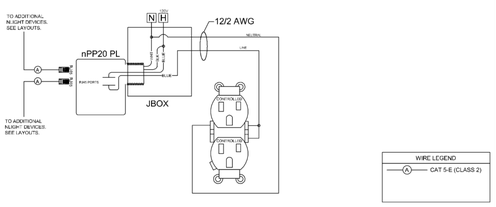


TYPICAL WIRING DIAGRAM: NPP16 D ER EFP
N.T.S.

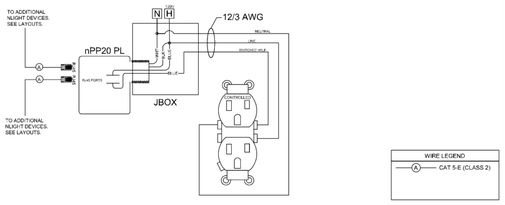


TYPICAL WIRING DIAGRAM: NSP5 PCD 2W
N.T.S.

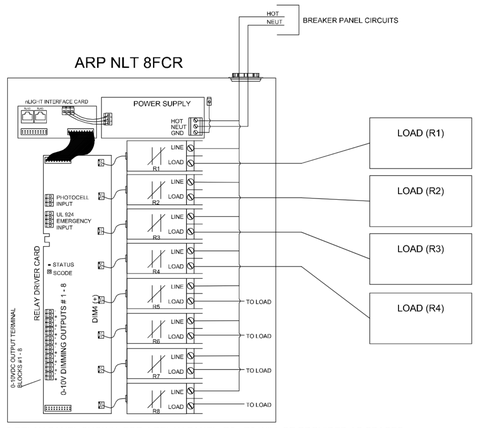
N.T.S.



TYPICAL WIRING DIAGRAM: PLUG LOAD CONTROLLER FULL SWITCHED
N.T.S.

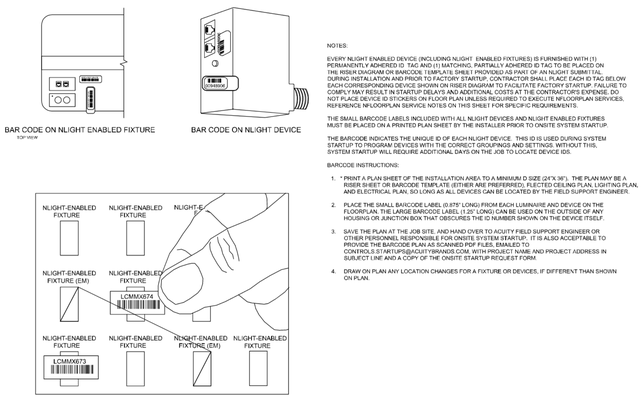


TYPICAL WIRING DIAGRAM: PLUG LOAD CONTROLLER HALF SWITCHED
N.T.S.



8 RELAY PANEL SHOWN. FOR 4 RELAY PANEL, R5 - R8 WILL BE PROVIDED AS SPACES.

TYPICAL DIAGRAM: ARP NLT 4FCR/8FCR
N.T.S.



NLIGHT BARCODE INSTRUCTIONS
N.T.S.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO GERARDO BATTISTA 22285 3/31/26 ELECTRICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

LIGHTING CONTROL DIAGRAMS

2E5.10

LIGHTING FIXTURE SCHEDULE

			Electrical			Source						Manufacturer					
Type	Name	Description	Apparent Load	Voltage	Driver	Source	Lumens	CCT	CRI	Condition	Finish	Manufacturer	Model Number	Equal 1	Equal 2	Mounting Details/ Mounting Height	Location
DP1	Hexagon Acoustic Pendant (direct/indirect)	"Stencil Softzone Pendant" series, stencil pendant surroundlite acoustic panels with direct/indirect 2' illuminated triangle segments on hexagon, surroundlite indirect shielding, direct spotless lens, 90 CRI, remote dimming 0-10V to 1%, 36" cable length	16.5w/2ft	UNV	Remote 0-10V dimming to 1%	LED	350lm/ft up 400lm/ft down	4000K	90+	Interior	TBD	**AXIS**	#STDISZ-[LENGTH]-SLI-350-DS0-400-[TOTAL LENGTH]-[HUB QUANTITY]-90-40-[FINISH]-UNV-DP-[CIRCUIT]-[MOUNTING]-[CANOPY]-HET2-[PANEL COLOR]-[PANEL QUANTITY]	LUMENWERX "SQUERO HUBS ACOUSTIX"	NO EQUAL	19/2AF9.20 01/2E7.10 06/2E7.10	Reception, Staff Work Room
P1	Pendant Cylinder	"EVO 4" series, 4" cylinder pendant, clear reflector, semi-specular reflector, medium wide distribution, pendant slop ceiling canopy cover	8 VA	UNV	Integral 0-10V dimming to 1%	LED	769lm	4000K	80+	Interior	TBD	**GOTHAM**	#EVO4CC-40-07-AR-LSS-MWD-MVOLT-GZ1-[MOUNTING]-[CANOPY TYPE]-[CORD LENGTH]-[FINISH]	DMF "M"	ALW "CORE"	01/2E7.10 06/2E7.10	Throughout
P1-H	Pendant Cylinder (High Output)	"EVO 4" series, 4" cylinder pendant, clear reflector, semi-specular reflector, medium wide distribution, pendant slop ceiling canopy cover	9 VA	UNV	Integral 0-10V dimming to 1%	LED	953lm	4000K	80+	Interior	TBD	**GOTHAM**	#EVO4CC-40-10-AR-LSS-MWD-MVOLT-GZ1-[MOUNTING]-[CANOPY TYPE]-[CORD LENGTH]-[FINISH]	DMF "M"	ALW "CORE"	01/2E7.10 06/2E7.10	Throughout
P2	4' Pendant Strip Light (BOH)	CLX lensed strip light with 48" length, 4000 nominal lumens, premium efficiency, less louver, round diffuse lens, general distribution, multi-volt voltage, and white finish; plus adjustable 10' aircraft cable with Y hanger...	24 VA	277V	Integral 0-10V dimming to 10%	LED	3975lm	4000K	80+	Interior	Standard	**LITHONIA**	#CLX-L48-4000LM-HEF-RDL-MVOLT-GZ10-40K-80CRI-WH + #ZACVH M100	COLUMBIA "CSL"	METALUX "SNLED"	05/2E7.10	Building A - MDF/Storage
R1	2x4 Recessed Flat Panel	"Chisel 2x4" series, 2x4 recessed flat panel, 90CRI, minimalist texture, 0-10V dimming to 1%, 3000 lumens, 277V	25 VA	277V	Integral 0-10V dimming to 1%	LED	3000lm	4000K	90+	Interior	Standard	**MARK**	#CHSL-2X4-[CEILING TRIM]-90CRI-40K-3000LM-MVML-[DIRECTIONAL GRADIENT]-MIN1-277-ZT	COLUMBIA "CBT"	METALUX "CGT"	03/2E7.10	Offices
R2	1x4 Recessed Flat Panel	"Chisel 1x4" series, 1x4 recessed flat panel, 90CRI, 2500 lumens, minimalist texture, 0-10V dimming to 1%, 277V	21 VA	277V	Integral 0-10V dimming to 1%	LED	2500lm	4000K	90+	Interior	Standard	**MARK**	#CHSL-1X4-CEILING TRIM]-90CRI-40K-2500LM-MNML-[DIRECTIONAL GRADIENT]-MIN1-277-ZT	COLUMBIA "CBT"	METALUX "CGT"	02/2E7.10	Restroom
W1-12	Wall Mounted 12' Direct/Indirect Linear	"Beam 2 Wall" series, 12' direct/indirect linear, 300lm/ft up, 500lm/ft down, 90CRI, surroundlite asymetric indirect shielding, direct spotless shielding lens, universal voltage, 0-10V dimming to 1%	77 VA	UNV	Integral 0-10V dimming to 1%	LED	300lm/ft up 500lm/ft down	4000K	90+	Interior	TBD	**AXIS**	#TB2WDLED-300-500-90-40-SO-SO-12-[FINISH]-UNV-DP	PRUDENTIAL "BPRO"	ALW "LIGHTPLANE +2"	04/2E7.10	Reception
W1-17	Wall Mounted 17' Direct/Indirect Linear	"Beam 2 Wall" series, 17' direct/indirect linear, 300lm/ft up, 500lm/ft down, 90CRI, surroundlite asymetric indirect shielding, direct spotless shielding lens, universal voltage, 0-10V dimming to 1%	109 VA	UNV	Integral 0-10V dimming to 1%	LED	300lm/ft up 500lm/ft down	4000K	90+	Interior	TBD	**AXIS**	#TB2WDLED-300-500-90-40-SO-SO-17-[FINISH]-UNV-DP	PRUDENTIAL "BPRO"	ALW "LIGHTPLANE +2"	04/2E7.10	Staff Workroom

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BALTAZAR
62235
3/31/26
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

LIGHTING FIXTURE SCHEDULE

2E6.10

GENERAL NOTES - LIGHTING FIXTURE/SCHEDULE

1. ALL LIGHTING FIXTURES SHALL BE LABELED WITH THE APPROPRIATE UL LABEL (DAMP, WET, ETC.) AS REQ BY CODES & LOCAL ORDINANCES.
2. SHOP DRAWING SUBMITTALS SHALL INCLUDE ALL FIXTURES, & DRIVERS/DIMMING INFORMATION. ANY SHOP DRAWINGS WHICH ARE SUBMITTED WITHOUT ANY ONE OF THESE ITEMS WILL BE REJECTED AS INCOMPLETE & WILL BE REQ TO BE RESUBMITTED WITH THE REQ INFORMATION.
3. ALL LIGHTING FIXTURE SPECIFIC INFORMATION (TYPE, OUTPUT/LUMEN LEVEL, DRIVER, COLOR, MTG, ETC.) HAS BEEN SPECIFIED WITH THE CONSIDERATION OF SPECIFIC PERFORMANCE & AESTHETIC REQUIREMENTS. ANY SUBSTITUTION OF THE SPECIFIED FIXTURES IS SUBJECT TO THE ARCHITECT & ENGINEER OF RECORD'S FINAL APPROVAL & ARE SUBJECT TO THE FOLLOWING CRITERIA:
   a. SUBMIT AN OPERABLE SAMPLE OF THE SPECIFIED FIXTURE & A 120V CORD & PLUG (& DRIVER TO OPERATE SAMPLE IF NECESSARY).
   b. PROVIDE COMPLETE PHOTOMETRIC REPORT(S) FOR THE SITE AND/OR FLOOR PLAN CONFIRMING SUBSTITUTE FIXTURE(S) MEET OR EXCEED DESIGNED ILLUMINANCE LEVELS IN SPACES IDENTIFIED. CLEARLY IDENTIFY ILLUMINANCE LEVELS (IN FOOT-CANDLES), & ALL INPUT DATA UTILIZED IN THE CALCULATION (LUMEN OUTPUTS, LIGHT LOSS FACTORS, ETC.). IN SITUATIONS WHERE SUBSTITUTIONS AFFECT FIXTURES EQUIPPED WITH EMERGENCY BATTERY PACKS OR OTHER EMERGENCY SOURCES OF POWER, PROVIDE ADDITIONAL PHOTOMETRIC REPORT(S) THAT CLEARLY IDENTIFY A MIN OF 1 FOOT-CANDLE ALONG THE PATH(S) OF EGRESS, ALL INPUT DATA UTILIZED IN THE CALCULATION, & THE LUMEN RATING & QUANTITY OF FIXTURES FOR THE EMERGENCY BATTERY PACK. SEE BELOW FOR PHOTOMETRIC PLAN GUIDELINES:
      1. POINT BY POINT SPACING IS NOT TO EXCEED 10'-0" IN ANY DIRECTION ON SITE PLANS; SPACING IS NOT TO EXCEED 4'-0"IN ANY DIRECTION ON INTERIOR FLOOR PLANS.
      2. PHOTOMETRIC STUDY IS TO BE BASED ON MAINTAINED ILLUMINANCE LEVELS (IN FOOT-CANDLES) USING MEAN FIXTURE LUMENS & THE SAME LIGHT LOSS FACTORS USED IN THE ORIGINAL DESIGN CALCULATIONS PERFORMED BY THE ENGINEER OF RECORD.
      3. ASSOCIATED REPORT TO INCLUDE AN ENERGY COST MODEL WHICH IDENTIFIES ADDITIONAL ENERGY OR ENERGY COSTS FOR A 10-YEAR PERIOD AS COMPARED TO THE ORIGINAL ITEM SPECIFIED. ALL ADDITIONAL EXPENSES WILL BE SUBTRACTED FROM THE CONTRACT COST.
   c. WHERE APPLICABLE, TEST SWITCH MOUNTING (INTEGRAL OR REMOTE) SHALL MATCH THE MOUNTING AS SPECIFIED ON THE DESIGN DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL COVER PLATES, TRIMS, REFLECTORS, ETC. NECESSARY FOR THE SPECIFIC TEST SWITCH MOUNTING.
   d. MANUFACTURER'S CATALOG CUT SHEET WHICH INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING INFORMATION: LUMEN LEVEL, DRIVER/TRANSFORMER OPTIONS, VOLTAGES, OPTICS, EPA RATING (WHERE APPLICABLE), FIXTURE DIMENSIONS, EMERGENCY OPTIONS (WHERE APPLICABLE), & FIXTURE FINISHES.
   e. FOR ALL SITE LIGHTING FIXTURES, PROVIDE POLE SPECIFICATIONS WITH SUPPLEMENTAL DOCUMENTATION IDENTIFYING POLE SIZE IS RATED ACCORDINGLY BASED ON FIXTURE(S) EPA & WIND RATING FOR THE PROJECT ZONE.
   f. A SIGNED COPY OF THE "SUBSTITUTION COMPLIANCE FORM" LOCATED IN THE DIVISION 1 SPECIFICATION WHICH STATES THAT IF THE PROPOSED SUBSTITUTION IS ACCEPTED, THEN THE PROJECT SCHEDULE WILL NOT BE NEGATIVELY AFFECTED. IF THE COMPLETION OF THE PROJECT IS DELAYED DUE TO THE PROPOSED SUBSTITUTION, THEN THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR ANY & ALL ESTABLISHED LIQUIDATED DAMAGES.
   g. CONTRACTOR TO PROVIDE ARCHITECT & ENGINEER OF RECORD WITH ALL SUBSTITUTE INFORMATION REFERENCED ABOVE NO LATER THAN TWO WORKING WEEKS PRIOR TO THE BID DEADLINE.
4. CATALOG NUMBERS AS REFERENCED ON THE FIXTURE SCHEDULE PROVIDE GENERAL FIXTURE INFORMATION. CONTRACTOR SHALL REVIEW LIGHTING PLANS & SPECIFICATIONS TO VERIFY ALL FIXTURE ASSOCIATED DESIGN INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY PARTS & PIECES REQ FOR A COMPLETE & OPERATIONAL INSTALLATION. ANY DISCREPANCIES BETWEEN DESCRIPTIONS, SPECIFICATIONS, & CATALOG NUMBERS ARE TO BE PRESENTED TO THE ENGINEER OF RECORD PRIOR TO COMPLETION OF THE BID PROCESS FOR CLARIFICATION.
5. ALL COLOR SPECIFIC INFORMATION WHICH RELATES TO LIGHTING FIXTURES AND/OR THEIR RELATED PARTS ARE TO BE REVIEWED & COMMENTED ON BY THE ARCHITECT. FIXTURES WHICH REQUIRE A CUSTOM COLOR WILL HAVE A CUSTOM COLOR PAINT WHICH WILL BE INCLUDED IN THE ARCHITECT'S SHOP DRAWING REVIEW COMMENTS.
6. ALL LIGHTING EQUIPMENT LOCATIONS ARE TO BE COORDINATED WITH THE ARCHITECTURAL REFLECTED CEILING PLAN PRIOR TO ORDERING & INSTALLING.
7. ENSURE COMPATIBILITY OF ALL DIMMING SYSTEMS & INDIVIDUAL LIGHTING CONTROLS WITH FIXTURES, & DRIVERS. ALL COMPONENTS TO BE FACTORY CERTIFIED COMPATIBLE FOR A FULL RANGE OF DIMMING.
8. LIGHTING FIXTURE CLEARANCES FROM COMBUSTIBLE MATERIALS ARE TO BE A MIN OF ½" (OTHER THAN AT POINTS OF SUPPORT) & 3" FROM INSULATION FOR NON-IC RATED RECESSED LIGHTING FIXTURES.
9. ALL LIGHTING FIXTURES WHICH ARE TO BE MOUNTED IN FOOD SERVICE AREAS SHALL BE PROVIDED WITH THE FOLLOWING CHARACTERISTICS: DOOR TO FRAME GASKETS, LENS TO FRAME GASKETS, INVERTED LENS, & A FOOD SERVICE RATING.
10. ALL LIGHTING FIXTURES TO BE MOUNTED IN A SUSPENDED CEILING ARE TO BE SUPPORTED BY T-BAR CLIPS & (2) #12 SUPPORT WIRES ATTACHED TO THE BUILDING FRAME. IN ADDITION, LIGHTING FIXTURE ARE TO BE SECURED TO THE CEILING GRID WITH (4) SHEET METAL SCREWS ((1) AT EACH CORNER OF THE FIXTURE) – SCREWS SHALL BE NEITHER VISIBLE NOR IMPEDE THE INSTALLATION OF CEILING TILES; UNO. WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
11. CONTRACTOR TO FOLLOW COLOR TEMPERATURE GUIDELINES LISTED BELOW UNLESS OTHERWISE NOTED OR SPECIFIED:
    a. 3500K FOR ALL INTERIOR ENVIRONMENTS
    b. 3000K FOR ALL EXTERIOR ENVIRONMENTS
12. CONTRACTOR TO FOLLOW CRI & TM30 VALUES GUIDELINES LISTED BELOW UNLESS OTHERWISE NOTED OR SPECIFIED:
    a. CRI 80 FOR INTERIOR
    b. TM30 RF VALUE ≥ 78 FOR INTERIOR
    c. TM30 RG VALUE ≥ 98 FOR INTERIOR
    d. CRI 70 FOR EXTERIOR
13. ALL FIXTURES, TRIMS, & MODULES/LAMPS SHALL BE CLEANED & FREE FROM DIRT, DUST, LABEL/ADHESIVE, & FINGER PRINTS.
14. IN THE EVENT OF THE FAILURE OF NORMAL POWER SUPPLIES, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY POWERED BY AN EMERGENCY POWER SYSTEM. THE FIXTURE SHALL BE EITHER:
    a. CIRCUITED TO AN EMERGENCY POWER SYSTEM, OR
    b. EMERGENCY BATTERY PACKS ARE TO BE PROVIDED. WHERE EMERGENCY BATTERY PACKS ARE PROVIDED, EMERGENCY LIGHTING FIXTURES & BATTERY PACKS ARE TO MEET THE FOLLOWING CRITERIA:
       1. FIXTURES SPECIFIED WITH INTEGRAL EMERGENCY BATTERY PACKS ARE TO BE FED WITH/PROVIDED WITH A CONSTANT HOT CONNECTION TO THE CHARGING LEAD.
       2. APPROVED EMERGENCY BATTERY PACKS SHALL BE PROVIDED AS FOLLOWS: BODINE #BSL23 OR #BSL722 OR EQUAL IF AVAILABLE.
       3. ALL LED FIXTURES EQUIPPED WITH EMERGENCY BATTERY PACKS SHALL HAVE THE BATTERY PACKS FACTORY INSTALLED & TESTED AT THE FIXTURE MANUFACTURER'S FACILITY TO ENSURE UL LISTING OF THE FIXTURE IS MAINTAINED. FIELD INSTALLATION OF LED EMERGENCY BATTERY PACKS IS STRICTLY PROHIBITED. NOTIFY ENGINEER OF RECORD SHOULD SPECIFIED FIXTURE NOT HAVE ADEQUATE SPACE TO ACCOMMODATE THE EMERGENCY BATTERY PACK. CONTRACTOR TO MODIFY BASE BID TO INCLUDE ALL NECESSARY EQUIPMENT FOR A COMPLETE OPERATIONAL, ADEQUATELY SIZED MINIATURE INVERTER SYSTEM TO BE MOUNTED IN NEAREST ELECTRICAL ROOM IN THE EVENT THE BATTERY PACK CAN NOT BE INSTALLED IN THE FIXTURE.
       4. ALL BATTERY PACKS ARE TO BE FACTORY INSTALLED IN FIXTURE ASSEMBLIES WHEN APPLICABLE. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR CONTACTING FIXTURE MANUFACTURERS TO VERIFY SPECIFIED (OR APPROVED SUBSTITUTE) FIXTURE HAS ADEQUATE SPACE WITHIN THE FIXTURE TO MOUNT THE EMERGENCY BATTERY PACK. IF IT IS DETERMINED THE BATTERY PACK CANNOT BE MOUNTED IN THE FIXTURE, THEN CONTRACTOR SHALL INCLUDE ALL COSTS REQ FOR REMOTE MOUNTING THE EMERGENCY BATTERY PACK ABOVE NEAREST ACCESSIBLE CEILING. ENSURE DISTANCE FROM FIXTURE TO REMOTE BATTERY PACK LOCATION DOES NOT EXCEED THE MANUFACTURER'S RECOMMENDED DISTANCES. COORDINATE ALL ACCESS PANELS WITH ARCHITECT OF RECORD PRIOR TO INSTALL.
       5. ALL LIGHTING FIXTURES WITH EMERGENCY BATTERY PACKS ARE TO BE PROVIDED WITH INTEGRAL TEST SWITCHES & CHARGE LIGHTS UNLESS OTHERWISE NOTED OR REQ BY THE AUTHORITY HAVING JURISDICTION (AHJ). IN THE EVENT INTEGRAL TEST SWITCHES ARE NOT ALLOWED, NOTIFY THE ENGINEER OF RECORD PRIOR TO INSTALLATION OF REMOTE TEST SWITCHES. TEST SWITCHES TO BE INSTALLED IN FIXTURES WITH A MIN OF 18" OF ADDITIONAL WIRING TO ALLOW FOR GENERAL FIXTURE MAINTENANCE.
       6. SHUNT UL 924 WILL BE PROVIDED IN CONTROL SYSTEM OR WITHIN FIXTURE TO RAISE EMERGENCY LIGHT FIXTURE TO 100% AT TIME OF EMERGENCY.
15. EMERGENCY ILLUMINATION UNITS SHALL BE ARRANGED TO PROVIDE AT LEAST AN AVERAGE OF 1 FOOT-CANDLE & A MIN OF 0.1 FOOT-CANDLE MEASURED ALONG THE PATH OF EGRESS. A MAXIMUM-TO-MIN ILLUMINATION UNIFORMITY RATIO OF 40-TO-1 SHALL NOT BE EXCEEDED. WHERE LOCAL CODES OR ORDINANCES REQUIRE MORE STRINGENT ILLUMINATION OR CONTRAST RATIOS, EMERGENCY ILLUMINATION UNITS SHALL MEET OR EXCEED LOCAL CODE OR ORDINANCE REQUIREMENTS.
16. INSTALL ALL EXIT SIGNS IN ACCORDANCE WITH THE LOCAL AHJ & FIRE AUTHORITY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL REQ PARTS, PIECES, & MOUNTING HARDWARE FOR EXIT SIGNS, AS WELL AS ENSURING THE EXIT SIGNS ARE MOUNTED IN AN APPROVED VISIBLE LOCATION. VERIFY ALL REQ CHEVRONS, MIRRORS, & FACES ARE PROVIDED AS REFERENCED ON THE ARCHITECTURAL REFLECTED CEILING PLAN. NOTIFY ARCHITECT & ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN ARCHITECTURAL & ELECTRICAL DRAWINGS PRIOR TO ORDERING OF EQUIPMENT.
17. TRACK LIGHTING FIXTURE SPECIFICATIONS ARE TO BE COORDINATED, VERIFIED, & CONFIRMED WITH EQUIPMENT MANUFACTURER AND/OR DISTRIBUTOR PRIOR TO ORDERING & INSTALLING. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY PARTS & PIECES FOR A COMPLETE, FUNCTIONAL, & OPERATIONAL INSTALLATION. TRACK LENGTHS ARE AS SPECIFIED ON THE FIXTURE SCHEDULE.
18. CONTRACTOR SHALL INSTALL ALL LIGHTING FIXTURES PER LOCAL & NATIONAL BUILDING, ELECTRICAL, & SEISMIC CODES. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL REQ MOUNTING HARDWARE & BRACING MATERIALS FOR COMPLETE & CODE COMPLIANT INSTALLATION. COORDINATE REQUIREMENTS WITH AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLATION.
19. CONTRACTOR TO INCLUDE IN BASE BID A MIN OF 2-HOURS FOR A ONE TIME AIMING & ADJUSTMENT TIME OF ALL MULTI-HEAD & DIRECTIONAL FIXTURE ASSEMBLIES. AIMING & ADJUSTMENT TO BE SCHEDULED FOR A NIGHT & AFTER HOURS WITH THE ARCHITECT, ENGINEER, & OWNER PRESENT. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AN APPROPRIATE TIME PRIOR TO ORDERING THE FINAL PUNCH WALK FOR THE PROJECT.
20. SUPPLEMENTARY OVERCURRENT PROTECTION PANEL FOR TRACK LIGHTING SYSTEMS TO BE PROMINENTLY LABELED AS FOLLOWS:

    NOTICE: THIS PANEL FOR TRACK LIGHTING ENERGY CODE COMPLIANCE ONLY. THE OVERCURRENT PROTECTION DEVICES IN THIS PANEL SHALL ONLY BE REPLACED WITH THE SAME OR LOWER AMPERAGE. NO OTHER OVERCURRENT PROTECTIVE DEVICE(S) SHALL BE ADDED TO THIS PANEL. ADDING TO, OR REPLACEMENT OF EXISTING OVERCURRENT PROTECTIVE DEVICE(S) WITH HIGHER CONTINUOUS AMPERE RATING, WILL VOID THE PANEL LISTING & REQUIRE RESUBMITTAL & RE-CERTIFICATION OF CALIFORNIA TITLE 24, PART 6 COMPLIANCE DOCUMENTATION.
21. LED DRIVERS SHALL CONFORM TO IEEE P1789 STANDARDS. ALTERNATIVELY, MANUFACTURERS MUST DEMONSTRATE CONFORMANCE WITH PRODUCT LITERATURE & TESTING WHICH DEMONSTRATES THIS PERFORMANCE. SYSTEM THAT DO NOT MEET IEEE P1789 WILL NOT BE CONSIDERED.
22. LED DRIVERS WILL NOT HAVE VOLTAGE LEAK OR CONTAIN A FILTER WITHIN THE CONTROL MODULE TO CONTROL THE VOLTAGE LEAK & REDUCE THE CHANCES OF FLICKERING.
23. LED DIODES SHALL BE SOURCED WITHIN 3 MACADAMS ELLIPSE ALONG THE BLACK BODY CURVE.

LIGHTING CONTROL SYSTEM REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING OF ALL MATERIAL, LABOR, EQUIPMENT, & SERVICES, IN CONNECTION W/ THE INSTALLATION OF A COMPLETE & FULLY FUNCTIONING & CODE COMPLIANT INSTALLATION.
2. IT IS THE INTENT OF THE CONTRACT DOCUMENTS, WHICH ARE PRESENTED IN A DIAGRAMMATIC FORMAT, TO PROVIDE CONTRACTOR INFORMATION THAT SUPPLEMENTS & ENHANCES THE GENERALLY ACCEPTED CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES & PROCEDURES EMPLOYED IN CONNECTION WITH INSTALLATION OF THIS TYPE OF PRODUCT / SYSTEM.
3. THE CONTRACTOR SHALL ALSO INCORPORATE THE REQ OF THE MFR INSTALLATION INSTRUCTIONS / WARRANTY REQ AS PART OF THE REQ OF THE CONSTRUCTION DOCUMENTS. IN THE EVENT OF A CONFLICT BETWEEN THE CONTRACT DOCUMENT REQ & THE MFR INSTALLATION REQ, THE MORE STRINGENT REQ SHALL APPLY - UNLESS THE MORE STRINGENT REQ VOIDS APPLICABLE WARRANTIES OR VIOLATES THE REQ OF THE LOCAL AUTHORITY HAVING JURISDICTION. ANY SUCH CONFLICT SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING THROUGH THE FORMAL RFI PROCESS.
4. REFER TO THE ASSOCIATED SCHEDULES, SCHEMATICS, DWG, & SPECIFICATIONS FOR DETAILED INFORMATION / REQ ON THIS PRODUCT / SYSTEM.
5. LIGHTING CONTROL SYSTEM MUST INTEGRATE WITH DISTRICT APPROVED AUTOMATED LOGIC ENERGY MANAGEMENT SYSTEM.
6. PROVIDE (6) "SPARE" ADDITIONAL RELAYS.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO RAMIREZ
22225
3/31/26
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

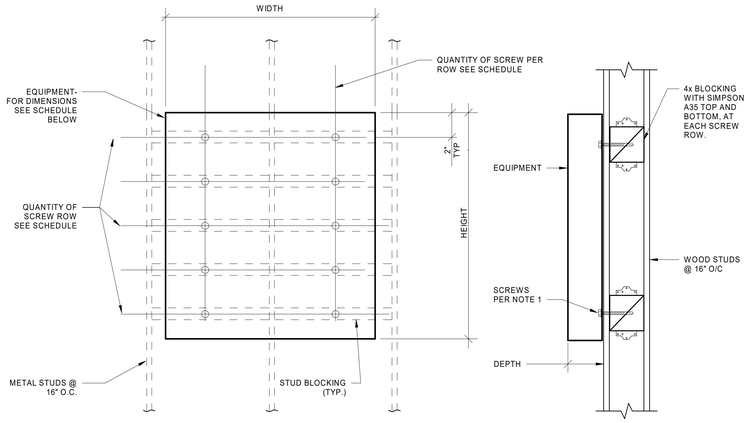
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

LIGHTING CONTROL SCHEDULES

2E6.20



FRONT ELEVATION

SIDE ELEVATION

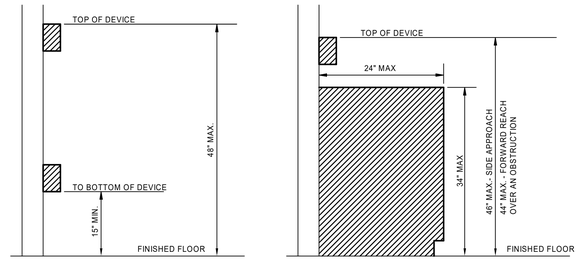
ANCHORAGE SCHEDULE - WALL MOUNTED ELECTRICAL EQUIPMENT

EQUIPMENT	LOCATION (ROOM NO.)	WEIGHT (lbs)	HEIGHT (in)	WIDTH (in)	DEPTH (in)	SCREWS - SEE NOTE 1 & 2	
						QTY OF SCREW ROWS	QTY OF SCREWS PER ROWS
PANEL AC1	STORAGE A06	108	42	20	5.75	6	2
PANEL F1	BLDG. F EXT.	108	42	20	5.75	6	2
CONTRACTOR PANELS	VARIOUS	80	30	20	6	2	2
LIGHT FIXTURES	VARIOUS	25	-	-	-	2	2

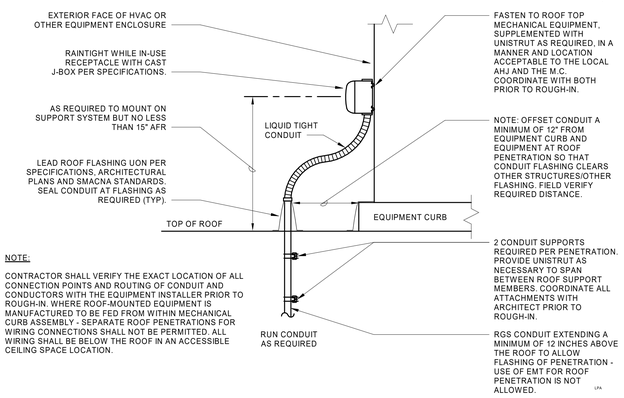
NOTE:

1. AT WOOD STUDS SCREWS SHALL BE 1/4" SIMPSON SDS SCREWS (ICC ESR-2296) WITH MINIMUM 2 1/2" EMBED INTO WOOD BLOCKING.

TYPICAL WALL MOUNTED EQUIPMENT SCHEDULE AND DETAILS — NTS — 09



ADA DEVICE MOUNTING — NTS — 02



NOTE:

CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL CONNECTION POINTS AND ROUTING OF CONDUIT AND CONDUCTORS WITH THE EQUIPMENT INSTALLER PRIOR TO ROUGH-IN. WHERE ROOF-MOUNTED EQUIPMENT IS MANUFACTURED TO BE FED FROM WITHIN MECHANICAL CURB ASSEMBLY - SEPARATE ROOF PENETRATIONS FOR WIRING CONNECTIONS SHALL NOT BE PERMITTED. ALL WIRING SHALL BE BELOW THE ROOF IN AN ACCESSIBLE CEILING SPACE LOCATION.

EQUIPMENT MOUNTED SWITCH / RECEPTACLE MOUNTING DETAIL — NTS — 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BATTISTA
ELECTRICAL
STATE OF CALIFORNIA
E22215
3/31/26

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

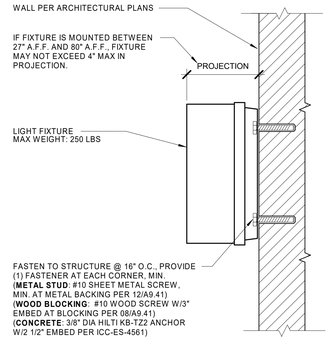
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

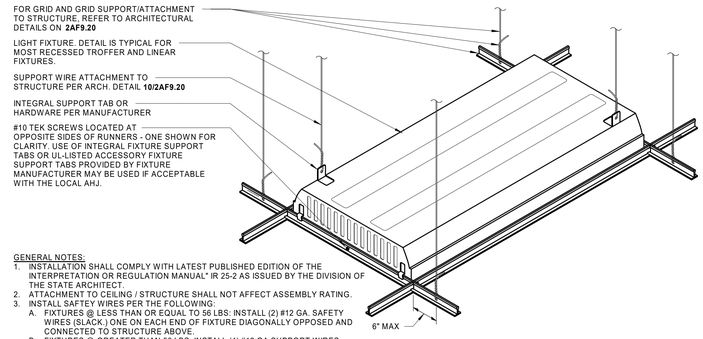
Job Number	31942
Checked By	Checker
Scale	As indicated

ELECTRICAL DETAILS

2E7.00



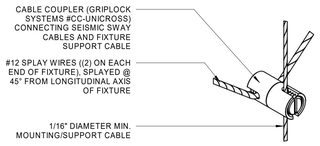
WALL MOUNTED LIGHT FIXTURE — N.T.S. — 04



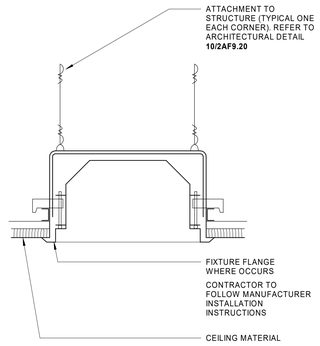
GENERAL NOTES:

1. INSTALLATION SHALL COMPLY WITH LATEST PUBLISHED EDITION OF THE INTERPRETATION OR REGULATION MANUAL" IR 25-2 AS ISSUED BY THE DIVISION OF THE STATE ARCHITECT.
2. ATTACHMENT TO CEILING / STRUCTURE SHALL NOT AFFECT ASSEMBLY RATING.
3. INSTALL SAFTEY WIRES PER THE FOLLOWING:
   A. FIXTURES @ LESS THAN OR EQUAL TO 56 LBS: INSTALL (2) #12 GA. SAFETY WIRES (SLACK) ONE ON EACH END OF FIXTURE DIAGONALLY OPPOSED AND CONNECTED TO STRUCTURE ABOVE.
   B. FIXTURES @ GREATER THAN 56 LBS: INSTALL (4) #12 GA SUPPORT WIRES (TAUT). ONE ON EACH CORNER OF FIXTURE CONNECTED TO STRUCTURE. WIRES SHALL SUPPORT (4) TIMES THE WEIGHT OF THE FIXTURE.
   C. FIXTURES @ LESS THAN OR EQUAL TO 56 LBS AND GREATER THAN 2'x4' IN SIZE: INSTALL (4) #12 GA. SAFETY WIRES (SLACK) AT EACH CORNER OF THE FIXTURE.

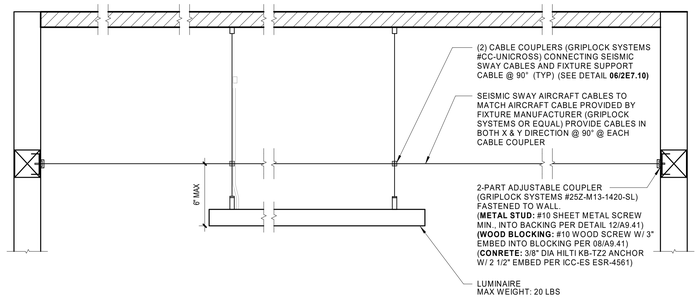
RECESSED FIXTURE - GRID CEILING — 1" = 1'-0" — 03



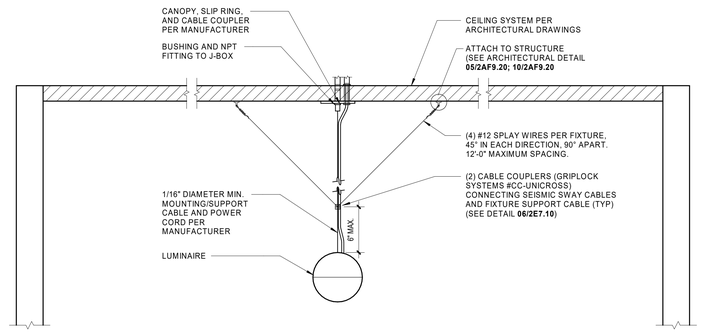
CC-UNICROSS CABLE COUPLER — N.T.S. — 06



RECESSED FIXTURE - HARD CEILING — N.T.S. — 02



PENDANT LINEAR - HORIZONTAL BRACING — N.T.S. — 05



PENDANT FIXTURE - SPLAY BRACING — N.T.S. — 01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ALDO VERARDO BATTISTA — 22235 — 3/31/26 — ELECTRICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	N.T.S.

LIGHTING DETAILS

2E7.10

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
This document is used to demonstrate compliance with requirements in 110.9, 110.12(c), 130.0, 130.1, 140.6 and 141.0(b)2 for indoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e) and 180.2(b)4 for indoor lighting scopes using the prescriptive path for multifamily occupancies. Multifamily includes dormitory and senior living facilities.	
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 1 of 8)
Project Address: 10505 Davis Road	**Date Prepared:** 4/17/2026

A. GENERAL INFORMATION

01	Project Location (city)	Stockton	04 Total Conditioned Floor Area (ft²)	1,840
02	Climate Zone	12	05 Total Unconditioned Floor Area (ft²)	0
03	Occupancy Types Within Project (select all that apply):		06 # of Stories (Habitable Above Grade)	1

● Office ● Support Areas

B. PROJECT SCOPE

This table includes any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.6 / 170.2(e) or 141.0(b)2 / 180.2(b)4 for alterations.

Scope of Work	Conditioned Spaces		Unconditioned Spaces	
01	02	03	04	05
My Project Consists of (check all that apply):	Calculation Method	Area (ft²)	Calculation Method	Area (ft²)
☐ New Lighting System				
☐ New Lighting System - Parking Garage				
☒ Altered Lighting System	Area Category Method	1840	Area Category Method	0
Total Area of Work (ft²)	1840		0	

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 2 of 8)
	Date Prepared: 4/17/2026

C. COMPLIANCE RESULTS

If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per 140.6(b)1 / 170.2(e)	Allowed Lighting Power per 140.6(b) / 170.2(e) (Watts)						Adjusted Lighting Power per 140.6(a) / 170.2(e) (Watts)				Compliance Results
	01	02	03	04		05	06	07		08	09
	Complete Building 140.6(c)1	Area Category 140.6(c)2 / 170.2(e)4	Area Category Additional 140.6(c)2G / 170.2(e)4Av (+)	Tailored 140.6(c)3 / 170.2(e)4B (+)	=	**Total Allowed** (Watts)	≥	Total Designed (Watts)	Adjustments: PAF Lighting Control Credits 140.6(a)2 / 170.2(e)1B (-)	= **Total Adjusted** (Watts) *Includes Adjustments	**05 must be >= 08 140.6 / 170.2(e)**
	(See Table I)	(See Table I)	(See Table J)	(See Table K)				(See Table F)	(See Table P)		
Conditioned		1,135.8	0		=	1,136	≥	1,009	0	= 1009	COMPLIES
Unconditioned					=		≥			=	
Controls Compliance (See Table H for Details)											COMPLIES
Rated Power Reduction Compliance (See Table Q for Details)											

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 3 of 8)
	Date Prepared: 4/17/2026

F. INDOOR LIGHTING FIXTURE SCHEDULE

This table includes all planned permanent and portable lighting other than dwelling unit/ hotel/ motel room lighting. Multifamily dwelling unit and hotel/motel room lighting is documented in Table T. If using Table T to document lighting in multifamily common use areas providing shared provisions for living, eating, cooking or sanitation, those luminaires are not included here.

Designed Wattage: Conditioned Spaces

01	02	03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description	Modular (Track) Fixture	Small Aperture & Color Change[1]	Watts per luminaire[2]	How is Wattage determined	Total Number of Luminaires	Excluded per 140.6(a)3 / 170.2(e)2C	Design Watts	Field Inspector	
									Pass	Fail
DP1	DP1 - (1) 16.5W/2FT Direcit/indirect LED pendant	No	NA	33	Mfr. Spec	14	No	462	☐	☐
P1	P1 - (1) 8W Pendant LED cylinder	No	NA	8	Mfr. Spec	17	No	136	☐	☐
P1-H	P1-H - (1) 9W Pendant LED cylinder	No	NA	9	Mfr. Spec	6	No	54	☐	☐
R1	R1 - (1) 25W 2'x4' Recessed LED flat panel	No	NA	25	Mfr. Spec	6	No	150	☐	☐
R2	R2 - (1) 21W 1'x4' Recessed LED flat panel	No	NA	21	Mfr. Spec	1	No	21	☐	☐
W1-12	W1-12 - (1) 77W Wall mounted 12FT direct/indirect LED linear	No	NA	77	Mfr. Spec	1	No	77	☐	☐
W1-17	W1-17 - (1) 109W Wall mounted 17FT direct/indirect LED linear	No	NA	109	Mfr. Spec	1	No	109	☐	☐
							Total Designed Watts: CONDITIONED SPACES	1,009		

[1]*FOOTNOTE: Design Watts for small aperture and color changing luminaires which qualify per 140.6(a)4B / 170.2(e)2D is adjusted to be 75% /80% of their rated wattage. Table F automatically makes this adjustment, the permit applicant should enter full rated wattage in column 05.*

[2]*Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) / 160.5(b). Wattage used must be the maximum rated for the luminaire, not the lamp.*

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 4 of 8)
	Date Prepared: 4/17/2026

G. MODULAR LIGHTING SYSTEMS

This section does not apply to this project.

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

This table includes lighting controls for conditioned and unconditioned spaces.

Building Level Controls

01	02	03	
		Field Inspector	
		Pass	Fail
Mandatory Demand Response 110.12(c)	Shut-off controls 130.1(c) / 160.5(b)4C	☐	☐
NA < 4,000W subject to multilevel	See Area/Space Level Controls	☐	☐

Area Level Controls

04	05	06	07	08	09	10	11	12	
Area Description	Complete Building or Area Category Primary Function Area	Manual Area Controls 130.1(a) / 160.5(b)4A	Multi-Level Controls 130.1(b) / 160.5(b)4B	Shut-Off Controls 130.1(c) // 160.5(b)4C	Primary/Sky lit Daylighting 130.1(d) / 160.5(b)4D	Secondary Daylighting 130.1(d) / 160.5(b)4D	Interlocked Systems 140.6(a)1/ 170.2(e)2A	Field Inspector	
								Pass	Fail
Reception F11	Office (>250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Principal Office F12	Office (<=250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Office F13	Office (<=250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Office F14	Office (<=250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Office F15	Office (<=250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Staff Workroom F16	Office (>250 square feet)	Readily Accessible	Dimmer	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 5 of 8)
	Date Prepared: 4/17/2026

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

Restroom F17	Restroom	Readily Accessible	Dimmer	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐
							13		
							Plan Sheet Showing Daylit Zones:		

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Each area complying using the Complete Building or Area Category Methods per 140.6(b) are included in this table. Column 06 indicates if additional lighting power allowances per 140.6(c) or adjustments per 140.6(a) are being used .

Conditioned Spaces

01	02	03	04	05	06	
Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft²)	Area (ft²)	Allowed Wattage (Watts)	Additional Allowance / Adjustment	
					Area Category	PAF
Office >250SQFT	Office (>250 square feet)	0.6	1,203	721.8	No	No
Office <250SQFT	Office (<=250 square feet)	0.65	565	367.2	No	No
Restroom	Restroom	0.65	72	46.8	No	No
	TOTALS:		1,840	1,135.8	See Tables J, or P for detail	

J. ADDITIONAL ALLOWANCE: AREA CATEGORY METHOD QUALIFYING LIGHTING SYSTEM

This section does not apply to this project.

K. TAILORED METHOD GENERAL LIGHTING POWER ALLOWANCE

This section does not apply to this project.

L. ADDITIONAL LIGHTING ALLOWANCE: TAILORED WALL DISPLAY

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 6 of 8)
	Date Prepared: 4/17/2026

M. ADDITIONAL LIGHTING ALLOWANCE: TAILORED FLOOR AND TASK LIGHTING

This section does not apply to this project.

N. ADDITIONAL LIGHTING ALLOWANCE: TAILORED DECORATIVE /SPECIAL EFFECTS

This section does not apply to this project.

O. ADDITIONAL LIGHTING ALLOWANCE: TAILORED VERY VALUABLE MERCHANDISE

This section does not apply to this project.

P. POWER ADJUSTMENT: LIGHTING CONTROL CREDIT (POWER ADJUSTMENT FACTOR (PAF))

This section does not apply to this project.

Q. RATED POWER REDUCTION COMPLIANCE FOR ONE-FOR-ONE ALTERATIONS

This section does not apply to this project.

R. 80% LIGHTING POWER FOR ALL ALTERATIONS - CONTROLS EXCEPTIONS

This section does not apply to this project.

S. DAYLIGHT DESIGN POWER ADJUSTMENT FACTOR (PAF)

This section does not apply to this project.

T. DWELLING UNIT LIGHTING

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 7 of 8)
	Date Prepared: 4/17/2026

U. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selections have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-LTI-E - Must be submitted for all buildings

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and any with "-A" in the form name must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/attcp/providers.html

Form/Title	Systems/Spaces To Be Field Verified
NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	Reception F11; Principal Office F12; Office F13; Office F14; Office F15; Staff Workroom F16; Restroom F17;
NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	Reception F11; Principal Office F12; Office F13; Office F14; Office F15;

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTI-E
Project Name: Elkhorn Elementary School - Campus Modernization Increment 2	**Report Page:** (Page 8 of 8)
Project Address: 10505 Davis Road	**Date Prepared:** 4/17/2026

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Aldo Bacuzzi	Documentation Author Signature:
Company: LPA Design Studios, Inc.	Signature Date: 2026-04-17
Address: 5301 California Ave.	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: Irvine CA	Phone: (949) 261-1001

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Aldo Bacuzzi	Responsible Designer Signature:
Company: LPA Design Studios, Inc.	Date Signed: 2026-04-17
Address: 5301 California Ave, Suite #100	License: E22215
City/State/Zip: Irvine CA 92617	Phone: (949) 261-1001

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO GERARDO BACUZZI E22215 3/31/26 ELECTRICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2
10505 DAVIS ROAD, STOCKTON, CA 95209
Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

ELECTRICAL ENERGY COMPLIANCE DOCUMENTATION

2E8.00

FIRE ALARM PLAN REQUIREMENTS

1. ALL WALL-MTD VISUAL SIGNALING APPLIANCES & COMBINATION AUDIBLE/VISUAL SIGNALING APPLIANCES SHALL BE MTD SUCH THAT THE ENTIRE LENS IS NOT LESS THAN 80" & NO GREATER THAN 96" ABOVE THE FINISHED FLOOR. ALL WALL MTD AUDIBLE SIGNALING APPLIANCES SHALL HAVE THEIR TOPS ABOVE FINISHED FLOOR AT HEIGHTS NOT LESS THAN 90" & BELOW FINISHED CLG ON NOT LESS THAN 6" (WHICHEVER IS LOWER).
2. ALL EQUIPMENT SHALL BE UL AND CSFM LISTED.
3. ALL WIRING SHALL BE IN ACCORDANCE WITH THE CEC & AUTHORITIES HAVING JURISDICTION.
4. ALL JUNCTION BOXES SHALL BE SIZED IN ACCORDANCE WITH THE CEC & SHALL HAVE THEIR COVERS PAINTED RED WHERE APPLICABLE.
5. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQ SERVICING, TROUBLE SHOOTING, ETC
6. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS W/O PRIOR APPROVAL FROM ELECTRICAL ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDL PARTS, ENGINEERING, ETC, THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
7. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW, NOR CLOSER THEN 3 FT (915mm) FROM AN AIR SUPPLY DIFFUSER.
8. ALL FAN SHUTDOWN FUNCTIONS, DAMPER CLOSURES & ASSOCIATED MECHANICAL SYSTEM FIRE ALARM INTERFACE SHALL BE BY MECHANICAL CONTRACTOR, & SHALL BE COORDINATED W/ FIRE ALARM SYSTEM.
9. ALL DUCT SMOKE DETECTORS SHALL BE MTD BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTORS EXPOSED TO THE WEATHER SHALL BE CSFM LISTED FOR OUTDOOR INSTALLATION, & WEATHER PROTECTED BY THE MECHANICAL CONTRACTOR. ALL AIR VELOCITY TESTING SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.
10. ALL 120VAC POWER REQ FOR THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR & SHALL MEET ALL REQUIRMENTS OF THE AUTHORITIES HAVING JURISDICTION.
11. ALL FIRE ALARM DEVICE BACKBOXES, FIRE ALARM TERMINAL CABINETS, GUTTERS, JUNCTION BOXES, & ASSOCIATED CONDUITS SHALL BE FURNISHED & INSTALLED BY ELECTRICAL CONTRACTOR UNO. REFER TO FIRE ALARM SYMBOL LIST AND/OR MTG DETAILS FOR ADDL INFO. SYSTEM SUPPLIER PROVIDED BACK BOXES SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR UNO. FIRE ALARM PANEL, REMOTES & COMPONENTS SHALL BE SECURED TO MTG SURFACES PER MFR SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED THE WEIGHT OF 20 LBS. W/O SPECIAL MTG DETAILS.
12. SMOKE DETECTOR TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH NFPA 72, ALL APPLICABLE CODES & THE MANUFACTURER'S INSTRUCTIONS.
13. ALL WIRING, INITIATING DEVICES & ANNUNCIATOR PANEL SHALL BE SUPERVISED TO THE PRINCIPAL POINT OF ANNUNCIATION. THE FIRE ALARM CONTROL PANEL TO SUPERVISE THE ANNUNCIATOR PANEL, ALL INITIATING & INDICATING DEVICE CIRCUITS.
14. ALL WIRING SHALL BE CUT FOR IN & OUT. WIRING SHALL NOT BE LOOPED THROUGH DEVICES PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EA JUNCTION BOX & CONNECTED DIRECTLY TO EA FIRE DEVICE. DO NOT SPLICE THE WIRE. THERE MUST BE @ LEAST 6' OF LEAD WIRE FROM THE BOX TO THE DEVICE.
15. POINT & COMMON ANNUNCIATION IS PROHIBITED. SLC MAY BE T-TAPED ONLY AT BUILDING FATC IF NECESSARY. INSTALL SLC LOOPED WITHIN ALL BUILDINGS AS SHOWN ON THE FLOOR PLANS.
16. PROVIDE 3/4" CONDUIT FROM FIRE ALARM CONTROL PANEL TO TELEPHONE BACKBOARD FOR OWNER PROVIDED CENTRAL STATION MONITORING. FIRE ALARM CONTROL PANEL WILL BE INSTALLED ON FIRE-RETARDANT TREATED PLYWOOD BACKBOARD.
17. CONTRACTOR TO FIELD VERIFY & PROVIDE DECIBEL METER FOR TESTING OF AMBIENT NOISE LEVELS (MIN 15db ABOVE AVERAGE AMBIENT NOISE LEVEL BUT NOT LESS 75 DBA AT 10 FT OR MORE THAN 110 DBA AT THE MIN HEARING DISTANCE - SEE NFPA 72 APPENDIX A.7.4.2.1.) INSTALL ADDL AUDIBLE DEVICES AS NEEDED TO ATTAIN REQ NOISE LEVELS IN ALL REQ AREAS. PROVIDE UPDATED PLANS & CALCULATIONS THROUGH THE "CHANGE ORDER" PROCESS WHEN INSTALLING ADDL DEVICES. INSPECTOR OF RECORD (IOR) TO WITNESS FINAL TEST OF SYSTEM. CONTRACTOR(S) TO PROVIDE FINAL TEST RESULT & "RECORD OF COMPLETION" TO ARCHITECT OF RECORD, OWNER, DIVISION OF THE STATE ARCHITECT, IOR & LOCAL FIRE AUTHORITY.
18. ALL CONDUITS ARE 3/4" UNO ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CLG, UNDER FLOORS & IN WALLS IN A NEAT & PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19. ALL FLOW SWITCHES SHALL BE 2 WIRE WITH NON-ELECTRONIC RETARD TYPE SIMILAR TO THE SYSTEM SENSOR MODEL "WFD SERIES" ONLY.
20. ALL DEVICES IN THE ALARM SYSTEM SHALL BE COMPATIBLE & INSTALLED PER MFR SPECIFICATIONS.
21. SYSTEM SHALL BE FURNISHED & INSTALLED BY A MFR AFFILIATE & AUTHORIZED DISTRIBUTOR. FIRE ALARM SYSTEM INSTALLATION COMPANY SHALL BE UL LISTED (UUJS). INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2. SUPERVISORY MONITORING SHALL BE TESTED & VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION W/ FINAL ACCEPTANCE TEST. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.
22. DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER THE CONSTRUCTION CLEAN-UP OF ALL TRADES IS COMPETE & FINAL. DETECTORS THAT HAVE BEEN INSTALLED PRIOR TO FINAL CLEAN-UP BY ALL TRADES SHALL BE CLEANED OR REPLACED IN ACCORDANCE WITH CHAPTER 7. CLEANING OR REPLACEMENT OF DEVICES THAT WERE MTD AT THE REQUEST OF THE CONTRACTOR WILL NOT BE PERFORMED W/O WRITTEN AUTHORIZATION THAT ASSUMES FINANCIAL RESPONSIBILITY FOR COSTS INCURRED. SEE THE LATEST VERSION OF NFPA 72.
23. PER CBC 2022, SECTION 11B-309, CONTROLS & OPERATING MECHANISMS AT INITIATING DEVICE "SHALL BE OPERABLE WITH ONE HAND & SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF (22.2N)." OPERABLE PARTS SHALL BE PLACED WITHIN THE REACH RANGES SPECIFIED IN SCTION 11B-308.
24. FIRE ALARM SYSTEM CONTROL PANEL SHALL HAVE PROGRAMMING TO ALLOW FOR THE MANUAL SILENCING OF THE AUDIBLE PORTION OF AN ALARM WHILE MAINTAINING THE ALARM STATUS OF ALL VISUAL DEVICES WITHIN THE SYSTEM.
25. THE SYSTEM SHALL CONFORM TO CALIFORNIA CODE OF REGULATIONS (CCR) TITLES 19 & 24 AS APPLICABLE TO THIS PROJECT.
26. SPEAKER COVERAGE SHALL COMPLY W/ NFPA 72 & 2022 CBC. PROVIDE 2W SPEAKER COVERAGE IN CLASSROOMS & 1/4W IN SMALL SPACES (OFFICES, RESTROOMS AND STORAGE/SUPPORT).
27. ALL FIRE ALARM SYSTEM VISUAL SIGNAL BE SYNCHRONIZED THROUGHOUT THE SITE.
28. WHERE SPEAKER/STROBE OCCUR AT WHITEBOARDS, LOCATE DEVICE(S) +4" ABOVE TOP OF WHITEBOARD, NOT TO EXCEED 96" TO TOP OF LENS.
29. PROVIDE A LABEL WITHIN THE FACP & EA POWER SUPPLY W/ THE PANEL NUMBER & CIRCUIT NUMBER OF THE 120 VOLT POWER SOURCE.
30. WHERE A DETECTOR IS INSTALLED ABOVE THE CLG, THE DETECTOR SHALL BE EASILY ACCESSIBLE & THE LOCATION OF THE DETECTOR SHALL BE CLEARLY MARKED. FOR DUCT SMOKE DETECTORS A REMOTE TEST STATION SHALL BE PROVIDED.
31. TEMPERATURE SETTINGS OF HEAT DETECTOR DEVICES ARE TO BE SET AT A MIN OF 20°F. ABOVE THE MAX EXPECTED TEMPERATURE OF THE SPACE INSTALLED PER NFPA 72, 2-23.
32. MECHANICAL UNIT (HVAC) SHUT DOWN SHALL UTILIZE FULLY AUTOMATIC FIRE ALARM SYSTEM AREA SMOKE COVERAGE TO TRIGGER RELAY FOR HVAC UNIT SHUT DOWN (PER CMC 609).
33. UPON COMPLETION OF SYSTEM INSTALLATION, THE SYSTEM SHALL BE TESTED IN THE PRESENCE OF & IN A MANNER ACCEPTABLE TO DSA/IOR CONTRACTOR SHALL SUPPLY NECESSARY TESTING EQUIPMENT, INCLUDING A "SOUND LEVEL METER" TO CHECK ACCEPTABLE NOISE LEVELS OF AUDIBLE DEVICES. PROVIDE TEST RESULTS PER NFPA 72 TO ARCHITECT, DSA, IOR & TO LOCAL FIRE AUTHORITY. THE INSTALLING CONTRACTOR SHALL PROVIDE A RECORD OF COMPLETION PER NFPA 72, FIGURE 7.8.2(a) THRU. 7.8.2(f).
34. THE "END OF LINE RESISTANCE" OF EA CIRCUIT SHALL BE TESTED IN THE PRESENCE OF THE IOR & SHALL NOT EXCEED A MAX OF 10% VOLTAGE DROP, OR LISTED MFR MIN OPERATING VOLTAGE.
35. REFER TO MANUFACTUTRER'S INSTALLALTION INSTRUCTION SHEETS FOR EXTERIOR NOTIFICATION APPLIANCE MOUNTING.
36. ALL WIRING USED IN UNDERGROUND CONDUIT SHALL BE LISTED FOR WET AREA APPLICATION, IN ACCORDANCE W/ CEC 760.
37. ALL UNDERGROUND FIRE ALARM SYSTEM CONDUCTORS SHALL BE CONT FROM END TO END. NO UNDERGROUND SPLICES WILL BE PERMITTED, NOR ACCEPTABLE.
38. FIRE ALARM SYSTEM IS FULLY AUTOMATIC SYSTEM.
39. APPLICABLE STANDARD 2022 NFPA 72.
40. INSTALLATION OF THE SYSTEM SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS & SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EA COMPONENT OF THE SYSTEM HAS BEEN APPROVED BY DSA.
41. A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE & USED FOR INSTALLATION.
42. ANY DISCREPANCIES BETWEEN THE DWG & THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA & THE ARCHITECT/ENGINEER OF THE PROJECT.
43. DSA, ARCHITECT/ENGINEER & OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND/OR TESTING.
44. ALL PENETRATIONS THROUGH RATED ASSEMBLIES, REQ OPENING PROTECTION SHALL BE PROVIDED W/ A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER LAB TESTING CRITERIA. APPROVED TYPE OF MATERIALS SHALL BE IDENTIFIED WITHIN THE SPECIFICATION WITHIN THE FIRE ALARM SECTION.
45. PROVIDE COMPLETE VOICE EVACUATION SYSTEM. PROVIDE ALL COMPONENTS, DEVICES & PANELS FOR A COMPLETE SYSTEM.
46. THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
47. VISUAL DEVICES SHOULD NOT EXCEED 2 FLASHES PER SECOND & SHOULD NOT BE SLOWER THAN 1 FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELA. VISUAL DEVICES WITHIN THE SAME VIEW FROM EACH OTHER SHALL BE SYNCHRONIZED.
48. UNDERGROUND & EXTERIOR CONDUITS TO HAVE WATERTIGHT FITTINGS & WIRE TO BE APPROVED FOR WET LOCATIONS.
49. ALL FIRE ALARM WIRING SHALL BE FLP OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQ FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
50. ALL LED REMOTE INDICATORS FOR DUCT DETECTORS & FIRE/SMOKE DAMPERS REQ BY THE LOCAL AHJ SHALL BE LOCATED IN CLG IN COORDINATION W/ ARCHITECT PRIOR TO ANY ROUGH-IN.

LIST OF APPLICABLE CODES AS

2025 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR*
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

APPLICABLE STANDARDS

FOR THE LIST OF APPLICABLE STANDARDS, INCLUDING CALIFORNIA AMENDMENTS TO THE NFPA STANDARD, REFER TO CBC CHAPTER 35 AND CFC CHAPTER 80.
2022 NFPA 72, 2022 NFPA 13

MEP SYSTEMS COMPONENT ANCHORAGE & BRACING NOTES

MEP DISTRIBUTION SYSTEM BRACING NOTE FOR PIPING, DUCT WORK, AND ELECTRICAL CONDUIT

1. ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQS PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 & 30:
   A. ALL PERMANENT EQUIPMENT AND COMPONENTS.
   B. TEMPORARY, MOVEABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
   C. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 LBS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.
2. THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:
   A. COMPONENTS WEIGHING LESS THAN 400 LBS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
   B. COMPONENTS WEIGHING LESS THAN 20 LBS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 LBS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.
3. THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE W/ ABOVE REQ.

MEP DISTRIBUTION SYSTEM BRACING NOTE FOR PIPING, DUCTWORK, AND ELECTRICAL CONDUIT

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7 SECTION 13.3 AS DEFINED IN ASCE 7 SECTIONS 13.6.5, 13.6.6, 13.6.7, AND 13.6.8; AND 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. THE MEP DESIGN PROFESSIONAL ENGINEER RESPONSIBLE FOR CONTENT ON THESE SHEETS HAS VERIFIED THAT THE DESIGN METHODS IDENTIFIED BELOW ARE IN ACCORDANCE WITH DSA IR 16-13.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP	MD	PP	E	
☐	☐	☐	■	OPTION 1: PROJECT-SPECIFIC DESIGN.
☐	☐	☐	☐	OPTION 2: DESIGN BASED ON OSHPD OPM, WITHIN PROJECT SUBMITTAL.
☐	☐	☐	☐	OPTION 3: DESIGN BASED ON OSHPD OPM, DEFERRED SUBMITTAL.

SYMBOL LEGEND

SYMBOL	MODEL	MFGR	DESCRIPTION	C.S.F.M. #
FACP	E3 SERIES	GAMEWELL-FCI	FIRE ALARM CONTROL PANEL W/VOICE EVAC. SYSTEM	7165-1703:0125
AMP	INX W/AM-50	GAMEWELL-FCI	NETWORK TRANSPONDER PANEL W/SPEAKER AMPLIFIER	7165-1703:0125
ANN	E3-LOC	GAMEWELL-FCI	REMOTE ANNUNCIATOR PANEL W/MICROPHONE	7165-1703:0125
FAPS	HPF24S8	HONEYWELL	FIRE ALARM POWER SUPPLY PANEL	7315-1637:0102
	ASD-PL3	GAMEWELL-FCI	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR	7272-1703:0501
	B300-6	SYSTEM SENSOR	DETECTOR BASE	7300-1653:0109
	ATD-L3H	GAMEWELL-FCI	ADDRESSABLE HEAT DETECTOR (ABOVE ACCESSIBLE CEILING U.N.O.)	7270-1703:0502
	B300-6	SYSTEM SENSOR	DETECTOR BASE	7300-1653:0109
	MS-7AF	GAMEWELL-FCI	ADDRESSABLE MANUAL PULL STATION	7150-1703:0119
	AOM-2RF	GAMEWELL-FCI	ADDRESSABLE CONTROL RELAY MODULE	7300-1703:0102
	AMM-2F	GAMEWELL-FCI	ADDRESSABLE MONITOR MODULE	7300-1703:0102
	M500X	SYSTEM SENSOR	ISOLATOR MODULE	7300-1653:0103
	SCRLED	SYSTEM SENSOR	CEILING MOUNT STROBE (SELECTABLE CANDELA)	7125-1653:0504
	SPSCRLED	SYSTEM SENSOR	CEILING MOUNT SPEAKER/STROBE (SELECTABLE CANDELA)	7125-1653:0533
WP	SPRKL	SYSTEM SENSOR	EXTERIOR SPEAKER W/WEATHERPROOF BACKBOX	7135-1653:0538
FACC	IPGSM-4G	HONEYWELL	FIRE ALARM CELLULAR COMMUNICATOR W/IP INTERNET	7300-1645-0199
FADC	ACE-11	SPACE AGE	FIRE ALARM DOCUMENTS CABINET	7300-0553:0110

CONDUCTOR DESIGNATION	WIRE IN CONDUIT	CONDUCTOR DESIGNATION	WIRE IN CONDUIT UNDERGROUND / WET LOCATION	CIRCUIT TYPE
Z	2 #16 UNSHIELDED (WEST PENN #D990)	ZU	2 #16 FPL UNSHIELDED (WEST PENN #AQ-225)	INITIATING CIRCUIT
N	2 #12 THHN STRANDED	NU	2 #12 THWN STRANDED	A/V CIRCUIT
P	2 #12 THHN STRANDED	PU	2 #12 THWN STRANDED	POWER CIRCUIT
C	2 #16 UNSHIELDED (WEST PENN #D990)	CU	2 #16 FPL UNSHIELDED (WEST PENN #AQ-225)	NETWORK CONTROL
S	2 #16 SHIELDED (WEST PENN #D991)	SU	2 #16 SHIELDED (WEST PENN #AQ-294)	SPEAKER CIRCUIT

EXAMPLE: 2N — 2N = NUMBER OF CONDUCTOR PAIRS; N = CONDUCTOR DESIGNATION

ABOVE EXAMPLE "2N" MEANS "2 PAIRS OF #12 WIRE"

NOTE:

1. ALL WIRE MODEL NUMBERS ARE WEST PENN. EQUIVALENT BY OTHER MANUFACTURER IS ACCEPTABLE.
2. COLOR CODE ALL FIRE ALARM CONDUCTORS PER DISTRICT STANDARDS. VERIFY COLOR SCHEMES PRIOR TO ORDERING FIRE ALARM CONDUCTORS.
3. ALL WIRE SHALL BE CLASS "B", U.O.N.
4. ALL WIRE SHALL BE IN MINIMUM 3/4" CONDUIT, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SLEEVES, LOCATION AND SIZE OF CONDUITS TO COMPLY WITH CODES AND STANDARDS.
5. UNDERGROUND CABLES SHALL BE LISTED AS UNDERGROUND BURIAL TYPE AND EXTERIOR CONDUITS SHALL BE WATERTIGHT FITTINGS.
6. CONFIRM WITH MANUFACTURER'S WIRING REQUIREMENTS BEFORE PULLING ANY FIRE ALARM CABLES.

FIRE ALARM SEQUENCE OF OPERATIONS

DEVICE \ ACTION	ACTIVATE ALL ALARM SIGNALS	ACTIVATE REMOTE ANNUNCIATOR	ACTIVATE TROUBLE OR SUPERVISORY SIGNAL	MONITOR TO UL LISTED CENTRAL STATION	CLOSE CSFD	SHUT DOWN AH-UNIT
CONTROL PANEL	YES	YES	YES	YES	YES	YES
MANUAL PULL STATION	YES	YES	NO	YES	YES	YES
SMOKE DETECTOR	YES	YES	NO	YES	YES	YES
HEAT DETECTOR	YES	YES	NO	YES	YES	YES
A/C POWER FAILURE	NO	YES	YES	YES	NO	NO
WIRING FAULTS	NO	YES	YES	YES	NO	NO

CENTRAL STATION INFORMATION

ALL-GUARD ALARM SYSTEMS INC.(UL#S3779)
DBA GRAND CENTRAL STATION
1306 STEALTH STREET
LIVERMORE CA, 94551
PHONE # 1-800-458-4519
ACCOUNT #1778441

FIRE ALARM SCOPE OF WORK

PROVIDE AND INSTALL NEW ADDRESSABLE, AUTOMATIC, POWER LIMITED 24VDC, SUPERVISED FIRE ALARM VOICE COMMUNICATION SYSTEM WITHIN THE EXISTING BUILDINGS AS INDICATED ON THE PLANS. REQUIRING PLAN REVIEW BY DSA AND FINAL INSPECTION AND TESTING. EXISITING FIRE ALARM SYSTEM WILL BE OPERATIONAL UNITL THE NEW SYSTEM IS COMPLETED.

FIRE SPRINKLER INFORMATION

EXISTING BUILDINGS ARE NOT SPRINKLERED

COMPLETE FIRE ALARM SUBMITTAL

AUTOMATIC FIRE ALARM VOICE EVAC. SYSTEM

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER — ALDO GERARDO SANCHEZ — 22285 — 3/31/28 — ELECTRICAL — STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

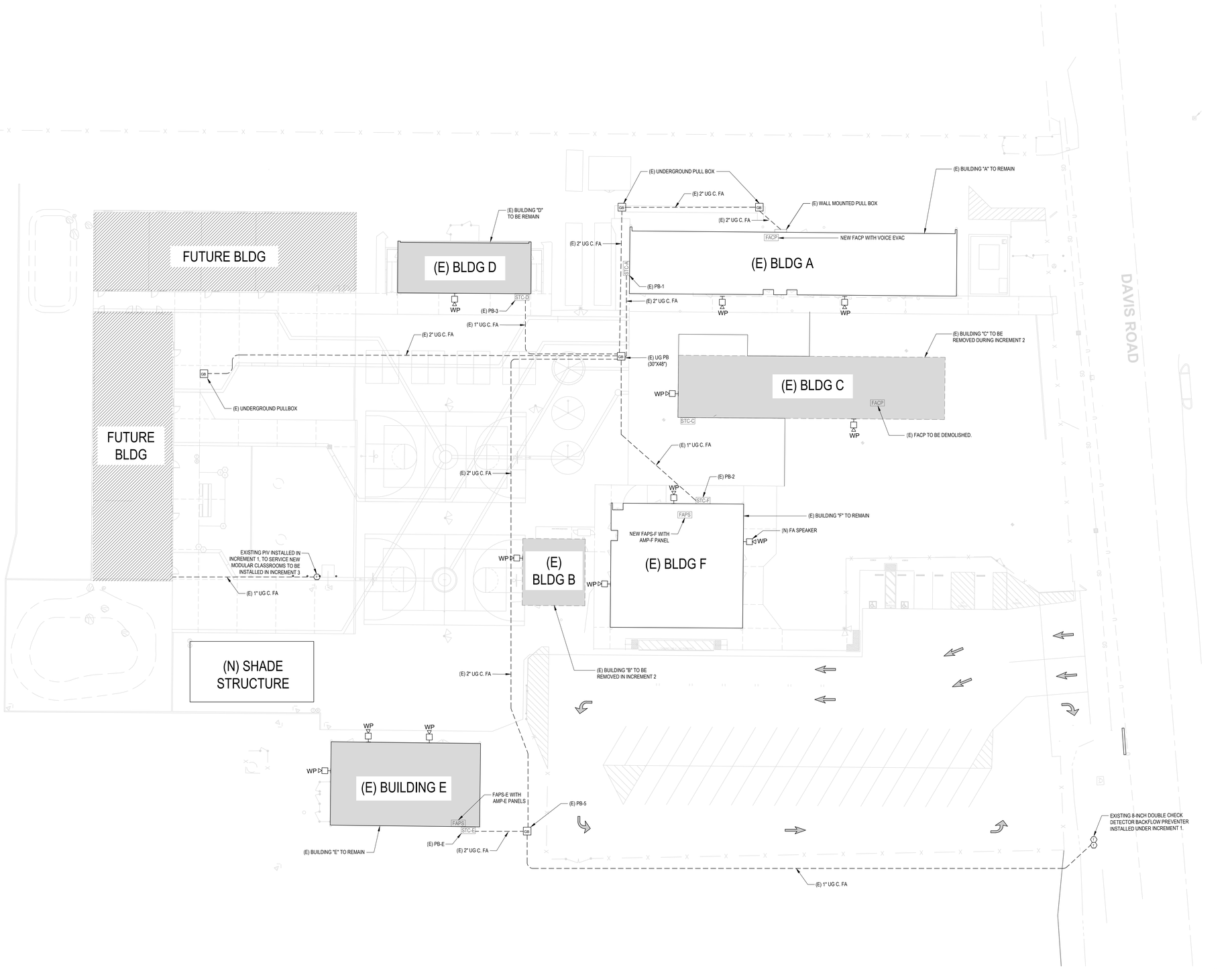
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

FIRE ALARM LEAD SHEET

2FA0.01



FIRE ALARM SITE PLAN 1" = 20'-0" 05

LEGEND

- FOR REFERENCE: RENOVATE (E) BUILDING SEE INC 2
- FOR REFERENCE: (E) BUILDING NOT UNDER SCOPE OF WORK
- FOR REFERENCE: DEMOLISH (E) BUILDING - SEE INC 2
- FOR REFERENCE: (E) BUILDING - SEE INC 3

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO LIBERARDO SCHULTZ ELECTRICAL STATE OF CALIFORNIA E22265 3/31/26

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

FIRE ALARM SITE PLANS

2FA0.20

KEYNOTES

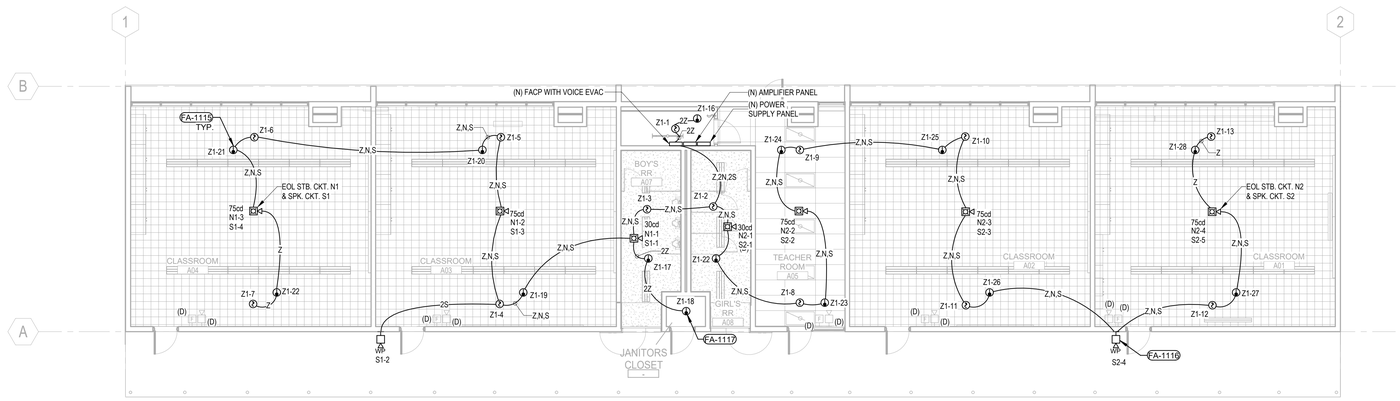
ITEM	DESCRIPTION
FA-1115	ATTIC HEAT DETECTOR TO BE INSTALLED ABOVE CEILING WITH ACCESS HATCHES TO BE PROVIDED.
FA-1116	EXTERIOR WEATHERPROOF FIRE ALARM HORN TO BE REPLACED WITH NEW FIRE ALARM SPEAKER.
FA-1117	HEAT DETECTOR TO BE INSTALLED BELOW CEILING.

LEGEND

- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTNING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.



TRUE NORTH

BUILDING A - FIRE ALARM PLAN | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO LAGRARDO RACHEZ ELECTRICAL STATE OF CALIFORNIA
E22255
3/31/28

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

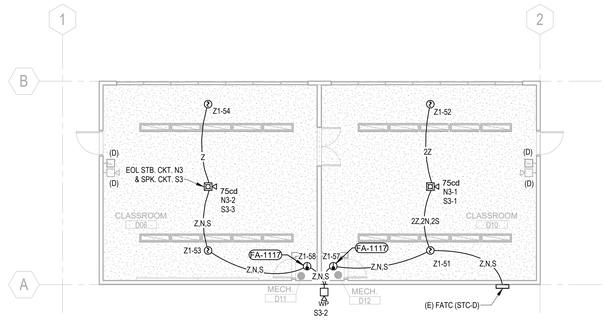
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

FIRE ALARM DEMO & REMODEL PLANS - BUILDING A

2FAA2.00



BUILDING D - FIRE ALARM FLOOR PLAN | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
FA-1117	HEAT DETECTOR TO BE INSTALLED BELOW CEILING.

LEGEND

- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTNING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMEMTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

FIRE ALARM DEMO & REMODEL PLANS - BUILDING D

2FAD2.01

KEYNOTES

ITEM	DESCRIPTION
FA-1005	INSTALL EXTERIOR SPEAKERS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS, REFER TO THE PROPER DEVICE INSTALLATION INSTRUCTIONS FOR WEATHERPROOF BACKBOX REQUIREMENT.
FA-1117	HEAT DETECTOR TO BE INSTALLED BELOW CEILING.

LEGEND

NOT IN SCOPE OF WORK

SCOPE OF WORK

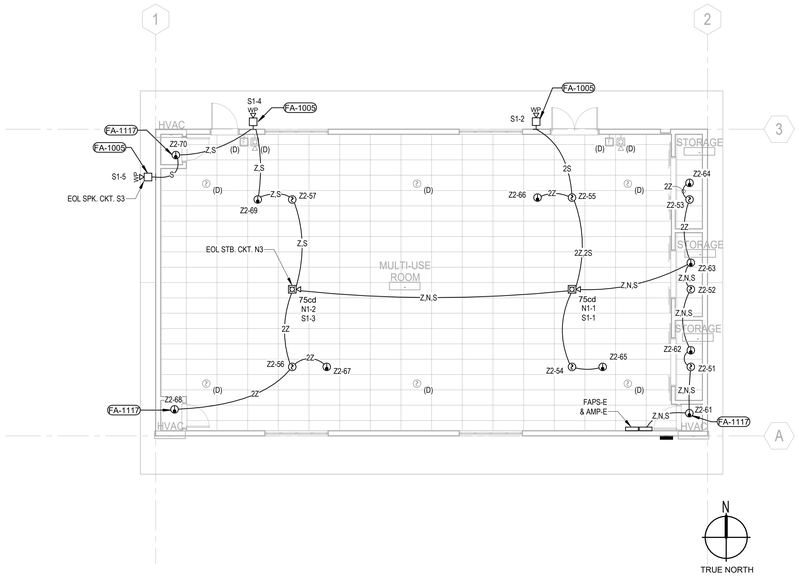
(E) GYP. TO REMAIN IN PLACE

2 X 4 ACT CLG

2' x 2' BLACK ACT CLG

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTNING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.



N

TRUE NORTH

BUILDING E - FIRE ALARM FLOOR PLAN | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER
ALDO GERARDO BACIZZI
E22285
3/31/28
ELECTRICAL
STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

Primary Project Name

PROJECT ADDRESS

Developed for
CLIENT NAME

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025

Job Number	Primary Project #
Checked By	Checker
Scale	1/8" = 1'-0"

FIRE ALARM DEMO & MODERNIZATION PLANS - BUILDING E

2FAE2.01

KEYNOTES

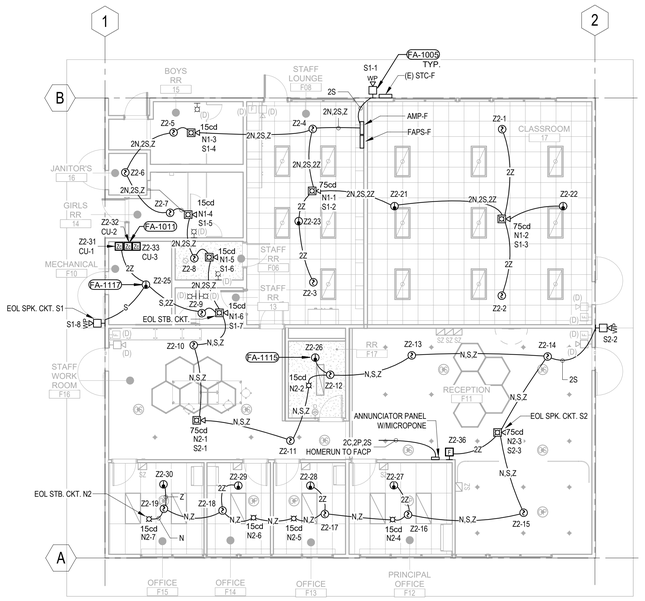
ITEM	DESCRIPTION
FA-1005	INSTALL EXTERIOR SPEAKERS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS, REFER TO THE PROPER DEVICE INSTALLATION INSTRUCTIONS FOR WEATHERPROOF BACKBOX REQUIREMENT.
FA-1011	PROVIDE FIRE ALARM RELAY MODULE WITH INTERPOSING RELAY FOR MECHANICAL EQUIPMENT AUTO SHUTDOWN (HVAC UNITS, FIRE SMOKE DAMPERS, HIGH VOLUME LOW SPEED FANS). VERIFY EXACT LOCATION AND QUANTITY ON MECHANICAL DRAWINGS.
FA-1115	ATTIC HEAT DETECTOR TO BE INSTALLED ABOVE CEILING WITH ACCESS HATCHES TO BE PROVIDED.
FA-1117	HEAT DETECTOR TO BE INSTALLED BELOW CEILING.

LEGEND

- NOT IN SCOPE OF WORK
- SCOPE OF WORK
- (E) GYP. TO REMAIN IN PLACE
- 2 X 4 ACT CLG
- 2' x 2' BLACK ACT CLG

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTNING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.



TRUE NORTH

BUILDING F - FIRE ALARM FLOOR PLAN | 1/8" = 1'-0" | 05

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO LAGRARDO RAMIREZ ELECTRICAL STATE OF CALIFORNIA
E22265
3/31/26

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1/8" = 1'-0"

FIRE ALARM DEMO & REMODEL PLANS - BUILDING F

2FAF2.01

E3 Fire Alarm Control Panel with Broadband

Protected Premises: **ELKHORN ES - CAMPUS MOD.- BLDG. A FACP** Date 7/17/2026
Address: **10505 DAVIS ROAD**
City: **STOCKTON** State **CA** Zip **95209**

Prepared By: **LPA, INC** Phone:
Address: 60 South Market St. Email:
City: San Jose State CA Zip 95113

Secondary Load Requirements **21.43** Amp Hours

Total Secondary Load from the calculation table below.

Current (Amps)		Time (hours)	Total (AH)
Secondary Standby Load 0.661 A	x	Required Standby Time 24 hours	15.87
Secondary Alarm Load 5.086 A	x	Required Alarm Time (hours) 0.250 hours	1.27
		Total Secondary Load	17.15
		Derating factor x 1.25	
		Secondary Load Required	**21.43 AH**

Battery Selection **31.00** Amp Hours
Select batteries from the list below.

31 AH Battery (12 volt)

Spare Battery Capacity	9.57 Amp Hours
Secondary Standby Load	19.84 Amp Hours
Secondary Alarm Load	1.59 Amp Hours

E3 Series Control Panel with Broadband

				Total Standby	0.661 A			Total Alarm	5.086 A
				Standby Current				Alarm Current	
Device	**Qty**		**Draw**	**Standby**	**Qty**		**Draw**	**Alarm**
1. System Device								
Intel. Loop Interface, Main Board (ILI-MB-E3)	1	x	0.08100	0.08100	1	x	0.15000	0.15000
2. E3 Optional Modules								
120V Power Supply Sub-Assembly (PM-9)	1	x	0.05000	0.05000	1	x	0.05000	0.05000
LCD Display & Switch Control (LCD-E3)	1	x	0.02400	0.02400	1	x	0.02800	0.02800
Auxiliary Switch Sub-Assembly (ASM-16)	1	x	0.01100	0.01100	1	x	0.01100	0.01100
3. 7100 Optional Modules								
4. INI-VGC Command Center								
Intel. Network Command Center (INI-VGC)	1	x	0.15000	0.15000	1	x	0.15000	0.15000
Addressable Switch Sub-assembly (ASM-16)	1	x	0.01100	0.01100	1	x	0.01100	0.01100
Voice Paging Microphone (Microphone)	1	x	0.00100	0.00100	1	x	0.00100	0.00100
5. INI-VGX Voice Gateway								
Intel. Network Voice Gateway (INI-VGX)	1	x	0.15000	0.15000	1	x	0.15000	0.15000
Amplifier Sub-assembly, 50 watt 25V (AM-50)	2	x	0.08600	0.17200	2	x	2.20600	4.41200
6. INI-VGE Command Center Voice Gateway								
7. Smoke Detectors/Modules								
Smoke Detector	10	x	0.00034	0.00340	10	x	0.00434	0.04340
Heat Detector	13	x	0.00025	0.00325	13	x	0.00425	0.05525
NAC Panel Activation	3	x	0.00000	0.00000	3	x	0.00500	0.01500
Addressable Monitor Module	3	x	0.00080	0.00240	3	x	0.00150	0.00450
Addressable Relay Control Module	3	x	0.00080	0.00240	3	x	0.00150	0.00450
				0.661 A				**5.086 A**
				Total Standby Load:				**Total Alarm Load:**

E3 Fire Alarm Control Panel with Broadband

Protected Premises: Elkhorn ES - Campus Mod. - Bldg. F AMP-F Date 7/17/2026
Address: 10505 DAVIS ROAD
City: **STOCKTON** State **CA** Zip **95209**

Prepared By: **LPA, INC** Phone:
Address: 60 South Market St. Email:
City: San Jose State CA Zip 95113

Secondary Load Requirements **19.30** Amp Hours

Total Secondary Load from the calculation table below.

Current (Amps)		Time (hours)	Total (AH)
Secondary Standby Load 0.613 A	x	Required Standby Time 24 hours	14.71
Secondary Alarm Load 2.908 A	x	Required Alarm Time (hours) 0.250 hours	0.73
		Total Secondary Load	15.44
		Derating factor x 1.25	
		Secondary Load Required	**19.30 AH**

Battery Selection **31.00** Amp Hours
Select batteries from the list below.

31 AH Battery (12 volt)

Spare Battery Capacity	11.70 Amp Hours
Secondary Standby Load	18.39 Amp Hours
Secondary Alarm Load	0.91 Amp Hours

E3 Series Control Panel with Broadband

				Total Standby	0.615 A			Total Alarm	2.911 A
				Standby Current				Alarm Current	
Device	**Qty**		**Draw**	**Standby**	**Qty**		**Draw**	**Alarm**
1. System Device								
Intel. Loop Interface, Main Board (ILI-MB-E3)	1	x	0.08100	0.08100	1	x	0.15000	0.15000
2. E3 Optional Modules								
LCD Display & Switch Control (LCD-E3)	1	x	0.02400	0.02400	1	x	0.02800	0.02800
Network LCD Annunicator (NGA)	1	x	0.20000	0.20000	1	x	0.20000	0.20000
Auxiliary Switch Sub-Assembly (ASM-16)	1	x	0.01100	0.01100	1	x	0.01100	0.01100
4. INI-VGC Command Center								
Voice Paging Microphone (Microphone)	1	x	0.00100	0.00100	1	x	0.00100	0.00100
5. INI-VGX Voice Gateway								
Intel. Network Voice Gateway (INI-VGX)	1	x	0.15000	0.15000	1	x	0.15000	0.15000
120V Power Supply Sub-Assembly (PM-9)	1	x	0.05000	0.05000	1	x	0.05000	0.05000
Amplifier Sub-assembly, 50 watt 25V (AM-50)	1	x	0.08600	0.08600	1	x	2.20600	2.20600
Addressable Output Module-Signal (AOM-2SF)	1	x	0.00080	0.00080	1	x	0.00650	0.00650
Addressable Control Module-Relay (AOM-2RF)	4	x	0.00080	0.00320	4	x	0.00150	0.00600
Addressable Monitor Module- (AMM-4)	1	x	0.00050	0.00050	1	x	0.00150	0.00150
7. Smoke Detectors/Modules								
Smoke Detector	12	x	0.00034	0.00408	12	x	0.00434	0.05208
Heat Detector	10	x	0.00025	0.00250	10	x	0.00425	0.04250
Pull Station	1	x	0.00050	0.00050	1	x	0.00150	0.00150
NAC Panel Activation	1	x	0.00000	0.00000	1	x	0.00500	0.00500
				0.615 A				**2.911 A**
				Total Standby Load:				**Total Alarm Load:**

E3 Fire Alarm Control Panel with Broadband

Protected Premises: Elkhorn ES - Campus Mod. - Bldg. E AMP-E Date 7/17/2026
Address: 10505 DAVIS ROAD
City: **STOCKTON** State **CA** Zip **95209**

Prepared By: **LPA, INC** Phone:
Address: 60 South Market St. Email:
City: San Jose State CA Zip 95113

Secondary Load Requirements **12.09** Amp Hours

Total Secondary Load from the calculation table below.

Current (Amps)		Time (hours)	Total (AH)
Secondary Standby Load 0.376 A	x	Required Standby Time 24 hours	9.01
Secondary Alarm Load 2.646 A	x	Required Alarm Time (hours) 0.250 hours	0.66
		Total Secondary Load	9.68
		Derating factor x 1.25	
		Secondary Load Required	**12.09 AH**

Battery Selection **18.00** Amp Hours
Select batteries from the list below.

17 AH Battery (12 volt)

Spare Battery Capacity	5.91 Amp Hours
Secondary Standby Load	11.27 Amp Hours
Secondary Alarm Load	0.83 Amp Hours

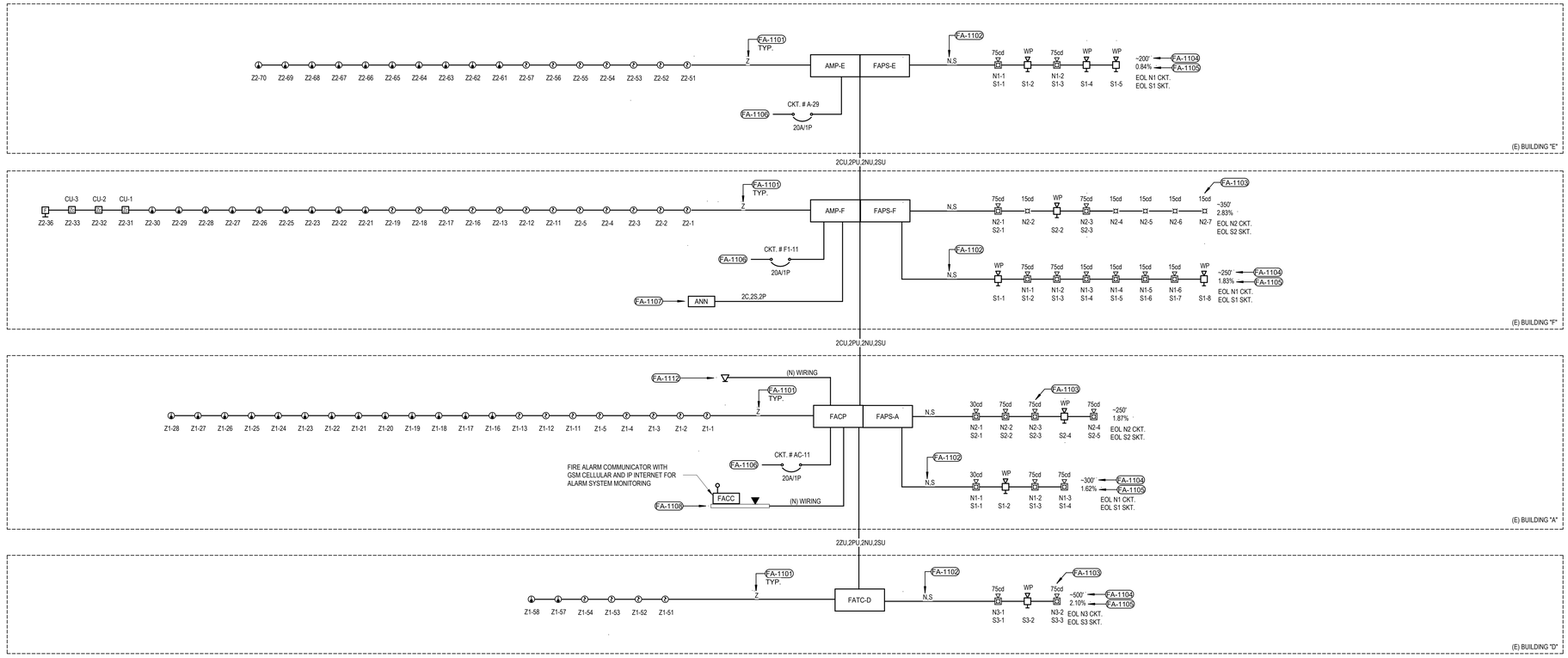
E3 Series Control Panel with Broadband

				Total Standby	0.376 A			Total Alarm	2.646 A
				Standby Current				Alarm Current	
Device	**Qty**		**Draw**	**Standby**	**Qty**		**Draw**	**Alarm**
1. System Device								
Intel. Loop Interface, Main Board (ILI-MB-E3)	1	x	0.08100	0.08100	1	x	0.15000	0.15000
2. E3 Optional Modules								
5. INI-VGX Voice Gateway								
Intel. Network Voice Gateway (INI-VGX)	1	x	0.15000	0.15000	1	x	0.15000	0.15000
120V Power Supply Sub-Assembly (PM-9)	1	x	0.05000	0.05000	1	x	0.05000	0.05000
Amplifier Sub-assembly, 50 watt 25V (AM-50)	1	x	0.08600	0.08600	1	x	2.20600	2.20600
Addressable Output Module-Signal (AOM-2SF)	1	x	0.00080	0.00080	1	x	0.00650	0.00650
Addressable Control Module-Relay (AOM-2RF)	3	x	0.00080	0.00240	3	x	0.00150	0.00450
Addressable Monitor Module- (AMM-4)	1	x	0.00050	0.00050	1	x	0.00150	0.00150
7. Smoke Detectors/Modules								
Smoke Detector	7	x	0.00034	0.00238	7	x	0.00434	0.03038
Heat Detector	10	x	0.00025	0.00250	10	x	0.00425	0.04250
Pull Station	0	x	0.00050		0	x	0.00150	
NAC Panel Activation	1	x	0.00000	0.00000	1	x	0.00500	0.00500
				0.376 A				**2.646 A**
				Total Standby Load:				**Total Alarm Load:**

KEYNOTES

ITEM	DESCRIPTION
FA-1101	ZONEABLE/ ADDRESSABLE CIRCUIT. PROVIDE 2#16 TWISTED PAIR PER CIRCUIT, TYPICAL.
FA-1102	NOTIFICATION CIRCUIT, PROVIDE 2#12 PER CIRCUIT, TYPICAL.
FA-1103	CANDELA RATING OF STROBE DEVICES.
FA-1104	DISTANCE TO END OF LINE (EOL) DEVICE.
FA-1105	WORST-CASE VOLTAGE DROP PERCENTAGE.
FA-1106	PROVIDE 3/4"C. WITH 2#12 GRD. DEDICATED CIRCUIT FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. PROVIDE 20 AMP, 1-POLE CIRCUIT BREAKER WITH APPROVED LOCK-ON DEVICE TO BLOCK THE HANDLE IN "ON" POSITION. PROVIDE RED INDICATOR IN PANELBOARD AND LABEL "FIRE ALARM CIRCUIT CONTROL" AS REQUIRED. CIRCUIT ID TO BE LABELED AT FIRE ALARM PANEL/EXTENDER. MATCH A.I.C. RATING OF DEVICES CURRENTLY USED. PROVIDE ALL REQUIRED MOUNTING HARDWARE.
FA-1107	PROVIDE NEW FIRE ALARM ANNUNCIATOR PANEL WITH MICROPHONE. VERIFY WITH DISTRICT REPRESENTATIVE, A.H.J. AND ARCHITECT FOR EXACT LOCATION.
FA-1108	PROVIDE (1) DEDICATED PHONE LINE (LAND LINE) AND (1) CELLULAR COMMUNICATOR (IPGSM) FOR FIRE ALARM SYSTEM MONITORING. CONTRACTOR TO SUPPLY UDACT (UNIVERSAL DIGITAL ALARM COMMUNICATOR TRANSMITTER) WHEN NOT SUPPLIED WITH CONTROL PANEL.
FA-1112	DATA DROP AND CONNECTION TO NEAREST IDF/MDF

FIRE ALARM CALCULATIONS NTS 07



FIRE ALARM RISER DIAGRAM NTS 05

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO GERARDO SANCHEZ 22285 3/31/28 ELECTRICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Date
Revision

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

FIRE ALARM RISER DIAGRAMS & CALCULATIONS

2FA5.00

Panel Location: Elkhorn ES - Inc. 2 - Building A - Storage Room A06

Panel Name: POWER SUPPLY PANEL FAPS-A

Regulated Load in Standby

Device Type	Number of Circuits/Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.075	=	0.075
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.0005	=	0
Notification Appliance Circuit					
Classroom Building A - NAC# N1	1	X	0.0004	=	0.0004
Classroom Building A - NAC# N2	1	X	0.0004	=	0.0004
Classroom Building A - NAC# N3	1	X	0.0004	=	0.0004
Classroom Building A - NAC# N4	1	X	0.0004	=	0.0004
			STANDBY LOAD	=	**0.0766**

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.175	=	0.175
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.025	=	0.000
Notification Appliance Circuit					
Classroom Building A - NAC# N1	1	X	0.379	=	0.379
Classroom Building A - NAC# N2	1	X	0.490	=	0.490
Classroom Building A - NAC# N3	1	X	0.316	=	0.316
Classroom Building A - NAC# N4	1	X	0.000	=	0.000
			ALARM LOAD	=	**1.360**

Battery Amp Hour Calculation

Standby Load Current (Amps)			Required Standby Time (Typically 24 or 60 Hours)		
	0.0766	X	24	=	1.8384 AH
Alarm Load Current (Amps)			Required Alarm Time (Typically 5 or 10 Minutes)		
	1.36	X	15	=	0.34 AH
			Sub Total Standby / Alarm Amp Hours		2.18 AH
			Multiply by the Derating Factor	X	1.25
			Total Ampere Hours Required	=	**3 AH**

(2)-7AH Batteries Required

Panel Location: Elkhorn ES - Inc. 2 - Building F - Staff Lounge F08

Panel Name: POWER SUPPLY PANEL FAPS-F

Regulated Load in Standby

Device Type	Number of Circuits/Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.075	=	0.075
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.0005	=	0
Notification Appliance Circuit					
Admin Building F - NAC# N1	1	X	0.0004	=	0.0004
Admin Building F - NAC# N2	1	X	0.0004	=	0.0004
Admin Building F - NAC# N3	1	X	0.0004	=	0.0004
Admin Building F - NAC# N4	1	X	0.0004	=	0.0004
			STANDBY LOAD	=	**0.0766**

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.175	=	0.175
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.025	=	0.000
Notification Appliance Circuit					
Admin Building F - NAC# N1	1	X	0.386	=	0.386
Admin Building F - NAC# N2	1	X	0.427	=	0.427
Admin Building F - NAC# N3	1	X	0.000	=	0.000
Admin Building F - NAC# N4	1	X	0.000	=	0.000
			ALARM LOAD	=	**0.988**

Battery Amp Hour Calculation

Standby Load Current (Amps)			Required Standby Time (Typically 24 or 60 Hours)		
	0.0766	X	24	=	1.8384 AH
Alarm Load Current (Amps)			Required Alarm Time (Typically 5 or 10 Minutes)		
	0.988	X	15	=	0.25 AH
			Sub Total Standby / Alarm Amp Hours		2.09 AH
			Multiply by the Derating Factor	X	1.25
			Total Ampere Hours Required	=	**3 AH**

(2)-7AH Batteries Required

Panel Location: Elkhorn ES - Inc. 2 - Building E - Multi-Use Room

Panel Name: POWER SUPPLY PANEL FAPS-E

Regulated Load in Standby

Device Type	Number of Circuits/Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.075	=	0.075
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.0005	=	0
Notification Appliance Circuit					
MPR Building E - NAC# N1	1	X	0.0004	=	0.0004
MPR Building E - NAC# N2	1	X	0.0004	=	0.0004
MPR Building E - NAC# N3	1	X	0.0004	=	0.0004
MPR Building E - NAC# N4	1	X	0.0004	=	0.0004
			STANDBY LOAD	=	**0.0766**

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
HPF24S8 Main Circuit Board	1	X	0.175	=	0.175
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base for CO Det.)	0	X	0.025	=	0.000
Notification Appliance Circuit					
MPR Building E - NAC# N1	1	X	0.222	=	0.222
MPR Building E - NAC# N2	1	X	0.000	=	0.000
MPR Building E - NAC# N3	1	X	0.000	=	0.000
MPR Building E - NAC# N4	1	X	0.000	=	0.000
			ALARM LOAD	=	**0.397**

Battery Amp Hour Calculation

Standby Load Current (Amps)			Required Standby Time (Typically 24 or 60 Hours)		
	0.0766	X	24	=	1.8384 AH
Alarm Load Current (Amps)			Required Alarm Time (Typically 5 or 10 Minutes)		
	0.397	X	15	=	0.10 AH
			Sub Total Standby / Alarm Amp Hours		1.94 AH
			Multiply by the Derating Factor	X	1.25
			Total Ampere Hours Required	=	**3 AH**

(2)-7AH Batteries Required

Poject Name: Elkhorn ES - Campus Modernization Inc. 2

Panel Location: Building A - Storage Room A06

Panel: FAPS-A

NAC SCHEDULE / VOLTAGE DROP CALCULATION
10 % MAXIMUM VOLTAGE DROP
CIRCUIT OUTPUT VOLTAGE = 20.4 (FOR CALCULATIONS)

CIRCUIT	DESCRIPTION	ESTIMATED CIRCUIT LENGTH	APPLIANCE QUANTITIES/CURRENT DRAW: Strobe 15cd 0.041	Speaker Strobe 15cd 0.041	Speaker Strobe 30cd 0.063	Speaker Strobe 75cd 0.111	Speaker Strobe 95cd 0.134	Speaker Strobe WP 30cd 0.094	TOTAL CKT. LOAD (AMPS)	WIRE GAUGE (18, 16, 14, 12)	ACTUAL VOLTAGE DROP %	ACTUAL VOLTAGE DROP (VOLTS)	TOTAL CIRCUIT RESISTANCE	MAXIMUM ALLOWABLE CKT. LENGTH
#N1	CLASSROOM BUILDING A STROBE CKT.	300 ft.			1	2			0.285	12	1.62%	0.330	1.2 Ohms	1,854 ft.
#N2	CLASSROOM BUILDING A STROBE CKT.	250 ft.			1	3			0.396	12	1.87%	0.382	1.0 Ohms	1,335 ft.
#N3	LIBRARY BUILDING D STROBE CKT.	500 ft.				2			0.222	12	2.10%	0.428	1.9 Ohms	2,381 ft.
#N4	SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
			Appliance Summary											
			0	**0**	**2**	**7**	**0**	**0**						

METHOD USED TO CALCULATE PERCENT OF VOLTAGE DROP:
[(CIRCUIT LENGTH IN FEET X 2) (AMPS X OHMS/FOOT)] X 100
20.4 VOLTS

Poject Name: Elkhorn ES - Campus Modernization Inc. 2

Panel Location: Building F - Staff Lounge F08

Panel: FAPS-F

NAC SCHEDULE / VOLTAGE DROP CALCULATION
10 % MAXIMUM VOLTAGE DROP
CIRCUIT OUTPUT VOLTAGE = 20.4 (FOR CALCULATIONS)

CIRCUIT	DESCRIPTION	ESTIMATED CIRCUIT LENGTH	APPLIANCE QUANTITIES/CURRENT DRAW: Strobe 15cd 0.041	Speaker Strobe 15cd 0.041	Speaker Strobe 30cd 0.063	Speaker Strobe 75cd 0.111	Speaker Strobe 95cd 0.134	Speaker Strobe WP 30cd 0.094	TOTAL CKT. LOAD (AMPS)	WIRE GAUGE (18, 16, 14, 12)	ACTUAL VOLTAGE DROP %	ACTUAL VOLTAGE DROP (VOLTS)	TOTAL CIRCUIT RESISTANCE	MAXIMUM ALLOWABLE CKT. LENGTH
#N1	ADMIN BUILDING F STROBE CKT.	250 ft.		4		2			0.386	12	1.83%	0.372	1.0 Ohms	1,369 ft.
#N2	ADMIN BUILDING F STROBE CKT.	350 ft.	5			2			0.427	12	2.83%	0.577	1.4 Ohms	1,238 ft.
#N3	ADMIN BUILDING F SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
#N4	ADMIN BUILDING F SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
			Appliance Summary											
			5	**4**	**0**	**4**	**0**	**0**						

METHOD USED TO CALCULATE PERCENT OF VOLTAGE DROP:
[(CIRCUIT LENGTH IN FEET X 2) (AMPS X OHMS/FOOT)] X 100
20.4 VOLTS

Poject Name: Elkhorn ES - Campus Modernization Inc. 2

Panel Location: Building E - Multi-Use Room

Panel: FAPS-E

NAC SCHEDULE / VOLTAGE DROP CALCULATION
10 % MAXIMUM VOLTAGE DROP
CIRCUIT OUTPUT VOLTAGE = 20.4 (FOR CALCULATIONS)

CIRCUIT	DESCRIPTION	ESTIMATED CIRCUIT LENGTH	APPLIANCE QUANTITIES/CURRENT DRAW: Strobe 15cd 0.041	Speaker Strobe 15cd 0.041	Speaker Strobe 30cd 0.063	Speaker Strobe 75cd 0.111	Speaker Strobe 95cd 0.134	Speaker Strobe WP 30cd 0.094	TOTAL CKT. LOAD (AMPS)	WIRE GAUGE (18, 16, 14, 12)	ACTUAL VOLTAGE DROP %	ACTUAL VOLTAGE DROP (VOLTS)	TOTAL CIRCUIT RESISTANCE	MAXIMUM ALLOWABLE CKT. LENGTH
#N1	MPR BUILDING E STROBE CKT.	200 ft.				2			0.222	12	0.84%	0.171	0.8 Ohms	2,381 ft.
#N2	MPR BUILDING E SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
#N3	MPR BUILDING E SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
#N4	MPR BUILDING E SPARE STROBE CKT.	0 ft.							0.000	12	0.00%	0.000	0.0 Ohms	0 ft.
			Appliance Summary											
			0	**0**	**0**	**2**	**0**	**0**						

METHOD USED TO CALCULATE PERCENT OF VOLTAGE DROP:
[(CIRCUIT LENGTH IN FEET X 2) (AMPS X OHMS/FOOT)] X 100
20.4 VOLTS

Battery Calculation for IPGSM-4G Communicator Panel

Panel Location: Building A in Storage Room A06

Panel: FACC

Regulated Load in Standby

Card/Device Type	Number of Card/Devices		Current (Amps)		Total Current (Amps)
IPGSM Control Board	1	X	0.230	=	0.230
Control Relay	0	X	0.0018	=	0
			STANDBY LOAD	=	**0.23**

Regulated Load in ALARM

Card/Device Type	Number of Card/Devices		Current (Amps)		Total Current (Amps)
IPGSM Control Board	1	X	0.951	=	0.951
Control Relay	0	X	0.0018	=	0
			ALARM LOAD	=	**0.951**

Battery Amp Hour Calculation

Standby Load Current (Amps)			Required Standby Time (Typically 24 or 60 Hours)		
	0.23	X	24	=	5.52 AH
Alarm Load Current (Amps)			Required Alarm Time (Typically 5 or 10 Minutes)		
	0.951	X	15	=	0.24 AH
			Sub Total Standby / Alarm Amp Hours		5.76 AH
			Multiply by the Derating Factor	X	1.25
			Total Ampere Hours Required	=	**7 AH**

(1) 12 Volt 7AH Battery Required

ELKHORN ES - CAMPUS MODERNIZATION INC. 2 - SPEAKER CIRCUIT SCHEDULE

SPEAKER CIRCUIT DESCRIPTION	PANEL CIRCUIT NUMBER	WIRE GAUGE (18, 16, 14, 12)	CIRCUIT VOLTAGE (25 OR 70 VRMS)	SPEAKER CIRCUIT LOAD CALCULATION: APPLIANCES QUANTITIES / TAP VALUES: SPEAKER TAPPED AT 0.25 Watts	SPEAKER TAPPED AT 0.5 Watts	SPEAKER TAPPED AT 1 Watts	SPEAKER TAPPED AT 2 Watts	SPEAKER TAPPED AT 4 Watts	TOTAL CIRCUIT LOAD (WATTS)	ESTIMATED CIRCUIT LENGTH (FEET)	MAXIMUM -3 dB DROP PER CIRCUIT: ACTUAL WIRE/LOSS (dB)	MAXIMUM ALLOWABLE CKT. LENGTH (FEET)	TOTAL CIRCUIT RESISTANCE (OHMS)
BLDG. A SPEAKER CKT. S1 FACP AMP.	CKT #1	16 awg	25 vrms	0	0	1	3	0	7.00 Watts	1000 ft.	-0.76 dB	4,512 ft.	8.2 Ohms
BLDG. A SPEAKER CKT. S2 FACP AMP.	CKT #2	16 awg	25 vrms	0	0	1	4	0	9.00 Watts	1000 ft.	-0.97 dB	3,510 ft.	8.2 Ohms
BLDG. D SPEAKER CKT. S3 FACP AMP.	CKT #3	16 awg	25 vrms	0	0	0	4	0	8.00 Watts	1000 ft.	-0.87 dB	3,948 ft.	8.2 Ohms
ADMIN BLDG. F SPEAKER CKT. S1 AMP-F	CKT #4	16 awg	25 vrms	0	0	4	4	0	12.00 Watts	1000 ft.	-1.27 dB	2,632 ft.	8.2 Ohms
ADMIN BLDG. F SPEAKER CKT. S2 AMP-F	CKT #5	16 awg	25 vrms	0	0	0	3	0	6.00 Watts	1000 ft.	-0.66 dB	5,265 ft.	8.2 Ohms
MPR BLDG. E SPEAKER CKT. S1 AMP-E	CKT #6	16 awg	25 vrms	0	0	0	4	0	8.00 Watts	1000 ft.	-0.87 dB	3,948 ft.	8.2 Ohms
MPR BLDG. E SPEAKER CKT. S2 AMP-E	CKT #7	16 awg	25 vrms	0	0	0	0	0	0.00 Watts	1000 ft.	0.00 dB	0 ft.	8.2 Ohms
				Appliance Summary					**Total Load (Watts)**				
				0	**0**	**6**	**22**	**0**	**50.00**				

NOTE:
LUMP SUM METHOD WAS USED TO CALCULATE MAXIMUM ALLOWABLE CIRCUIT LENGTH. THIS METHOD ALLOWS FOR A SMALL MARGIN OF SAFETY, TAKING INTO CONSIDERATION THE ACTUAL INSTALLED CIRCUIT ROUTING MAY DIFFER FROM WHAT IS SHOWN ON THE SHOP DRAWINGS. IF THE ACTUAL CIRCUIT LENGTH IS GOING TO EXCEED THE MAXIMUM ALLOWABLE CIRCUIT LENGTH, CONTACT YOUR LOCAL BRANCH.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO LEONARDO RAMIREZ 22255 3/31/28 ELECTRICAL STATE OF CALIFORNIA

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision / Date

Submittal / Date
100% SCHEMATIC DESIGN 08/29/2025
100% DESIGN DEVELOPMENT 07/09/2026
DSA SUBMITTAL 04/24/2026

Job Number	31942
Checked By	Checker
Scale	1" = 1'-0"

FIRE ALARM CALCULATIONS

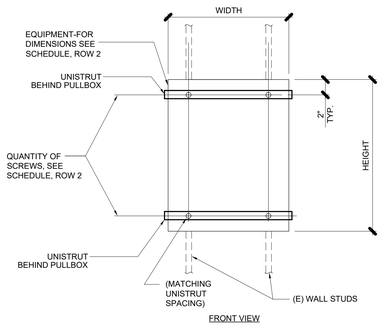
2FA6.00

ANCHORAGE SCHEDULE - WALL MOUNTED ELECTRICAL EQUIPMENT

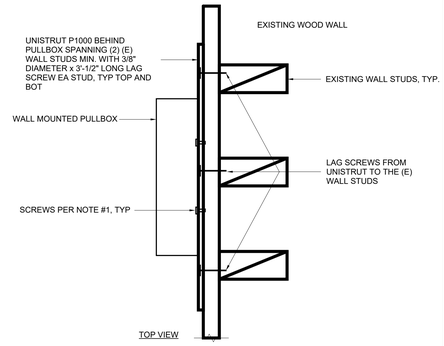
EQUIPMENT	LOCATION (ROOM NO.)	WEIGHT (lbs)	HEIGHT (in)	WIDTH (in)	DEPTH (in)	SCREWS - SEE NOTES 1 & 2	
						QUANTITY OF SCREWS ROWS	QUANTITY OF SCREWS PER ROW
SUB-PANELS	VARIOUS	80	60	20	6	6	2
WALL MOUNTED PULLBOX	VARIOUS	60	24	24	6	2	2

NOTES:

1. USE #10 SMS SCREWS.
2. FASTENERS EXPOSED TO WEATHER SHALL BE STAINLESS STEEL OR HOT-DIPPED GALVANIZED.

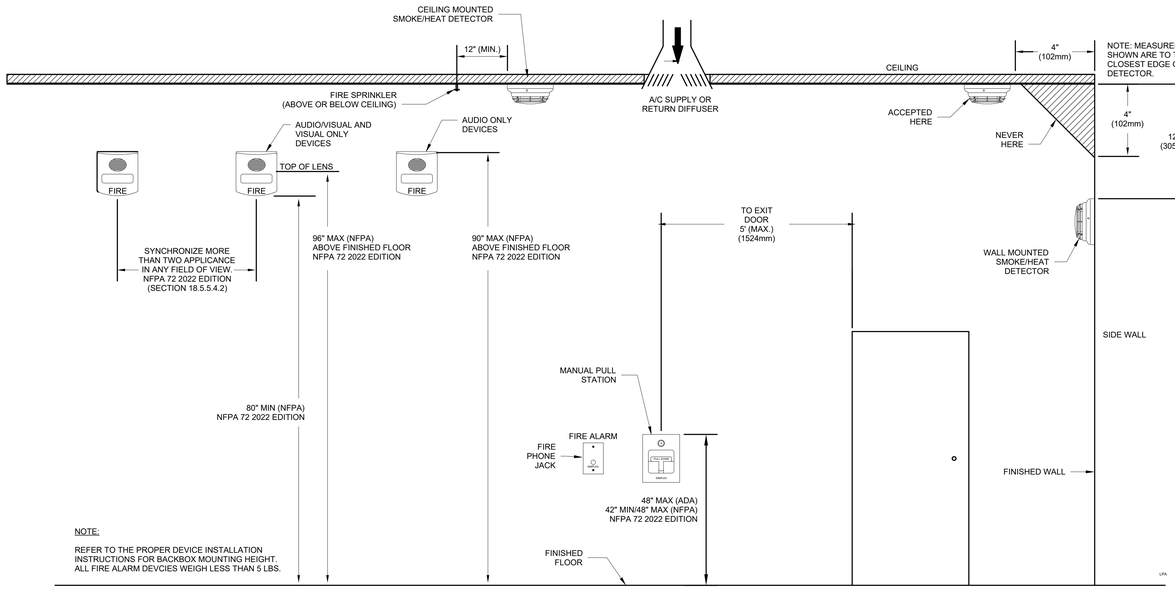


FRONT VIEW

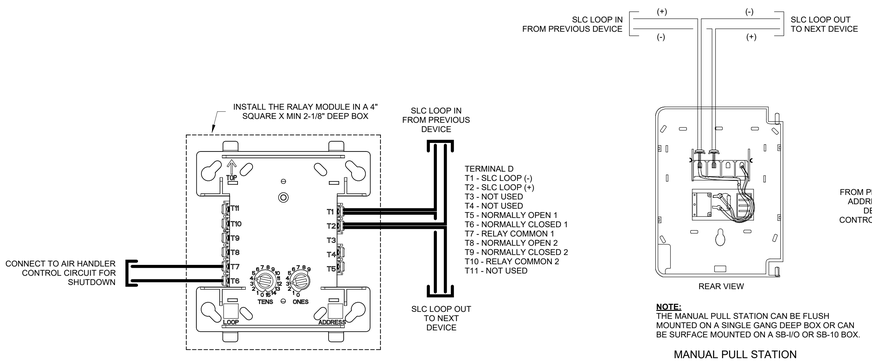


TOP VIEW

TYPICAL WALL MOUNTED EQUIPMENT SCHEDULE AND DETAIL | NTS | 04



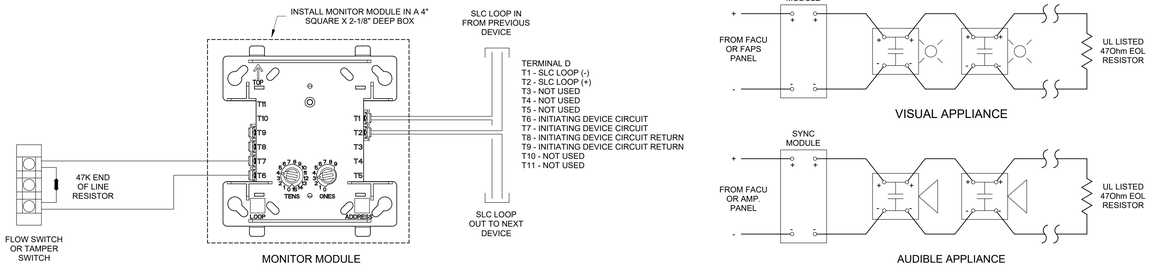
FIRE ALARM ELEVTION DETAILS | NTS | 03



RELAY MODULE

MANUAL PULL STATION

STANDARD DETECTOR BASE

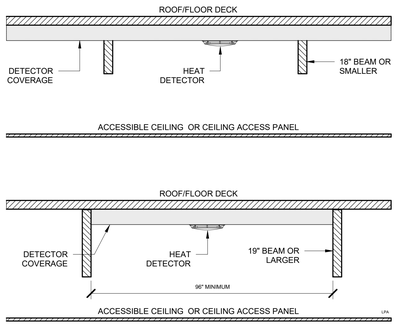


MONITOR MODULE

VISUAL APPLIANCE

AUDIBLE APPLIANCE

FIRE ALARM WIRING DETAILS | NTS | 01



FIRE ALARM MOUNTING DETAILS | NTS | 17

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

REGISTERED PROFESSIONAL ENGINEER ALDO ALBERARDO RAMIREZ ELECTRICAL STATE OF CALIFORNIA
E22265
3/31/26

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	07/09/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	1" = 1'-0"

FIRE ALARM DETAILS

2FA7.00

CONTRACTOR(S) GUIDELINES:

28. ALL SPLICES SHALL UTILIZE 3M 710 MODULES. ALL CABLES MUST BE EQUIPPED TO PROVIDE A CONTINUOUS BOUND OF CABLE SHIELDS THROUGH ALL SPLICES.

29. PULL ROPES SHALL BE PLACED IN ALL VACANT CONDUITS.

30. ALL WORK MUST BE COMPLETED IN A NEAT AND PROFESSIONAL MANNER. THE WORK SITE SHALL BE KEPT CLEAN AND ALL DAMAGE TO DISTRICT'S PROPERTY REPAIRED.

31. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONDUCTING A FINAL CLEANUP OF THE WORK SITE PRIOR TO FINAL SYSTEM ACCEPTANCE.

32. CONTRACTOR SHALL REMOVE ALL COPPER, FIBER AND COAXIAL CABLES ABANDONED IN CONDUIT, CEILINGS AND WALLS PER CEC. CABLE SHALL INCLUDE ALL INTRABUILDING, RISER SYSTEMS AND STATION CABLES FOR ALL LOW VOLTAGE/TECHNOLOGY/STRUCTURED CABLING SYSTEMS.

33. CONTRACTOR(S) SHALL VERIFY ALL SITE CONDITIONS PRIOR TO BID.

34. IN ACCESSIBLE CEILING SPACES;

a. THE CONTRACTOR SHALL PROVIDE THE REQUIRED STUB UP(S) / OUT(S) AND BOXES WITH MUD-RINGS TO THE NEAREST ACCESSIBLE CEILING SPACE AND / OR NEAREST TECHNOLOGY PATHWAY INFRASTRUCTURE, REFERENCE PLANS AND SPECIFICATION FOR MORE INFORMATION.

b. THE DESIGNATED SCS / TECHNOLOGY CONTRACTOR(S) SHALL PROVIDE A J-HOOK PATHWAY SYSTEM AND REQUIRED SLEEVES. DO NOT USE CEILING TILE WIRE HANGERS, WATER OR ELECTRICAL PIPES, OR LIGHT FIXTURES TO HANG CABLE. CABLE MUST BE A MINIMUM OF 6 INCHES ABOVE THE CEILING TILE AND MUST NOT COME WITHIN TWELVE INCHES OF A LIGHT FIXTURE.

- THE SCS / TECHNOLOGY CONTRACTOR WILL PROVIDE THE PATHWAY REQUIRED FOR THE STRUCTURE CABLING SYSTEMS.
- THE DESIGNATED LOW VOLTAGE / TECHNOLOGY CONTRACTOR(S) FOR EACH "SUB-SYSTEM WILL PROVIDE THE PATHWAY REQUIRED FOR THE SYSTEMS, OUTSIDE WHAT IS CONSIDERED THE STRUCTURED CABLING SYSTEM.

35. IN INACCESSIBLE AND HARDLID CEILING SPACES;

a. THE CONTRACTOR SHALL PROVIDE ALL CONDUIT PATHWAYS, BOXES ETC. FOR A COMPLETE SYSTEM FROM THE MDF ROOM, IDF ROOM(S), IDF CABINET(S), AND ALL OTHER LOW VOLTAGE / TECHNOLOGY SYSTEMS HEADEND, CABINETS, TERMINAL CABINETS, ETC. TO THE POINT OF TERMINATION AT THE STATION END LOCATION PER PLANS AND SPECIFICATION.

TECHNOLOGY ABBREVIATIONS:

ACP	ACCESS CONTROL PROCESSOR	MIC	MICROPHONE
AFF	ABOVE FINISHED FLOOR	MM	MULTIMODE
AHJ	AUTHORITY HAVING JURISDICTION	MPOE	MINIMUM POINT OF ENTRY
AMP	AMPLIFIER	(N)	NEW
AOR	ARCHITECT OF RECORD	NC	NORMALLY CLOSED
AUD	AUDIO	NIC	NOT IN CONTRACT
AUTO	AUTOMATIC	NO	NORMALLY OPEN
AUX	AUXILIARY	NTS	NOT TO SCALE
AV	AUDIOVISUAL	NVR	NETWORK VIDEO RECORDER
AVc	AUDIOVISUAL CONTROLLER	OC	ON CENTER
AWG	AMERICAN WIRE GAUGE	OFCI	DISTRICT FURNISHED, CONTRACTOR INSTALLED
B	BLANK		
BCT	BONDING CONDUCTOR FOR TELECOMMUNICATIONS CONDUIT	OFOI	DISTRICT FURNISHED, DISTRICT INSTALLED
C	CONDUIT	OSP	OUTSIDE PLANT
CATV	COMMUNITY ANTENNA TELEVISION	PB	PULL BOX
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED	PIR	PASSIVE INFRARED
		POE	POWER OVER ETHERNET
CFOI	CONTRACTOR FURNISHED, DISTRICT INSTALLED	PR	PAIR OF CONDUCTORS
		PTZ	PAN TILT ZOOM
CL	CENTERLINE	PVC	POLYVINYL CHLORIDE
DIV	DIVISION	PWR	POWER
DC	DOOR CONTACT	RCP	REFLECTED CEILING PLAN
(E)	EXISTING	REX	REQUEST TO EXIT
EC	ELECTRICAL CONTRACTOR	RFI	REQUEST FOR INFORMATION
ECS	EMERGENCY COMMUNICATION SYSTEM	RMC	RIGID METALLIC CONDUIT
		RR	REMOVE AND RELOCATE
EF	ENTRANCE FACILITY FOR TELECOMMUNICATION	SM	SINGLE MODE
		STR	STRANDS (OF FIBER)
EMT	ELECTRIC METALLIC TUBING	STP	SHIELDED TWISTED PAIR
ER	EQUIPMENT ROOM	SEC	SECURITY
EXT	EXTERIOR	TA	TEMPERATURE ALARM
(F)	FUTURE	TBB	TELECOMMUNICATIONS BONDING BACKBONE
FACP	FIRE ALARM CONTROL PANEL	TELCO	TELEPHONE COMPANY
FATC	FIRE ALARM TERMINAL CABINET		
FB	FLOORBOX	TGB	TELECOMMUNICATIONS GROUNDING BUSBAR
FO	FIBER OPTIC		
GB	GROUND BOX	TMGB	TELECOMMUNICATION MAIN GROUNDING BUSBAR
GC	GENERAL CONTRACTOR		
IC	INTERCOM	TYP	TYPICAL
IDF	INTERMEDIATE DISTRIBUTION FRAME	UON	UNLESS OTHERWISE NOTED
		UPS	UNINTERRUPTIBLE POWER SUPPLY
ICP	INTRUSION CONTROL PROCESSOR		
INT	INTERIOR	UTP	UNSHIELDED TWISTED PAIR
IP	INTERNET PROTOCOL	V	VOICE
IT	INFORMATION TECHNOLOGY	WB	WALL BOX
JB	JUNCTION BOX	WP	WEATHERPROOF
MDF	MAIN DISTRIBUTION FRAME		
LCP	LIGHTING CONTROL PANEL		

EQUIPMENT ANCHORAGE NOTES:

APPLICABLE CODE: 2022 CBC

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA-APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 AND 30.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, AND DUCTWORK DISTRIBUTION SYSTEM BRACING NOTES:

APPLICABLE CODE: 2022 CBC PER IR 16-13.

MEP DRISTRIBUTION SYSTEM BRACING NOTE FOR PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7 SECTION 13.3 AS DEFINED IN ASCE 7 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2022 CBC SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. THE MEP DESIGN PROFESSIONAL ENGINEER RESPONSIBLE FOR CONTENT ON THESE SHEETS HAS VERIFIED THAT THE DESIGN METHODS IDENTIFIED BELOW ARE IN ACCORDANCE WITH DSA IR 16-13.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP	MD	PP	E	
☐	☐	☐	■	OPTION 1: PROJECT-SPECIFIC DESIGN.
☐	☐	☐	☐	OPTION 2: DESIGN BASED ON OSHPD, WITHIN PROJECT SUBMITTAL.
☐	☐	☐	☐	OPTION 3: DESIGN BASED ON OSHPD, DEFERRED SUBMITTAL.

TECHNOLOGY PENETRATION NOTES:

1. UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL MAKE NO PENETRATION OF FLOORS, WALLS OR CEILING WITHOUT THE PRIOR WRITTEN APPROVAL OF THE DISTRICTS REPRESENTATIVE.

2. WALL PENETRATIONS:

a. THE SCS AND/OR LV CONTRACTOR SHALL PROVIDE FIRE STOPPING FOR ALL COMMUNICATIONS RATED (AND IN SOME CASES NON-RATED, THAT WILL BE DESCRIBED BELOW THIS SECTION) PATHWAYS AND SPACES. THESE FIRE STOPPING DEVICES SHALL CONFORM TO (BUT NOT LIMITED TO) UL 1479, ASTM E814, BICSI TDMM, FIRE STOPPING ANSI/TIA-568-C, STANDARD FOR INSTALLING COMMERCIAL BUILDING TELECOMMUNICATIONS CABLING, SECTION 5, CLAUSE 5.1 THROUGH 5.2.3, MANUFACTURES GUIDELINES OR OTHER PREVAILING CODE AND MUST BE AN APPROVED UL LISTED SYSTEM.

b. CABLE TRAY FIRE-STOPPING SHALL UTILIZE THE MULTI GANG FIRE-STOPPING SYSTEM THAT WILL BE ABLE TO STACK THE UNITS HORIZONTALLY AND/OR VERTICALLY IF REQUIRED DUE TO CURRENT AND/OR FUTURE CABLING DESIGNS.

c. THE CONTRACTOR SHALL INSTALL PENETRATION FIRE-STOP SEAL MATERIALS IN ACCORDANCE WITH DESIGN REQUIREMENTS, AND MANUFACTURER'S INSTRUCTIONS.

d. THE CONTRACTOR'S INSTALLER SHALL BE CERTIFIED, LICENSED OR OTHERWISE QUALIFIED BY THE FIRE-STOPPING MANUFACTURER AS HAVING BEEN PROVIDED THE NECESSARY TRAINING TO INSTALL MANUFACTURER'S PRODUCTS PER SPECIFIED REQUIREMENTS.

e. ALL THROUGH-PENETRATION SHALL BE A MANUFACTURED, UL CLASSIFIED, FIRE-STOP DEVICE / SYSTEM DESIGNED TO ALLOW CABLES TO PENETRATE FIRE-RATED WALLS WITH A BUILT-IN FIRE SEALING SYSTEM THAT AUTOMATICALLY ADJUSTS TO THE AMOUNT OF CABLES INSTALLED. THE FIRE-STOPPING DEVICE SHALL BE CAPABLE OF INSTALLATION IN NEW CONSTRUCTION OR RETROFIT IN EXISTING STRUCTURES.

f. THE CONTRACTOR MUST NOT USE CONCRETE OR OTHER NON-REMOVABLE SUBSTANCE FOR FIRE STOPPING ON CABLE TRAYS, WIREWAYS OR CONDUITS. CONTRACTORS WHO USE THIS METHOD WILL BE REQUIRED TO REPLACE ALL CABLES AFFECTED AND PROVIDE THE ORIGINAL SPECIFIED ACCESS TO EACH EFFECTED AREA. THIS REQUIREMENT ALSO APPLIES TO MAINTAINING FIRE RATINGS OF ALL FLOORS PENETRATED BY CONDUITS OR DEVICES DESIGNATED FOR USE BY VOICE AND DATA CABLING.

g. ANY PENETRATIONS THROUGH FIRE-RATED WALLS FOR CABLE PATHWAYS / CABLES SHALL BE SEALED BY USE OF A NON-PERMANENT FIRE BLANKET OR OTHER METHOD IN COMPLIANCE. THE CONTRACTOR MUST USE FIRE STOPPING ON CABLE TRAYS, WIREWAYS AND CONDUITS EITHER VERTICAL OR HORIZONTAL. FOUR DIFFERENT METHODS OF FIRE-STOPPING HAVE BEEN IDENTIFIED FOR THE HORIZONTAL THROUGH PENETRATIONS BETWEEN WALLS, RATED, RATED WITH ACOUSTIC PROPERTIES, NON-RATED, AND NON-RATED WITH ACOUSTIC PROPERTIES.

BELOW ARE METHODS TO ACCOMPLISH THESE DIFFERENT TYPES:
- SEALING OF RATED OPENINGS BETWEEN FLOORS OR THROUGH RATED WALLS, WHETHER EXISTING OR CREATED BY THE CONTRACTOR FOR PLACEMENT OF CABLE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SEALING MATERIAL AND APPLICATION SHALL BE AN APPROVED UL LISTED SYSTEM AND SHALL BE ACCOMPLISHED IN SUCH A MANNER THAT IS ACCEPTABLE TO THE LOCAL FIRE AND BUILDING AUTHORITIES HAVING JURISDICTION OVER THIS WORK. CREATION OF SUCH OPENINGS AS ARE NECESSARY FOR CABLE PASSAGE BETWEEN LOCATIONS AS SHOWN ON THE DRAWINGS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ANY OPENINGS CREATED BY OR FOR THE CONTRACTOR AND LEFT UNUSED SHALL ALSO BE SEALED AS PART OF THIS WORK.
- RATED WALLS WITH THROUGH PENETRATIONS WITH ACOUSTIC PROPERTIES SHALL BE INSTALLED WITH FACTORY MANUFACTURED DEVICE. SUCH AS A STI "EZ PATH" OR WIREMOLD "FLAMESTOPPER" OR EQUAL. THE TYPICAL STC RATING IS TO BE EQUAL TO OR GREATER THAN THE WALL PENETRATED, (AVG IS A RATING OF 44 STC PER UBC RATINGS).
- NON-RATED PATHWAY, ALTHOUGH NOT REQUIRED TO BE FIRE-STOPPED, SHALL BE A MANUFACTURED DEVICE THAT WILL ALLOW FIRE-STOPPING TO BE INSTALLED IN THE FUTURE IF REQUIRED, (I.E. WIREMOLD "FLAMESTOPPER" OR EQUAL).
- A NON-RATED PATHWAY WITH ACOUSTIC PROPERTIES CAN BE FOUND IN AREAS SUCH AS, CONFERENCE ROOMS, HUMAN RESOURCE OFFICES, MEDICAL EXAMINATION ROOMS ETC. THESE ROOMS REQUIRE TO LIMIT THE AMOUNT OF AMBIENT NOISE THAT CAN TRAVEL FROM ONE ROOM TO THE OTHER THROUGH THE CEILING GRID. IF THIS WALL IS PENETRATED, INSTALL A SYSTEM THAT WILL RE-ESTABLISH THE STC RATING OF THE WALL, THE TYPICAL STC RATING IS AN AVERAGE OF 44 STC PER UBC RATINGS.

CONTRACTOR(S) GUIDELINES:

1. ALL TECHNOLOGY WORK SHALL COMPLY WITH DESIGN GUIDELINES AS WELL AS APPLICABLE FEDERAL, STATE, AND LOCAL CODES. WHERE THE CONSTRUCTION DOCUMENTS INDICATE MORE RESTRICTIVE REQUIREMENTS, THE DOCUMENTS SHALL GOVERN BUT THE CONSTRUCTION DOCUMENTS SHALL NOT BE INTERPRETED AS AUTHORITY TO VIOLATE ANY CODE OR REGULATION.

2. IN THE EVENT OF A CONFLICT OR INCONSISTENCY BETWEEN ITEMS INDICATED ON THE PLANS AND/OR SPECIFICATIONS OR WITH CODE REQUIREMENTS, THE NOTE, CODE OR SPECIFICATION WHICH PRESCRIBES AND ESTABLISHES THE MORE COMPLETE JOB OR THE HIGHER STANDARD SHALL PREVAIL.

3. OMISSIONS FROM THE DRAWINGS, SPECIFICATIONS OR THE MIS-DESCRIPTION OF DETAILS FROM WORK WHICH ARE CLEAR AND NECESSARY TO CARRY OUT THE INTENT OF THE DRAWINGS, SPECIFICATIONS, OR WHICH ARE CUSTOMARILY PERFORMED, SHALL NOT RELIEVE THE CONTRACTOR FROM PERFORMING SUCH OMITTED OR MIS-DESCRIBED DETAILS OF THE WORK BUT THEY SHALL BE PERFORMED AS IF FULLY AND CORRECTLY SET FORTH AND DESCRIBED IN THE DRAWINGS AND SPECIFICATIONS.

4. THE CONTRACTOR SHALL CHECK ALL DRAWINGS FURNISHED, IMMEDIATELY UPON THEIR RECEIPT AND SHALL PROMPTLY NOTIFY THE DISTRICT OF ANY DISCREPANCIES.

5. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BEAR THE UNDERWRITERS LABEL (UL) AND SHALL BE INSTALLED IN THE MANNER FOR WHICH THEY ARE DESIGNED AND APPROVED.

6. THE CONTRACTOR SHALL NOT BORE, NOTCH OR IN ANY WAY CUT INTO ANY STRUCTURAL MEMBER WITHOUT WRITTEN APPROVAL FROM THE ARCHITECT OR STRUCTURAL ENGINEER.

7. ALL CHANGES TO STRUCTURES (BUILDING, DRILLING, CORING, ETC.) NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED IN WRITING BY STRUCTURAL ENGINEER.

8. FOR PURPOSES OF CLEARNESS AND LEGIBILITY, THE TELECOM DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC. THE SIZE AND LOCATION OF EQUIPMENT IS SHOWN TO SCALE WHEREVER POSSIBLE. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DATA INFORMATION AS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATION SECTIONS WHERE SCS AND LOW VOLTAGE WORK INTERFACES WITH OTHER TRADES.

9. THE CONTRACTOR SHALL MAINTAIN AS-BUILT DRAWINGS TO REFLECT ALL CHANGES MADE DURING CONSTRUCTION AND ANY DEVIATIONS FROM THE ELECTRICAL AND TECHNOLOGY DRAWINGS. THIS INCLUDES DEVIATIONS FROM OUTLET NUMBERS AND ANY ADDITION, DELETION OR RELOCATION OF OUTLETS SHOWN ON WORKING DRAWINGS, PATHWAY ADDITIONS, DELETIONS OR RELOCATIONS. THE CONTRACTOR SHALL AFTER COMPLETION OF JOB, PROVIDE THE DISTRICT AN ELECTRONIC AND HARD COPY OF AS-BUILT WORK.

10. ANY DEVIATIONS FROM PLANS OR SPECS MUST BE APPROVED IN WRITING BY THE DISTRICT'S REPRESENTATIVE.

11. ALL FOOTAGES ON DRAWINGS ARE ESTIMATED AND MUST BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING MATERIAL.

12. ALL STATION CABLES SHALL BE NEATLY DRESSED AND SECURED EVERY FIVE FEET AT A MINIMUM.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF CEILING TILE INCLUDING REPLACEMENT OF BROKEN OR DAMAGED TILES.

14. ALL LOCATIONS PASSING THROUGH A FIRE OR A SMOKE BARRIER MUST BE FIRE STOPPED USING APPROVED (UL CLASSIFIED) FIRE STOP SYSTEM, INSTALLED PER THE MANUFACTURER'S INSTRUCTIONS AND PROPERLY LABELED.

15. CONDUIT SHALL BE FILLED TO MAXIMUM CAPACITY (PER CODE, STANDARDS, AND NORMS) BEFORE UTILIZING ANOTHER VACANT CONDUIT.

16. ALL STATION OUTLETS AND TERMINALS SHALL BE PROPERLY IDENTIFIED USING THE DISTRICT'S STANDARD INTERNAL DISTRIBUTION NUMBERING SCHEME. ALL LABELS SHALL BE PREPRINTED OR TYPED.

17. EACH BACKBONE RISER AND/OR OSP CABLE SHALL BE EQUIPPED WITH A PERMANENT LABEL INDICATING CABLE TYPE, PAIR OR OPTIC COUNTS, DISTANT ENDS, AND CABLE LENGTH. BOTH ENDS OF EACH CABLE AND AT EVERY MAINTENANCE HOLE, HAND HOLE, AND PULL BOX, SHALL BE SO LABELED.

18. FIBER BACKBONE CABLE SHALL BE PLACED WITH 6 FOOT MAINTENANCE LOOP AT BOTH ENDS OF THE RUN. THE MAINTENANCE LOOP SHALL BE SECURED IN SUCH A MANNER TO PROVIDE PROTECTION DURING SUBSEQUENT CABLE PULLS.

19. ALL STATION CABLES/OUTLETS SHALL BE TESTED AND DOCUMENTED USING A PAIR SCANNER SPECIFICALLY DESIGNED TO TEST THE TYPE OF CABLE INSTALLED (E.G. CATEGORY 6A). TEST RESULTS SHALL BE ONE PAGE PER AND NOTED WITH THE STATION/JACK NUMBERING SCHEME THAT IS STANDARDIZED FOR THE DISTRICT.

20. ALL FIBER OPTIC STATION AND RISER CABLE SHALL BE TESTED END-TO-END AND THE RESULTS (LOSS IN dB) NOTED ON A SEPARATE TYPED SHEET.

21. AFTER STATION CABLE IS TESTED AND DOCUMENTED, ONE PAIR FROM EACH VOICE STATION SHALL BE CROSS CONNECTED THROUGH EACH CLOSET BACK TO THE MAIN DISTRIBUTION FRAME. TELEPHONE NUMBER ASSIGNMENTS FOR EACH JACK MUST BE APPROVED BY THE TELECOM STAFF PRIOR TO IMPLEMENTATION. A WRITTEN RECORD OF ALL CROSS CONNECT ASSIGNMENTS WILL BE PROVIDED TO THE DISTRICT BY THE SCS CONTRACTOR.

22. FIBER CABLES SHALL BE SPLICED TOGETHER USING A FUSION SPLICE AND PLACED IN A FIBER SPLICE CASE THAT IS RE-ENTERABLE, FULLY DRESSED AND ENCLOSED TO FIT THE NUMBER AND TYPE OF CABLES TERMINATED.

23. CABLE TRAY SHALL BE PLACED IN MDF AND IDF(S) AS SHOWN ON DRAWINGS AND AS REQUIRED TO PROPERLY SECURE CABLES AND WIRE.

24. A BACKBONE CABLE ASSIGNMENT RECORD SHEET SHALL BE PREPARED (TYPED) PRIOR TO START OF ACCEPTANCE TESTING. ALL FLOOR PLANS SHALL BE NEATLY HAND NOTED WITH STATION JACK NUMBER AND CABLE LENGTH.

25. ALL CABLES SHALL BE CLEARLY LABELED WITH CABLE NUMBERS, PAIR ASSIGNMENTS AND DESIGNATION.

26. ALL CABLE TRAYS, LADDER RACKS, CONDUITS, EQUIPMENT RACKS, PROTECTOR PANELS, AND CABLE SHEATHS SHALL BE BONDED & GROUNDED TO EQUIPMENT GROUND WITH #6 WIRE (MIN.)

27. ALL SPLICES SHALL BE CONTAINED WITHIN AN APPROVED SPLICE CASE DESIGNED FOR MULTIPLE CLOSURE.

TECHNOLOGY CABLING NOTES:

1. THE USE OF LUBRICANTS SUCH AS CLEAR GLIDE, TO FACILITATE THE INSTALLATION OF CABLES IN CONDUITS IS ENCOURAGED FOR FRICTION REDUCTION AND TO MAINTAIN THE REQUIRED PULL TENSION. YELLOW 77 AND POLYWATER "F" IS PERMISSIBLE FOR USE AS A LUBRICANT FOR ISP TECHNOLOGY CABLING. THE USE OF OSP, LOW TEMPERATURE CABLE LUBRICANTS SHALL NOT BE ACCEPTABLE IN AN INDOOR PLENUM ENVIRONMENT. UNDER NO CIRCUMSTANCES SHALL CABLE PULLING LUBRICANT BE ALLOWED TO ACCUMULATE ON WALLS, FLOORS, BACKBOARDS, OR OTHER SURFACES OUTSIDE THE CONDUIT.

2. ANY CABLE DAMAGED OR EXCEEDING RECOMMENDED INSTALLATION PARAMETERS DURING INSTALLATION SHALL BE REPLACED BY THE CONTRACTOR BEFORE FINAL ACCEPTANCE AT NO COST TO THE DISTRICT.

3. EACH RUN OF CABLE BETWEEN THE TERMINATION BLOCK OR PATCH PANEL AND THE STATION CONNECTOR SHALL BE CONTINUOUS WITHOUT ANY JOINTS OR SPLICES.

4. ALL STATION CABLE SHALL BE PLACED IN THE INTERIOR OF WALLS UNLESS OTHERWISE NOTED OR OBSTRUCTED.

5. PROVIDE BUSHINGS, GROMMETS AND STRAIN-RELIEF FOR CABLES TERMINATING AT WALL-MOUNTED OUTLETS AND PATCH PANELS TO ENSURE DURABLE AND ROBUST CONNECTIONS. THE BUSHINGS AND GROMMETS ARE INTENDED TO PROTECT THE CABLES FROM ANY SHARP EDGES THAT PRESENT A RISK TO THE CABLES. ENSURE THAT ALL SHARP EDGES ARE COVERED TO PROTECT THE CABLES FROM DAMAGE.

6. ALL CABLE BUNDLES EXITING FLOOR OR WALL PENETRATIONS AND RUNNING INTO FURNITURE OR CASEWORK SHALL BE WRAPPED IN SPIRAL WRAP OR SPLIT-LOOM TUBING TO PROTECT THE CABLING AND PROVIDE A NEAT INSTALLATION.

7. ALL CABLE OR INNERDUCT SHALL RUN PARALLEL OR AT RIGHT ANGLES TO BUILDING WALL STRUCTURES.

8. IN SUSPENDED CEILING AND RAISED FLOOR AREAS WHERE DUCT, CABLE TRAYS OR CONDUIT ARE NOT AVAILABLE, CABLE BUNDLES SHALL BE SUPPORTED VIA "J" HOOKS ATTACHED TO THE BUILDING STRUCTURE AND FRAMEWORK AT A MAXIMUM OF FIVE (5) FOOT INTERVALS. MINIMUM 1 " WIDE J-HOOKS SHALL BE APPROPRIATELY SIZED TO ALLOW A MINIMUM OF 60% SPARE CAPACITY FOR FUTURE CABLE INSTALLATION. THE CONTRACTOR SHALL INCLUDE ALL COSTS IN BASE BID FOR ANY ADDITIONAL SUPPORTS/SEISMIC BRACING REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

9. THE CONTRACTOR SHALL BUNDLE, IN BUNDLES OF 48 OR LESS, STATION OR OTHER CABLING WITH 3/4" HOOK AND LOOP "VELCRO" STRIPS TIGHT ENOUGH TO HOLD THE BUNDLE TOGETHER IN A CYLINDRICAL SHAPE, BUT NOT SO TIGHT AS TO DEFORM THE CABLE GEOMETRY. IT SHALL BE POSSIBLE TO COMPLETELY ROTATE ALL HOOK AND LOOP TIES AROUND ALL CABLE BUNDLES. PLENUM RATED HOOK AND LOOP TIES WILL BE USED IN ALL PLENUM AREAS.

10. CABLES OR J-HOOKS SHALL NOT BE ATTACHED TO LIFT OUT CEILING GRID SUPPORTS OR LAID DIRECTLY ON THE CEILING GRID.

11. CABLES OR J-HOOKS SHALL NOT BE ATTACHED TO OR SUPPORTED BY FIRE SPRINKLER HEADS OR DELIVERY SYSTEMS OR ANY ENVIRONMENTAL SENSOR LOCATED IN THE CEILING AIR SPACE.

12. WHERE ADDITIONAL CONDUIT(S)/SLEEVE(S) ARE REQUIRED, BUT NOT PROVIDED BY THE CONTRACTOR, THE SCS AND/OR LV CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SUCH CONDUIT(S)/SLEEVE(S). CONDUIT(S) AND SLEEVE(S) SHALL BE OF SUITABLE MATERIAL, SIZED, INSTALLED, FIRE-STOPPED, AND GROUNDED AS REQUIRED BY THE CEC, ANSI/TIA-569-D STANDARD AND ALL OTHER APPLICABLE CODES AND STANDARDS. SLEEVES SHALL CONSIST OF METALLIC CONDUIT DE-BURRED AND GROMMETED ON BOTH ENDS WITH FLANGES OR OTHER MEANS TO PREVENT THE SLEEVE FROM SLIPPING OR FALLING OUT OF THE PARTITION. SLEEVES SHALL EXTEND A MINIMUM OF 6" ON BOTH SIDES OF THE PARTITION. OUTSIDE PERIMETER OF SLEEVES SHALL BE SEALED AGAINST SOUND, AIR, WATER, HEAT, OR AS REQUIRED BY PARTITION DESIGN. INSIDE OF SLEEVE SHALL BE SEALED SIMILARLY AFTER INSTALLATION OF ALL CABLING. CABLES SHALL BE INDEPENDENTLY SUPPORTED ON EITHER SIDE OF THE SLEEVE. SLEEVES SHALL NOT BE USED AS CABLE SUPPORTS. ANY CONDUIT(S) AND SLEEVE(S) ADDED BY THE SCS CONTRACTOR SHALL BE APPROVED BY THE DISTRICTS REPRESENTATIVE PRIOR TO ROUGH-IN.

13. IN THE EVENT CONTRACTOR IS REQUIRED TO REMOVE CEILING TILES, SUCH WORK SHALL NOT BREAK OR DISTURB GRID. REMOVAL OF THE CEILING GRID MUST BE COORDINATED WITH THE DISTRICTS REPRESENTATIVE. ALL INSULATION SHALL BE REPLACED IN ITS ORIGINAL LOCATION.

14. THE NUMBER OF CABLES IN EACH CONDUIT SHALL BE CONTROLLED TO ALLOW FOR FUTURE CABLE INSTALLATION AND TO STAY WITHIN THE MANUFACTURER'S MAXIMUM ALLOWABLE CABLE PULLING TENSION. CONDUIT FILL RATIOS SHALL NOT EXCEED THE CURRENT REQUIREMENTS OF THE CEC, ANSI/TIA-569-D, REFERENCE SECTION B.2, TABLES 1 AND 2 OF THIS DOCUMENT FOR ADDITIONAL REQUIREMENTS.

15. CONDUITS:
- ALL BACKBONE CABLING WILL RUN THROUGH DEDICATED CONDUITS.
- ALL NEW CONDUITS WILL BE SUPPLIED WITH A PULL STRING BY THE CONTRACTOR.
- EXISTING CONDUITS SHALL BE PROVEN TO BE CLEAR BY THE SCS AND/OR LV CONTRACTOR PRIOR TO PULLING OF CABLES.
- SCS AND/OR LV CONTRACTOR SHALL SUPPLY PULL STRING AND PULL ROPE FOR THE INSTALLATION OF ALL CABLES IN EXISTING CONDUITS.
- FOR ALL CONDUITS LEFT WITH AVAILABLE CAPACITY, SCS AND/OR LV CONTRACTOR SHALL REPLACE PULL STRINGS DURING THE COURSE OF HIS WORK.
- SCS AND/OR LV CONTRACTOR MUST SEAL ALL CONDUITS WITH AN APPROVED SEALING COMPOUND.

TECHNOLOGY GROUNDING SYSTEM NOTES:

1. THE CONTRACTOR SHALL PROVIDE A TELECOMMUNICATION GROUNDING BUSBAR (TGB) AND TELECOMMUNICATION BONDING BACKBONE (TBB) CABLE(S) AT EACH MDF ROOM AND IDF LOCATION. TERMINATE THE TBB ON GROUND BARS LOCATED AT EACH MDF ROOM AND IDF CABINET FROM BUILDING STEEL OR MAIN ELECTRICAL GROUND, OR AS OTHERWISE INDICATED ON THE DRAWINGS.

2. THE SCS CONTRACTOR SHALL UTILIZE A TELECOMMUNICATIONS BONDING BACKBONE (TBB) AS INDICATED IN THE DRAWINGS. GROUNDING MUST BE IN ACCORDANCE WITH THE CEC, ANSI/TIA-607-B AND ALL LOCAL CODES AND PRACTICES.

3. THE SCS CONTRACTOR SHALL BE RESPONSIBLE FOR BONDING ALL METALLIC SHEATH COMMUNICATIONS CABLES ENTERING THE BUILDING PER MANUFACTURER SPECIFICATIONS AND CEC 770-33, 800-33 AND 800-40. ALL GROUNDS SHALL CONSIST OF # 6-AWG COPPER WIRE AND SHALL BE SUPPLIED FROM AN APPROVED BUILDING GROUND AND BONDED TO THE MAIN ELECTRICAL GROUND. ALL CABLE SHEATHS AND SPLICE CASES SHALL BE GROUNDED TO A TELECOMMUNICATIONS GROUND BUS.

4. THE SCS CONTRACTOR SHALL PROVIDE GROUNDING AND BONDING FROM ALL HORIZONTAL EQUIPMENT INCLUDING DISTRIBUTION AND CROSS CONNECT FRAMES, PATCH PANELS, CABLE TRAYS, EQUIPMENT RACKS, LADDER TRAYS, CONDUITS, ACTIVE TELECOMMUNICATION EQUIPMENT, SLEEVES, TEST APPARATUS. EQUIPMENT SHALL BE BONDED TO THE TBB GROUND BARS UTILIZING A #6-AWG GREEN CONDUCTOR WITH 2-HOLE LONG BARREL COMPRESSION GROUNDING LUGS.

a. EACH EQUIPMENT CABINET AND RACK REQUIRES ITS OWN DEDICATED RACK GROUNDING BUSBAR (RGB) WITH A BONDING CONNECTION TO THE GROUNDING INFRASTRUCTURE. THE GROUNDING INFRASTRUCTURE CONSIST OF A TB, BY PROVIDING EVERY RACK/CABINET WITH ITS OWN DEDICATED #6 WAG (MIN.) GREEN CONDUCTORS BACK TO THE TOMB/TB. ALL GROUND CONDUCTOR ATTACHMENTS SHALL UTILIZE 2-HOLE LONG BARREL COMPRESSION LUGS.

b. HORIZONTAL CABLES SHALL BE GROUNDED IN COMPLIANCE WITH ANSI/TIA-607-C, FP 70 (EEC) AND LOCAL REQUIREMENTS AND PRACTICES.

c. IN RAISED-FLOOR ENVIRONMENTS, THE GROUND CONDUCTOR SHALL ATTACH TO THE LOWEST HOLES ON THE FRONT RAIL OF EACH RACK/CABINET.

d. RACK MOUNTED EQUIPMENT SHALL BE GROUNDED VIA THE CHASSIS, IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

e. BONDING OF LADDER RACK SECTIONS: ATTACH BONDING STRAPS TO EACH LADDER RACK SECTION BY UTILIZING EITHER TWO (2) TRI-LOBULAR THREAD-FORMING SCREWS (NOT SELF-TAPPING OR SHEET METAL SCREWS) OR BY USING TWO (2) STANDARD BOLTS WITH TWO (2) "TYPE B" INTERNAL / EXTERNAL TOOTH LOCK WASHERS PER BOLT. IF THREAD-FORMING SCREWS ARE NOT USED, REMOVE PAINT AT EACH CONNECTION POINT AND USE AN APPROVED ANTI-OXIDANT PRIOR TO ATTACHING THE BONDING STRAP.

TECHNOLOGY TERMINAL BACKBOARD NOTES:

1. WHERE INDICATED ON DRAWINGS, CONTRACTOR TO PROVIDE NEW PLYWOOD TERMINAL BACKBOARDS. USE DOUGLAS FIR PLYWOOD, INTERIOR A/C GRADE, FINISHED ONE SIDE AND PRIME COAT PAINTED ON ALL SURFACES WITH A FINISH COAT OF FIRE RETARDANT WHITE ENAMEL. ON EACH PLYWOOD SHEET LEAVE ONE (1) FIRE MARSHAL STAMP UNPAINTED FOR INSPECTION. UNLESS OTHERWISE INDICATED, USE 8'-0" HIGH X LENGTH AS SHOWN ON DRAWINGS X 3/4" THICK PLYWOOD. REFERENCE BACKBOARD ELEVATIONS FOR MORE INFORMATION.

2. FASTENERS THROUGH TREATED BACKBOARDS MUST BE COATED IN COMPLIANCE WITH THE FIRE-TREATMENT'S EVALUATION REPORTS.

TECHNOLOGY PATHWAY NOTES:

1. PATHWAYS CAN BE DIVIDED UP INTO TWO SEPARATE CATEGORIES, OUTSIDE PLANT (OSP) AND INSIDE PLANT (ISP). IT IS THE SCS AND/OR LV SYSTEM(S) CONTRACTOR'S RESPONSIBILITY TO IDENTIFY ALL EXISTING PATHWAYS (CONDUIT, CABLE TRAY, ETC) THAT WILL BE UTILIZED ON THE PROJECT, AND COORDINATE WITH THE ON-SITE ELECTRICAL OR GENERAL CONTRACTOR TO PROVE ALL PATHS SUBJECT TO BE USED ON THIS PROJECT, BEFORE INSTALLATION. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION ALL UNDERGROUND (OSP) PATHWAYS, NON-ACCESSIBLE AND OPEN CEILING SPACE PATHWAYS AS DESCRIBED IN SECTION F, CONTRACTOR GUIDELINES OF THESE TECHNOLOGY GENERAL NOTES.

2. ALL PULL-BOXES SHALL BE SIZED AND INSTALLED PER ANSI/TIA-569-D. PULL-BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL-BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL-BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED. PULL-BOXES SHALL BE SIZED ACCORDING TO THE FOLLOWING: FOR FILL RATIO BASED CONDUIT SIZING REFER TO THE FILL RATIO TABLE 1A - 2B BELOW AND REFERENCE TO ANSI/TIA-569-D.

PULLBOX SIZING PER ANSI/TIA 569-D

Conduit Size	WIDTH	LENGTH	DEPTH	WIDTH INCREASE PER ADDITIONAL CONDUIT
1"	4"	15"...	3"	2"
2"	8"	36"	4"	5"
3"	61	48"	5"	6"
4"	101	60"	8"	8"

FILL RATIO TABLE 1A - Conduit

Conduit Size	.13	.18	.19	.20	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30	.31	.32	.33	.34	.35	.37	.39
3/4"	16	8	7	6	6	5	5	4	4	4	3	3	3	3	2	2	2	2	2	1	1
1"	26	13	12	11	9	9	8	7	7	6	6	5	5	4	4	4	4	3	3	3	2
1 1/4"	45	23	21	19	17	15	14	13	12	11	10	9	9	8	7	7	6	6	6	5	5
1 1/2"	61	32	28	25	23	21	19	18	16	15	14	13	12	11	10	10	9	8	8	7	6
2"	101	52	47	42	38	35	32	29	27	25	23	21	20	18	17	16	15	14	13	12	11
2 1/2"	176	92	82	74	67	61	56	51	47	44	40	38	35	33	31	29	27	25	24	21	19
3"	266	139	124	112	102	93	85	78	72	66	61	57	53	50	46	43	41	38	36	32	29
3 1/2"	347	181	162	146	133	121	111	102	94	86	80	74	69	65	61	57	53	50	47	42	38
4"	444	231	208	187	170	155	142	130	120	111	103	95	89	83	78	73	68	64	61	54	49

FILL RATIO TABLE 2A - Cable Tray / Wire Basket / Raceway

Tray Size (WxD)	.13	.18	.19	.20	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30	.31	.32	.33	.34	.35	.37	.39
4x4	482	251	225	203	184	168	154	141	130	120	111	103	96	90	84	79	74	70	66	59	53
6x4	723	377	338	305	277	252	231	212	195	180	167	155	145	135	127	119	112	105	99	89	80
12x4	1447	754	677	661	554	505	462	424	391	361	335	311	290	271	254	238	224	211	199	178	160
18x4	2170	1132	1016	917	831	758	693	636	587	542	503	467	436	407	381	358	336	317	299	267	241
24x4	2894	1509	1355	1222	1109	1010	924	849	782	732	671	623	581	543	509	477	449	423	399	357	321
6x6	1085	566	508	458	415	379	346	318	293	271	251	233	218	203	190	179	168	158	149	133	120
12x6	2170	1132	1016	917	831	758	693	636	587	542	503	467	436	407	381	358	336	317	299	267	241
18x6	3256	1698	1524	1375	1247	1137	1040	955	880	814	754	701	654	611	572	537	505	476	449	401	361
24x6	4341	2264	2032	1834	1663	1516	1387	1273	1174	1085	1006	935	872	815	763	716	673	634	598	535	482

PATHWAY SEPARATION FROM SOURCE OF ELECTROMAGNETIC ENERGY:

CONDITION	<2KVA	2-5 KVA	>5KVA
Unshielded Power Lines in Proximity to open PVC Pathways	5" (In.)	12" (In.)	24" (In.)
Unshielded Power Lines in Proximity to Grounded Metallic Pathways	2.5" (In.)	6" (In.)	12" (In.)
Power Lines enclosed in Metal Grounded Pathways in proximity to Grounded Metallic...	<1" (In.)	3" (In.)	6" (In.)

3. FOR ALL FIRESTOPPING OF SCS AND LV SYSTEMS PATHWAY RESPONSIBILITIES REFERENCE SECTION G, PENETRATION OF WALLS, FLOOR AND CEILINGS OF THESE TECHNOLOGY GENERAL NOTES.

4. FOR ALL OTHER SCS AND/OR LV SYSTEMS PATHWAY RESPONSIBILITIES REFERENCE SECTION F, CONTRACTOR GUIDELINES OF THESE TECHNOLOGY GENERAL NOTES.

5. OUTSIDE PLANT (OSP) PATHWAYS CAN BE BROKEN DOWN INTO THE FOLLOWING ITEMS, MAINTENANCE HOLES, HAND HOLES, PULLBOXES, AND CONDUITS.

a. WHILE ENTERING MAINTENANCE HOLES, HAND HOLES, PULLBOXES, FOLLOW ALL CODES AND SAFETY PRACTICES OF A "CONFINED SPACE". UTILIZE NECESSARY EQUIPMENT TO MAINTAIN ALL SAFE PULLING TENSIONS FOR THE CABLES TO BE INSTALLED. THIS INFORMATION CAN BE FOUND ON THE CABLE MANUFACTURER'S SPECIFICATIONS SHEETS.

b. BEFORE EXITING THE MAINTENANCE HOLE, HAND HOLE, PULLBOX, NOTE ON PAPER OR DIGITAL MEANS THE EXISTING AND NEW CABLE(S) LOCATION(S) AND ROUTE(S), AND PROVIDE A "BUTTERFLY" PRINT TO AHJ AND DISTRICT'S REPRESENTATIVE. LABEL THE INSTALLED MEDIA PER SPECIFICATIONS.

c. WITH DIRECTION OF DISTRICT OR DISTRICT'S REPRESENTATIVE, CHOOSE AND PROVE ALL CONDUITS BEFORE THE INSTALLATION OF THE MEDIA. MEASURE ALL PATHWAYS WITH MULE-TAPE PRIOR TO ORDERING MATERIAL. ALL LABOR AND MATERIAL COSTS ASSOCIATED WITH DISCREPANCIES BETWEEN DRAWINGS AND VERIFIABLE SITE CONDITIONS SHALL BE BORNE BY CONTRACTOR. COORDINATE WITH THE ELECTRICAL OR GENERAL CONTRACTOR (EC OR GC), IF CONDUITS ARE PLUGGED OR MISSING PULL ROPE.

d. TRAIL ALL BACKBONE MEDIA (I.E. COPPER, FIBER OR INNERDUCT) WITH A 3/8" YELLOW POLY-NYLON ROPE, LABEL THE ROPE, AND TIE OFF EITHER END, FOR FUTURE INSTALLATIONS.

e. PROVIDE AND INSTALL ALL HARDWARE NECESSARY TO SUPPORT THE CABLING TO THE WALLS OF THE MAINTENANCE HOLE, HAND HOLES, PULLBOX. (IF IT DOES NOT ALREADY EXIST) THIS HARDWARE IS TO BE CONSTRUCTED FOR THE AREA IT IS TO BE INSTALLED AND DESIGNED FOR THE PURPOSE INTENDED FOR ITS USE.

f. SCS AND/OR LV CONTRACTOR TO PROVIDE EXPANSION PLUGS IN ALL DUCTS/CONDUITS ENTERING THE BUILDING. SEAL ALL UNUSED DUCTS/CONDUITS WITH PLUGS THAT ALLOW THE PULL-STRING TO BE TIED OFF ON THE INSIDE.

6. INSIDE PLANT (ISP) PATHWAYS CAN BE BROKEN DOWN INTO THE FOLLOWING ITEMS, HOLLOW WALL PENETRATION, MEMBRANE PENETRATION, ACCESSIBLE CEILING (I.E. "J" HOOKS), AND CONDUIT.

7. CABLE RACEWAYS AND CONDUITS SHALL NOT BE FILLED GREATER THAN THE CEC, AND BICSI RECOMMENDED FILL FOR THE PARTICULAR RACEWAY OR CONDUIT SIZE FOR CLASS 2/3 WIRE/CABLE.

a. CONDUIT AND PATHWAY ROUTING SHOWN FOR THE SCS AND LV SYSTEMS ARE STRICTLY DIAGRAMMATICAL FOR THE PURPOSE OF THE BID TO ILLUSTRATE GENERAL METHODOLOGY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE BEST MEANS & METHODS FOR SCS & TECHNOLOGY CONDUIT AND PATHWAY INSTALLATION. ADDITIONALLY IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE INSTALLATION PLAN WITH THE DISTRICTS REPRESENTATIVE AND ALL TRADES PRIOR TO INSTALLATION. REFER TO PLANS AND GENERAL ELECTRICAL SPECIFICATION FOR ADDITIONAL REQUIREMENTS.

b. CONDUIT PATHWAYS SHALL BE SUPPLIED BY THE ELECTRICAL OR GENERAL CONTRACTOR AS PER THE DRAWINGS, OTHER CONDUITS (IF ANY) MAY NEED TO BE COORDINATED WITH THE EC AND/OR GC OF THE PROJECT.

c. NO CABLE IS TO BE PULLED THROUGH A CONDUIT L-BEND "LB" (CONDULETS).

d. ALL EXPOSED CONDUIT AND HARDWARE SHALL BE PAINTED TO MATCH SURROUNDING SURFACES.

e. CONDUITS SHALL CONTAIN PLASTIC OR NYLON PULL TAPE RATED AT 200 LBS. WITH A MINIMUM OF 5 FEET OF EXTRA PULL TAPE COILED AT EACH END.

f. TERMINATE CONDUIT STUBS AND SLEEVES THAT PROTRUDE THROUGH STRUCTURAL FLOORS 2"-3" ABOVE THE FLOOR SURFACE.

g. INSTALL BUSHINGS AND BELL ENDS AS REQUIRED ON ALL CONDUITS.

h. FLEX CONDUIT IS UNACCEPTABLE FOR USE AS A COMMUNICATIONS CONDUIT EXCEPT AT SEISMIC JOINTS AND/OR IF APPROVED IN WRITING BY THE ENGINEER.

i. ALL UNDER SLAB OR IN-SLAB CONDUITS SHALL BE INSTALLED IN A MANNER THAT PREVENTS WATER INFILTRATION OF THE CONDUIT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROUND WATER, RAIN WATER OR CONSTRUCTION WATER IS PREVENTED FROM ENTERING AND/OR REMOVED FROM THE CONDUITS PRIOR TO PLACEMENT OF COMMUNICATIONS CABLES. SEE ELECTRICAL SPECIFICATIONS, DETAILS AND PLANS FOR ADDITIONAL CONDUIT SEALING REQUIREMENTS.

j. PROVIDE LABELING OF EACH CONDUIT PER GENERAL ELECTRICAL SPECIFICATIONS.

k. REINSTALL PULL-STRINGS IN ALL SCS AND LV ISP PATHWAYS AFTER USE TO FACILITATE FUTURE ADDITION OF CABLES.

l. IT IS THE SCS AND/OR LV CONTRACTOR'S RESPONSIBILITY TO REPORT ANY UNUSABLE OR INADEQUATE CONDUIT RUNS TO THE DISTRICT PRIOR TO PULLING ANY CABLE.

m. PULL BOXES ARE NOT TO BE USED IN LIEU OF A BEND, AND THE CONDUIT SHALL EXIT A PULLBOX ON THE WALL OPPOSITE THE WALL ENTERED.

n. CONDUITS SHALL;
- CONTAIN NO CONTINUOUS SECTIONS LONGER THAN 30M (98 FT.)
- CONTAIN NO MORE THAN (3) 90° BENDS (270° MAX.) OR (1) REVERSE BEND WITHOUT INSTALLING A PULL BOX SIZED PER STANDARDS & CODE.
- SPLIT CONDUITS IN PLACE OF PULL BOXES ARE UNACCEPTABLE.

o. CONDUIT BEND RADIUS SHALL BE;
- A MINIMUM OF 6 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS 2" IN DIAMETER OR LESS.
- A MINIMUM OF 10 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS MORE THAN 2" IN DIAMETER.

p. POWER SEPARATION:
- THE CONTRACTOR SHALL NOT PLACE ANY DISTRIBUTION CABLING ALONGSIDE POWER LINES, OR SHARE THE SAME CONDUIT, CHANNEL OR SLEEVE WITH ELECTRICAL APPARATUS. AT NO POINT SHALL THE COMMUNICATIONS CABLES BE TIED TO POWER CABLES OR OTHER BUILDING SERVICES. STATION CABLES AND TIE CABLES INSTALLED WITHIN CEILING SPACES SHALL BE ROUTED THROUGH THESE SPACES AT RIGHT ANGLES TO ELECTRICAL POWER CIRCUITS.
- AVOID ELECTROMAGNETIC INTERFERENCE (EMI) BY MAINTAINING ADEQUATE PHYSICAL SEPARATION BETWEEN TECHNOLOGY CABLING AND POSSIBLE SOURCES SUCH AS, BUT NOT LIMITED TO, ELECTRIC MOTORS, ELECTRIC PENCIL SHARPENERS, TRANSFORMERS, FLUORESCENT LIGHTS THAT SHARE DISTRIBUTION SPACE WITH TELECOMMUNICATIONS CABLING, COPIERS THAT SHARE WORK AREA SPACE WITH LINE CORDS AND TERMINALS, LARGE FAX MACHINES AND POWER CORDS THAT SUPPORTS SUCH EQUIPMENT.

TECHNOLOGY GENERAL NOTES:

A. ALL STRUCTURED CABLING SYSTEM (SCS) & LOW VOLTAGE (LV) CABLING USED THROUGHOUT THIS PROJECT SHALL COMPLY WITH THE REQUIREMENTS AS OUTLINED IN THE STANDARDS, CODES AND LOCAL REGULATIONS FOR THE FOLLOWING: ANSI/TIA-568-C, ANSI/TIA-569-D, ANSI/TIA-606-B, ANSI/TIA-607-B, BICSI TDMM (CURRENT VERSION), CEC ARTICLE 90, ARTICLE 300, CEC ARTICLE 645, CEC ARTICLE 646, CEC ARTICLE 725, CEC ARTICLE 760, CEC ARTICLE 770, CEC ARTICLE 800, CEC ARTICLE 830. THE SCS & TECHNOLOGY SYSTEM(S) MUST MEET ALL LOCAL AND OTHER PREVAILING CODES.

B. ALL SCS & LV CABLING SHALL BEAR UL LISTED TYPE CMP (PLENUM RATED) AND/OR CM/G (GENERAL PURPOSE) AND/OR CMR (RISER RATED). ALL FIBER OPTIC CABLING SHALL BEAR OFNP (PLENUM RATED) AND/OR OFNR (RISER RATED) AND/OR OFN/G (GENERAL PURPOSE). THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING APPROPRIATELY RATED CABLE FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.

C. ALL INSTALLATION SHALL BE DONE IN CONFORMANCE WITH ANSI/TIA-568-C STANDARDS AND MANUFACTURERS INSTALLATION GUIDELINES. THE CONTRACTOR SHALL ENSURE THAT THE CABLE'S MINIMUM BEND RADIUS AND, MAXIMUM PULLING TENSIONS OF THE SPECIFIED DISTRIBUTION CABLES ARE NOT EXCEEDED. THE CABLE BENDS MUST MAINTAIN THE PROPER RADIUS DURING THE PLACEMENT OF THE FACILITIES. FAILURE TO FOLLOW THE APPROPRIATE GUIDELINES WILL REQUIRE THE CONTRACTOR TO PROVIDE, IN A TIMELY FASHION, ANY ADDITIONAL MATERIAL AND LABOR NECESSARY TO PROPERLY RECTIFY THE SITUATION TO THE SATISFACTION AND WRITTEN APPROVAL OF THE DISTRICTS REPRESENTATIVE. THIS SHALL ALSO APPLY TO ANY AND ALL DAMAGES SUSTAINED TO THE CABLES BY THE CONTRACTOR DURING THE IMPLEMENTATION.

D. ALL SCS AND/OR LV INSTALLATIONS SHALL BE PERFORMED BY QUALIFIED TECHNICIANS FOR THAT SYSTEM. THE LABOR EMPLOYED BY THE CONTRACTOR SHALL BE REGULARLY EMPLOYED IN THE INSTALLATION AND REPAIR OF SCS AND/OR LV SYSTEMS AND SHALL BE ACCEPTABLE TO THE DISTRICTS REPRESENTATIVE TO ENGAGE IN THE INSTALLATION AND SERVICE OF THIS SYSTEM.

E. THE MDF AND IDF SPACES ARE DESCRIBED BELOW, AND ENCOMPASS THE AREAS THE COMMUNICATIONS CABLING EXISTS IN. THESE AREAS INCLUDE (BUT NOT LIMITED TO) THE BACKBOARDS, CABINETS, RACKS, FRAMES, LADDER RACKS, TERMINATION FIELDS, AND PATCH CORDS. (WALL AND RACK TYPES FOR COPPER AND FIBER). THE SCS CONTRACTOR IS RESPONSIBLE FOR FOLLOWING THE STANDARDS, CODES AND LOCAL REGULATIONS FOR THESE SPACES, (E.G. ANSI/TIA-568-C, ANSI/TIA-569-D, ANSI/TIA-606-B, ANSI/TIA-607-B , BICSI TDMM (CURRENT VERSION), CEC ARTICLE 90, ARTICLE 300, CEC ARTICLE 645, CEC ARTICLE 646, CEC ARTICLE 725, CEC ARTICLE 770, CEC ARTICLE 800, CEC ARTICLE 830.

F. THE WIRING OF THE SYSTEM SHALL BE EXECUTED IN ACCORDANCE WITH THE DRAWINGS AND THE EQUIPMENT MANUFACTURER'S WIRING DIAGRAMS. SHOULD ANY VARIATIONS IN THESE REQUIREMENTS OCCUR, THE CONTRACTOR SHALL NOTIFY THE DISTRICTS REPRESENTATIVE BEFORE MAKING ANY CHANGES. IT SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER - AUTHORIZED INSTALLER OF THE APPROVED EQUIPMENT TO INSTALL THE EQUIPMENT AND GUARANTEE THE SYSTEM TO OPERATE AS PER PLANS AND SPECIFICATIONS.

G. ALL MATERIALS SHALL BE NEW. NO USED OR RE-MANUFACTURED PARTS OR COMPONENTS SHALL BE ACCEPTED.

H. CABLE STORAGE: THE CONTRACTOR SHALL NOT ROLL OR STORE CABLE REELS WITHOUT AN APPROPRIATE UNDERLAY AND THE PRIOR WRITTEN APPROVAL OF DISTRICTS REPRESENTATIVE.

I. SPECIAL EQUIPMENT AND TOOLS: IN ORDER TO ENSURE THE LEAST AMOUNT OF CABLE UNTWISTING, IT IS REQUIRED THAT ALL CABLES SHALL BE STRIPPED USING A CABLE MANUFACTURER'S RECOGNIZED SPECIAL TOOL. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FURNISH ANY SPECIAL INSTALLATION EQUIPMENT OR TOOLS NECESSARY TO PROPERLY COMPLETE THE SYSTEM. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, TOOLS FOR TERMINATING CABLES, TESTING AND SPLICING EQUIPMENT FOR COPPER/FIBER CABLES, COMMUNICATION DEVICES, JACK STANDS FOR CABLE REELS, OR CABLE WINCHES.

J. UNDER NO CIRCUMSTANCE ARE "CHANNEL LOCKS" OR OTHER PLIERS NOT DESIGNED BY THE SCS MANUFACTURE TO BE USED TO TERMINATE WAO JACKS.

PROJECT CODES AND STANDARDS:

APPLICABLE PROJECT BUILDING CODES, EFFECTIVE AS OF DATE: JANUARY 1, 2023

2022 CALIFORNIA ADMINISTRATIVE CODE (CAC)
2022 CALIFORNIA BUILDING CODE (CBC)
2022 CALIFORNIA ELECTRICAL CODE (CEC)
2022 CALIFORNIA FIRE CODE (CFC)
2022 CALIFORNIA ENERGY CODE
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
2022 CALIFORNIA REFERENCED STANDARDS CODE
2022 NFPA 72: NATIONAL FIRE ALARM AND SIGNALING CODE, NATIONAL FIRE PROTECTION ASSOCIATION
2022 NFPA 1221: NATIONAL FIRE ALARM AND SIGNALING CODE, NATIONAL FIRE PROTECTION ASSOCIATION

APPLICABLE INDUSTRY STANDARDS, CURRENT EDITION

TIA-568: GENERIC CABLE STANDARDS
TIA-568-1: COMMERCIAL CABLE STANDARDS
TIA-568-2: BALANCED TWISTED PAIR CABLING AND COMPONENTS
TIA-568-3: OPTICAL CABLING FEEDER COMPONENTS
TIATIA-568-4: BROADBAND COAX CABLING AND COMPONENTS
TIA-569: TELECOMMUNICATION PATHWAYS AND SPACES
TIA-570: RESIDENTIAL TELECOMMUNICATIONS
TIA-598: OPTICAL FIBER CABLE COLOR CODING
TIA-606: ADMINISTRATIVE LABELING STANDARDS
TIA-607: TELECOMMUNICATIONS BONDING AND GROUNDING
TIA-758: TELECOMMUNICATIONS OUTSIDE PLANT
TIA-526-7: SINGLE-MODE FIBER STANDARDS
TIA-526-14: MULTI-MODE FIBER STANDARDS

CONTRACTOR SUBMITTALS:

DESIGN DOCUMENTS AND SPECIFICATIONS:

IT SHALL BE UNDERSTOOD THAT THE DRAWINGS, DETAILS, AND ONE-LINES PROVIDED WITH THE DESIGN PACKAGE ARE ILLUSTRATIVE. DATA PRESENTED ON DESIGN DRAWINGS IS AS ACCURATE AS PRELIMINARY SURVEYS AND PLANNING CAN REGULATE. ACCURACY IS NOT GUARANTEED AND FIELD VERIFICATION, OF ALL DIMENSIONS, ROUTING, ETC., BY THE CONTRACTOR IS REQUIRED.

THE CONTRACTOR IS DIRECTED TO MAKE FIELD SURVEYS AS PART OF HIS WORK PRIOR TO SUBMITTING SYSTEM LAYOUT DRAWINGS (SHOP DRAWINGS).

DOCUMENTS ARE PROVIDED TO SHOW THE INTENT OF THE DESIGN AND SPECIFICATION AND TO ASSIST THE CONTRACTOR IN SUBMITTING A BID. THE CONTRACTOR SHALL MAKE ALLOWANCE IN THE PROPOSAL TO COVER WHATEVER WORK IS REQUIRED TO COMPLY WITH THE INTENT OF THE DESIGN AND PROVIDE A FULLY FUNCTIONING COMPLETE, OPERABLE, AND INTEGRATED SYSTEM.

IN CASE OF DOUBT OF WORK INTENDED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REQUEST INSTRUCTIONS FROM THE ARCHITECT, PROJECT DESIGNER, OR CLIENT PRIOR TO BID.

INSTALLATION OF SYSTEMS INFRASTRUCTURE, CABLING, AND DEVICES SHALL NOT BE STARTED UNTIL CONTRACTOR FURNISHED SHOP DRAWINGS (IN AUTOCAD 2018/ OR SIMILAR PROFESSIONAL DRAWING FORMAT) AND PRODUCT SUBMITTALS HAVE BEEN APPROVED BY THE DESIGNER AND/OR ARCHITECT AND IF (A. APPLICABLE, APPROVED BY THE DIVISION OF THE STATE ARCHITECT).

ANY AND ALL DESIGN AND/OR INSTALLATION DISCREPANCIES, CHANGE ORDERS, (INCLUDING LABOR, MATERIALS, AND SHIPPING) INCURRED WITHOUT CONTRACTOR SHOP DRAWINGS OR AFTER CONTRACTOR SHOP DRAWINGS HAVE BEEN APPROVED SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

ANY WORK PERFORMED WITHOUT APPROVED CONTRACTOR FURNISHED SHOP DRAWINGS AND SUBMITTALS SHALL NOT BE ALLOWED. IF WORK PERFORMED PRIOR TO APPROVE SHOP DRAWINGS, CONTRACTOR WILL DO SO AT THEIR OWN RISK.

ORDERING AND INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL THE FOLLOWING QUALIFICATIONS, PRODUCT SUBMITTALS, AND INSTALLATION SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED.

THE CONTRACTOR IS HEREBY ACKNOWLEGING AND ACCEPTING ALL CONDITIONS AS NOTED BELOW BY SUBMISSION OF PROJECT BID.

ANY DESIGN AND/OR INSTALLATION DISCREPANCIES/CHANGE ORDERS/REWORK (INCLUDING LABOR, MATERIALS, SHIPPING) INCURRED BEFORE OR AFTER CONTRACTOR FURNISHED SHOP DRAWINGS HAVE BEEN APPROVED SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

PRODUCT DATA SUBMITTALS REQUIREMENTS:

- INDEX OF MATERIALS: PRODUCT DESCRIPTION, MANUFACTURER, AND MODEL. ALL SPEC. SHEETS SHALL HIGHLIGHT SPECIFIC MODEL, AND ALL ACCESSORIES TO BE INSTALLED.
- PRODUCT SUBSITUTIONS: REASON FOR SUBSTITUTION, PRODUCT FEATURES/WARRANTY EQUAL, DESCRIPTION, MANUFACTURER, MODEL.
- CONTRACTOR QUALIFICATIONS: C7 AND/OR C10 LICENSE AS REQUIRED BY PROJECT SPECIFICATIONS. INDUSTRY RECOGNIZED INSTALLATION AND MANUFACTURER QUALIFICATIONS SHALL BE HELD PRIOR TO SUBMISSION OF BID.

INSTALLATION SHOP DRAWING SUBMITTALS REQUIREMENTS:

- PROJECT NOTES: CODE AND PROJECT SPECIFIC REQUIREMENTS
- LEGENDS/SHEDULES: DEVIXCE ANNOTATIONS, INFRASTRUCTURE, CABLING, DEVICE MANUFACTURER AND MODEL, AND RELEVANT DETAIL IDENTIFICATIONS.
- SITE PLAN: UTILITY AND SITE GROUND BOXES, PULL BOXES, CONDUITS, CABLING, AND RELEVANT DETAIL IDENTIFICATIONS.
- FLOOR AND CEILING PLANS: EQUIPMENT ROOM(S), DEVICE LOCATIONS, DEVICE UNIQUE LABEL IDENTIFIER, MANUFACTURER AND MODEL, HORIZONTAL PATHWAYS, KEYNOTES, AND RELEVANT DETAIL IDENTIFICATIONS.
- ONE-LINES: FULL SYSTEM CONNECTIVITY ONE-LINES SHOWING POINT-TO-POINT TERMINATIONS, SCHEDULES.
- INSTALLATION DETAILS: UTILIZE APPROVED CONSTRUCTION DOCUMENMT DETAILS. IF CONTRACTOR INSTALLATION REQUIREMENTS ARE ALTERED FROM APPROVED CONSTRUCTION DOCUMENTS THE CONTRACTOR SHALL BE REQUIRED TO DESIGN AND DRAFT ALL DETAILS FOR DESIGN REVIEW AND/OR SUBMISSION OF AHJ FOR APPROVAL.
- AUDIO-VISUAL: CONTROL PANEL GRAPHIC USER INTERFACE (GUI) SCREEN(S) SHOT AND CONTROL FUNCTIONS.

TECHNOLOGY SHEET INDEX

SHEET NUMBER	SHEET NAME
2T0.01	TECHNOLOGY NOTES
2T0.02	TECHNOLOGY LEGENDS
2TA2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG A
2TA5.01	TECHNOLOGY MDF-1.0 RACK ELEVATION AND SCHEDULE - BLDG A
2TE2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG E
2TE5.01	TECHNOLOGY IDF-1.4 RACK ELEVATION AND SCHEDULE
2TF2.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG F
2TF3.01	TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG F
2TF5.01	TECHNOLOGY IDF-1.3 RACK ELEVATION AND SCHEDULE
2T7.01	TECHNOLOGY SYSTEM ONE LINE DIAGRAM
2T8.01	TECHNOLOGY MDF/IDF EQUIPMENT DETAILS
2T8.02	TECHNOLOGY HORIZONTAL PATHWAYS DETAILS
2T8.03	TECHNOLOGY DETAILS
2T8.04	TECHNOLOGY SECURITY DETAILS
2T8.05	TECHNOLOGY RATED ASSEMBLY PENETRATIONS

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

LP CONSULTING ENGINEERS

MEP & FS / Sustainability / CxA

1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778

www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY NOTES

2T0.01

TECHNOLOGY SYMBOL LEGEND:

ALL NOTES ARE TYPICAL UNLESS NOTED OTHERWISE ON PLANS AND DETAILS

ROW#	SYMBOL	DESCRIPTION	DEVICE BACK BOX	PLASTER RING	MOUNTING HEIGHT	DEVICE CONDUIT	CABLING RESPONSIBILITY			CABLE MFR.	CABLE PRODUCT NUMBER	DEVICE RESPONSIBILITY			DEVICE MFR.	DEVICE PRODUCT NUMBER	DEVICE ACCESSORY	MAX. LOAD	INSTALLATION NOTES
							CFCI	OFCI	OFOI			CFCI	OFCI	OFOI					
1	MDF	MDF EQUIPMENT RACK	N/A	N/A	N/A	N/A				N/A	N/A	✓			MIDDLE ATLANTIC	AS NOTED PER EQUIPMENT SCHEDULE(S)	N/A	1600 LBS	01 2T8.01
2	IDF	IDF EQUIPMENT RACK	N/A	N/A	AS NOTED PER PLAN	N/A				N/A	N/A	✓			MIDDLE ATLANTIC	AS NOTED PER EQUIPMENT SCHEDULE(S)	N/A	500 LBS.	03 2T8.01
3	IDF	IDF EQUIPMENT RACK	N/A	N/A	AS NOTED PER PLAN	N/A				N/A	N/A	✓			MIDDLE ATLANTIC	AS NOTED PER EQUIPMENT SCHEDULE(S)	N/A	300 LBS.	05 2T8.01
4		PULL BOX INTERIOR: NEMA1, EXTERIOR: NEMA3	N/A	N/A	+24' TO CENTER	N/A				N/A	N/A	✓			HOFFMAN	24"X24"X8"	N/A	N/A	
5		CONDUIT SLEEVES, SIZE AND QTY. AS NOTED PER PLAN	N/A	N/A	AS NOTED PER PLAN	N/A				PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G	✓			GENERAL	EMT RIGID	N/A	N/A	01 2T8.02
6		CABLE LADDER	N/A	N/A	ABV. EQUIPMENT RACK	N/A				N/A	N/A	✓			CHATSWORTH	AS REQUIRED	N/A	N/A	11 2T8.01
7		SOLID BOTTOM CABLE TRAY	N/A	N/A	N/A	N/A				N/A	N/A	✓			MONO SYSTEMS	RACE TRAY	N/A	N/A	09 2T8.02
8	J J J	NON-CONTINUOUS OPEN ENDED PATHWAY, J-HOOK	N/A	N/A	6" ABV. CEILING	N/A	✓			N/A	N/A	✓			B-LINE	BCH-32/ BCH-64	N/A	N/A	INSTALL 6" ABOVE CEILING
9	#	DATA / VOICE OUTLET # EQUALS DROP QTY., IF NONE, DROP COUNT EQUALS ONE (1)	4-11/16" SQ., 2-1/8" DEEP	2-DEVICE	+18" TO CENTER	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G	✓			N/A	N/A	N/A	N/A	04 2T8.03
10	WAP	WIRELESS ACCESS POINT (2 DATA DROP)	4-11/16" SQ., 2-1/8" DEEP	1-DEVICE	+108" TO CENTER / CEILING	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G			✓	OWNER FURNISHED / OWNER INSTALLED		N/A	N/A	12 2T8.03
11		SYNCHRONOUS CLOCK	N/A	N/A	+108" WALL	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G			✓	OWNER FURNISHED / OWNER INSTALLED		N/A	N/A	09 2T8.03
12	AVi	AUDIOVISUAL INPUT	4-11/16" SQ., 2-1/8" DEEP	2-DEVICE	+18" TO CENTER	1 EA. 1-1/4"C	✓			BELDEN	638AMJ	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	N/A	N/A	
13	AVo	AUDIOVISUAL OUTPUT	4-11/16" SQ., 2-1/8" DEEP	2-DEVICE	+48" TO TOP	1 EA. 1"C	✓			BELDEN	638AMJ	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PANDUIT EXECUTIVE FACEPLATE	N/A	
14		LED/ TV MONITOR, WALL MOUNTED	N/A	N/A	+60" TO CENTER	1 EA. 1-1/4"C	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PANDUIT EXECUTIVE FACEPLATE	N/A	16 2T7.01
15		LED/ TV MONITOR, TV ON CART	N/A	N/A	N/A	N/A	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	N/A	N/A	01 2T7.01
16	AV	8" LAY-IN AUDIO-VISUAL SPEAKER	N/A	N/A	CEILING	N/A	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	N/A	N/A	11 2T8.03
17	AV	AUDIO-VISUAL SPEAKER, WALL MOUNTED	N/A	N/A	+108" WALL	1 EA. 1"C	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	✓			PER AUDIO-VISUAL ONE-LINES / SCHEDULES	PER AUDIO-VISUAL ONE-LINES / SCHEDULES	N/A	N/A	13 2T8.03
18	SPK-#	8" LAY-IN INTERCOM / PAGING SPEAKER	N/A	N/A	CEILING	N/A	✓			PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G			✓	OWNER FURNISHED / OWNER INSTALLED		PANDUIT EXECUTIVE FACEPLATE	N/A	11 2T8.03
19	SPK-#	HARD LID CEILING INTERCOM / PAGING SPEAKER	N/A	N/A	CEILING	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/BLUE): PUP6XHD04BU-G			✓	OWNER FURNISHED / OWNER INSTALLED		PANDUIT EXECUTIVE FACEPLATE	N/A	16 2T8.03
20	SPK-#	INTERCOM / PAGING SPEAKER, WALL MOUNTED	N/A	N/A	+108" WALL	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/GREEN): PUP6AS04GR-GZ			✓	OWNER FURNISHED / OWNER INSTALLED		PANDUIT EXECUTIVE FACEPLATE	N/A	10 2T8.03, 15 2T8.03
21		WALL / CEILING FIXED POSITION INTRUSION MOTION SENSOR	4-11/16" SQ., 2-1/8" DEEP	1-DEVICE	+96" TO BOTT.	1 EA. 3/4"C	✓			BELDEN	638AMJ	✓			BOSCH	PER INTRUSION ONE-LINES/ SCHEDULES	N/A	N/A	04 2T8.04
22		HIDDEN DOOR POSITION CONTACT, DPDT	N/A	N/A	TOP OF DOOR	1 EA. 1/2"C	✓			BELDEN	638AMJ	✓			ABLOY	PER INTRUSION ONE-LINES/ SCHEDULES	N/A	N/A	09 2T8.04
23		WEATHERPROOF FIXED DOME CAMERA W/ IR	4-11/16" SQ., 2-1/8" DEEP	2-DEVICE	+108" WALL OR CEILING	1 EA. 1"C	✓			PANDUIT	CAT6A (PLENUM/YELLOW): PUP6AS04YL-GZ			✓	OWNER FURNISHED / OWNER INSTALLED		N/A	N/A	01 2T8.04, 02 2T8.04, 03 2T8.04
24	CR	ACCESS CONTROL, PROXIMITY CARD READER	4-11/16" SQ., 2-1/8" DEEP	1-DEVICE	+48" TO TOP	1 EA. 3/4"C	✓			BELDEN	638AMJ	✓			HID	SIGNO 40	N/A	N/A	
25	AH	ACCESS CONTROL HARDWARE (PROVIDED BY DIVISION 08)	N/A	N/A	TOP OF DOOR	1 EA. 1/2"	✓			BELDEN	638AMJ			✓	HARDWARE CONSULTANT TO PROVIDE: ALL DOOR LOCKSET / HINGE / HARNESS / MISC. ACCESSORIES. DIV. 28 TO PROVIDE: CONTROLLER, READER, PSU, CABLING, TERMINATION, ACTIVATION.		N/A	N/A	

NOTES:

1. REFERENCE AUDIO VISUAL SPECIFICATIONS AND MANUFACTURER GUIDELINES WHEN DETERMINING BACK BOX SIZE FOR AV EQUIPMENT.
2. USE EXTENSION RINGS IF NEEDED, ON ALL LOCATIONS.
3. REFERENCE EIA/TIA STANDARDS.
4. ROUTE CONDUIT INWALL TO NEAREST TO ACCESSIBLE CEILING SPACES.
5. PAINT INSIDE OF BACK BOX BLUE FOR PRE GYP. BOARD INSPECTION.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

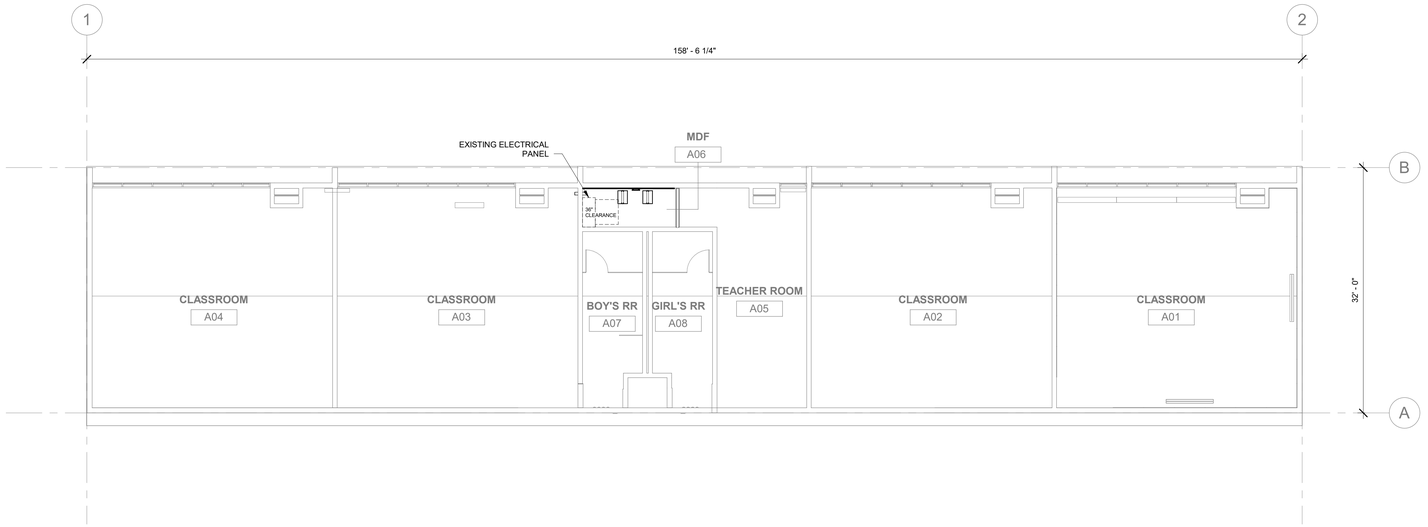
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY LEGENDS

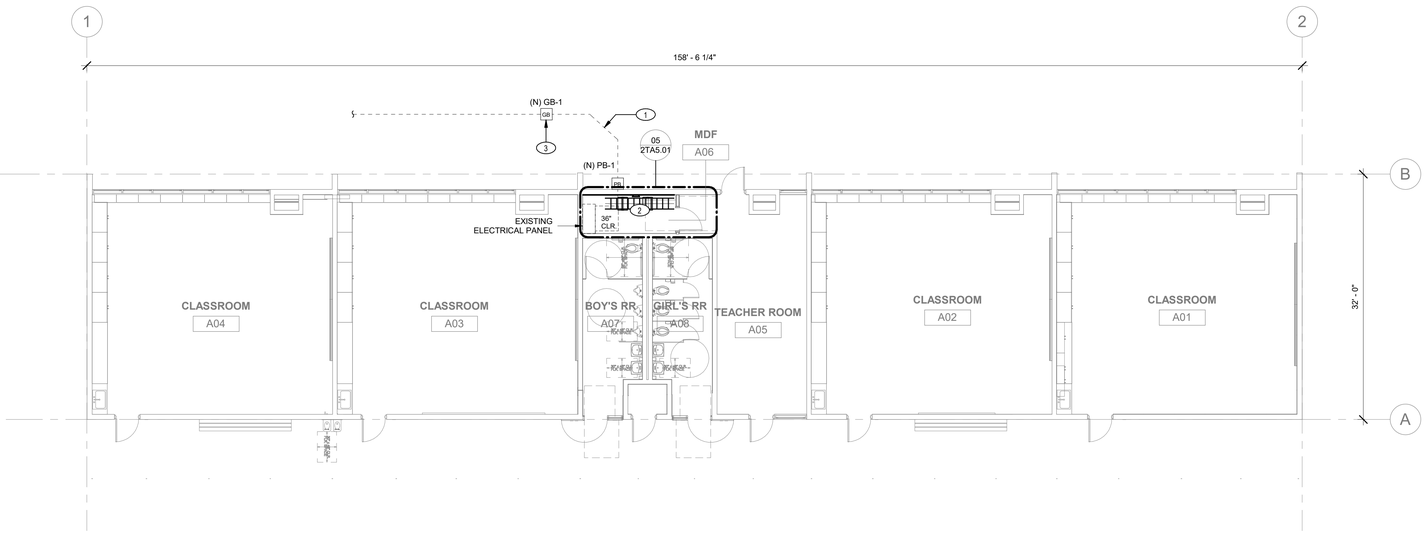
2T0.02



N

0 4 8 12 16

TECHNOLOGY REFLECTED CEILING PLAN - BLDG A | 1/8" = 1'-0" | 2TA2.01 | 07



N

0 4 8 12 16

TECHNOLOGY FLOOR PLAN - BLDG A | 1/8" = 1'-0" | 2TA2.01 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW 5 EA. 4" UNDERGROUND CONDUITS.
2	NEW MDF EQUIPMENT RACK, FLOOR MOUNTED WITH 6"X6" VERTICAL WIRE MANAGEMENT AT BOTH SIDES. PROVIDE 1 EA. 220VAC/30A AND 1 EA. 120VAC/20A DEDICATED CIRCUITS. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
3	NEW GROUND BOX WITH BASE EXTENSIONS AND LID. LID SHALL BE H20 TRAFFIC RATED AT ALL VEHICLE OR HIGH WEIGHT CAPACITY AREAS AND CONCRETE LID AT OTHER LOCATIONS, TYP., U.N.O. LIDS SHALL BE LABELED "SIGNAL" OR "COMMUNICATIONS".

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LP CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

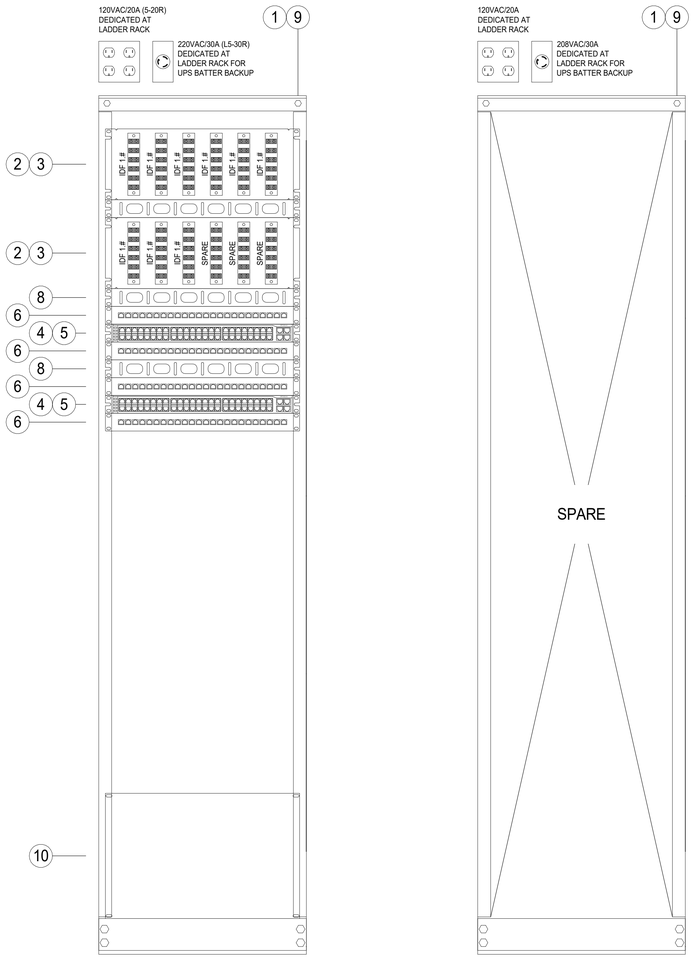
Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG A

2TA2.01

EQUIPMENT SCHEDULE

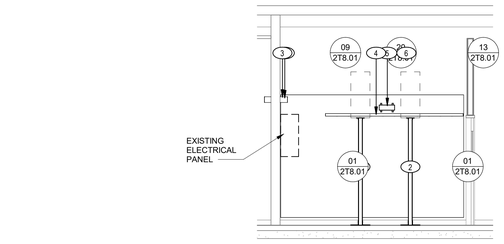
TAG ID	DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	UL LOAD CAPACITY (RACK W/ EQUIPMENT)
1	TECHNOLOGY EQUIPMENT RACK, 2-POST (45RU)	MIDDLE ATLANTIC	RL12-45	1600 LBS.
2	FIBER OPTIC TERMINATION HOUSING ((4RU)	CORNING	CCH-04U	N/A
3	FIBER OPTIC ADAPTER CASSETTE FOR ABOVE, TYPE LC	CORNING	CCH-CS12-A9-P00RE	N/A
4	DATA SWITCH - 48 PORT POE (1RU)	OWNER FURNISHED / OWNER INSTALLED		N/A
5	FIBER TRANSCIEVER MODULE, LC (2 EA)			N/A
6	PATCH PANEL - WITH REAR WIRE MANAGER (24-PORT) (1RU)	PANDUIT	CPP24WBLY	N/A
7	PATCH PANEL - WITH REAR WIRE MANAGER (48-PORT) (2RU)	PANDUIT	CPPL48WBLY	N/A
8	HORIZONTAL WIRE MANAGER (1RU)	PANDUIT	WMPF1E	N/A
9	VERTICAL WIRE MANAGER, 4.9"-WIDE (45RU)	PANDUIT	WMPV45E	N/A
10	SMART UPS BATTERY BACKUP, 2200VA (120VAC/20A)	APC	SRT2200RMXLA	N/A
	NETWORK MANAGEMENT CARD	APC	9641	N/A



01 2T8.01 SEE DETAIL FOR RACK ANCHORAGE REQUIREMENTS

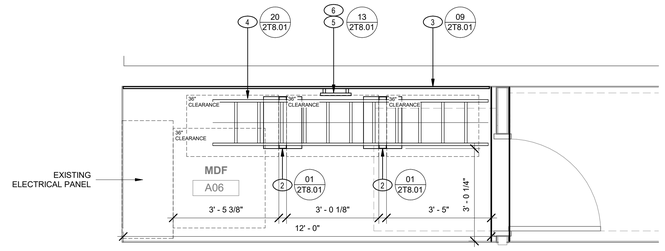
MDF-1.0

TECHNOLOGY MDF-1.0 RACK ELEVATION AND EQUIPMENT SCHEDULE | SCALE: NTS | 17



0 4 8

TECHNOLOGY MDF 1.0 NORTH ELEVATION | 1/4" = 1'-0" | 2TA5.01 | 07



1 0 1 2

TECHNOLOGY MDF ENLARGED 1.0 FLOOR PLAN | 1/2" = 1'-0" | 2TA5.01 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	EXISTING 1 EA. 4" CONDUIT SLEEVE. CAULK AND SEAL ALL SLEEVE ROUGH-IN GAPS, AND OPENINGS IN ACCORDANCE WITH REQUIRED FIRE RATINGS.
2	NEW MDF EQUIPMENT RACK, FLOOR MOUNTED WITH 6"X6" VERTICAL WIRE MANAGEMENT AT BOTH SIDES. PROVIDE 1 EA. 220VAC/30A AND 1 EA. 120VAC/20A DEDICATED CIRCUITS. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
3	NEW UNUSED 4'X8'X3/4" FIRE RATED PLYWOOD, PAINTED COLOR: "WHITE". CUT PLYWOOD TO FIT LENGTH OF ALL ROOM WALLS. RATED PLYWOOD "AC" GRADE SIDE WALL BE FACING THE INTERIOR OF THE ROOM AND ALL FIRE RATED MARKINGS SHALL NOT BE PAINTED.
4	NEW OVERHEAD 18"-WIDE LADDER RACK, COLOR: "BLACK".
5	NEW LOW VOLTAGE TECHNOLOGY GROUND BUS BAR. GROUND LOW VOLTAGE TECHNOLOGY BUS BAR TO MAIN ELECTRICAL SYSTEM. SEE ELECTRICAL DOCUMENTS FOR ADDITIONAL INFORMATION.
6	ALL LOW VOLTAGE TECHNOLOGY EQUIPMENT AND PATHWAYS SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH ANSI/TIA-607.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LP CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

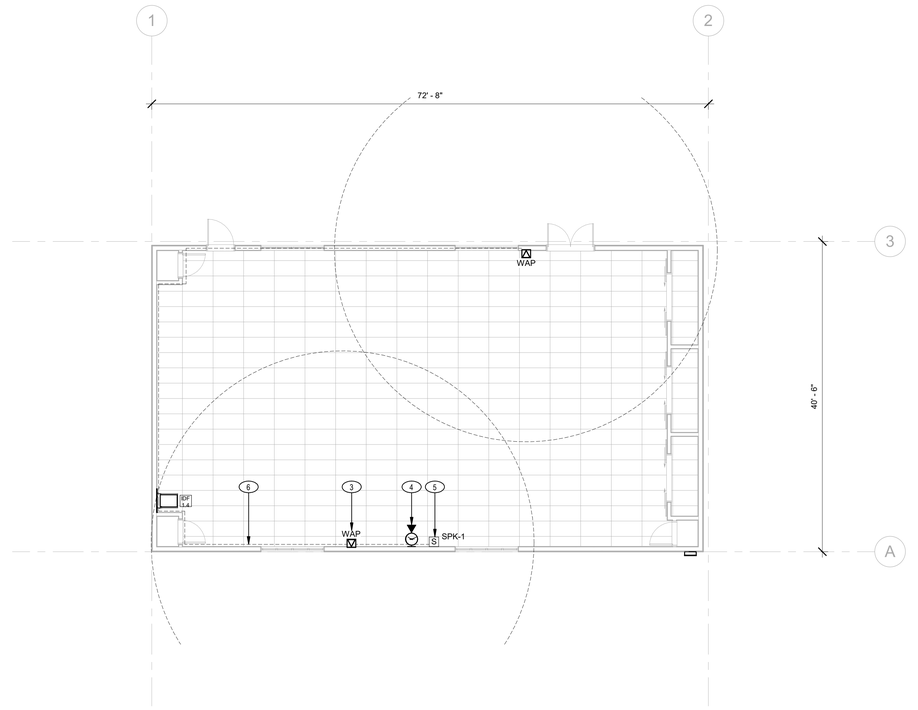
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY MDF-1.0 RACK ELEVATION AND SCHEDULE - BLDG A

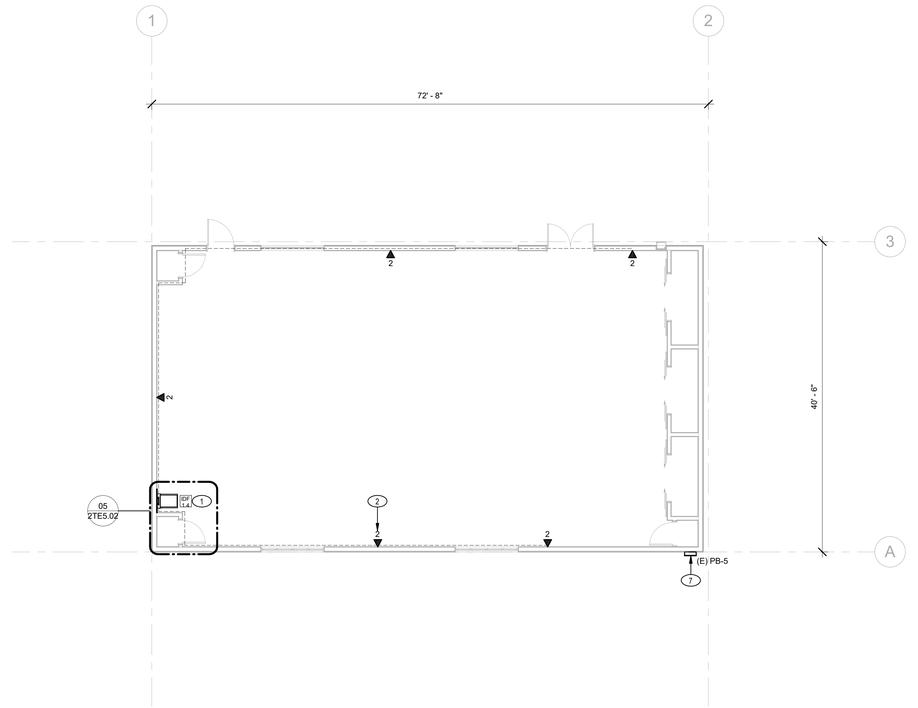
2TA5.01



N

0 4 8 12 16

TECHNOLOGY REFLECTED CEILING PLAN - BLDG E | 1/8" = 1'-0" | 2TE2.01 | 07



N

0 4 8 12 16

TECHNOLOGY FLOOR PLAN - BLDG E | 1/8" = 1'-0" | 2TE2.01 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW IDF EQUIPMENT RACK, WALL MOUNTED WITH VERTICAL WIRE MANAGEMENT AT BOTH SIDES. PROVIDE 1 EA. 220VAC/30A AND 1 EA. 120VAC DEDICATED CIRCUIT. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2	NEW WALL NETWORK DATA / VOICE WORK AREA OUTLET (RJ45-F). PROVIDE JACK QTY. AS NOTED ON PLANS. INSTALL HORIZONTAL PATHWAYS, CATEGORY CABLING, JACKS, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, AND TEST PERMANENT LINK. CABLES SHALL MAINTAIN PROPER BEND RADIUS AND BE KINK-FREE.
3	NEW WALL WIRELESS ACCESS POINT STATION DROP (RJ45-F). PROVIDE 2 EA. CABLES AT ALL LOCATIONS. INSTALL HORIZONTAL PATHWAYS, CATEGORY CABLING, JACKS, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, AND TEST PERMANENT LINK. CABLES SHALL MAINTAIN PROPER BEND RADIUS AND BE KINK-FREE.
4	NEW 12" ANALOG WALL CLOCK. INSTALL HORIZONTAL PATHWAYS, CLOCK CABLING, CLOCK, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE TO MASTER CLOCK, AND TEST TIME DISPLAY ACCURACY.
5	NEW WALL INTERCOM / PAGING SPEAKER. INSTALL HORIZONTAL PATHWAYS, BACK BOX, SPEAKER CABLING, SPEAKER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
6	NEW WIREMOLD SURFACE MOUNTED RACEWAY TO DEVICE AT BUILDING WALLS, BUILDING SHELL TYP. U.N.O.
7	EXISTING WALL MOUNTED PULL BOX WITH HINGED LOCKING LID.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS

MEP & FS / Sustainability / CxA

1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778

www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
SAMI S. ZEID
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

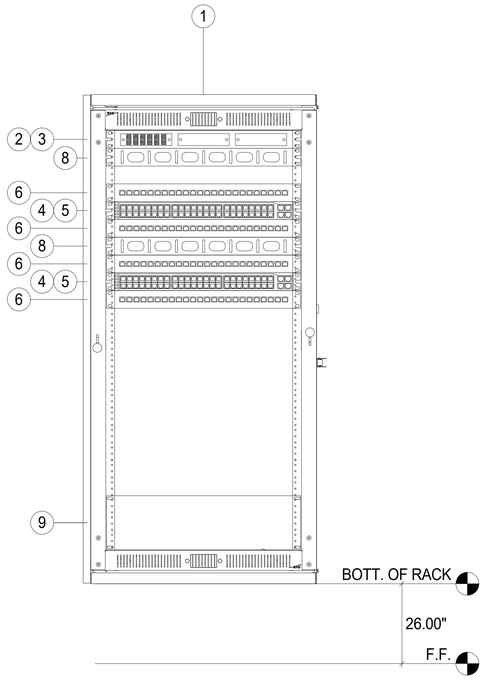
Submittal	Date
100% SCHEMATIC DESIGN	09/20/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG E

2TE2.01

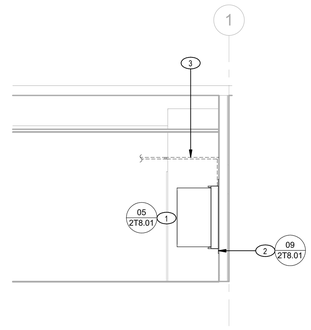
EQUIPMENT SCHEDULE				
TAG ID	DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	UL LOAD CAPACITY (RACK W/ EQUIPMENT)
1	TECHNOLOGY EQUIPMENT RACK, WALL SWING (24RU)	MIDDLE ATLANTIC	DWR-24-26PD	300 LBS.
2	FIBER OPTIC TERMINATION HOUSING (1RU)	CORNING	CCH-01U	N/A
3	FIBER OPTIC ADAPTER CASSETTE FOR ABOVE, TYPE LC	CORNING	CCH-CS12-A9-P00RE	N/A
4	DATA SWITCH - 48 PORT POE (1RU)	OWNER FURNISHED / OWNER INSTALLED		N/A
5	FIBER TRANSCIEVER MODULE, LC (2 EA)			N/A
6	PATCH PANEL - WITH REAR WIRE MANAGER (24-PORT) (1RU)	PANDUIT	CPP24WBLY	N/A
7	PATCH PANEL - WITH REAR WIRE MANAGER (48-PORT) (2RU)	PANDUIT	CPPL48WBLY	N/A
8	HORIZONTAL WIRE MANAGER (1RU)	PANDUIT	WMPF1E	N/A
9	SMART UPS BATTERY BACKUP, 2200VA (120VAC/20A)	APC	SRT2200RMXLA	N/A
	NETWORK MANAGEMENT CARD	APC	9641	N/A



05 / 2T8.01 SEE DETAIL FOR RACK ANCHORAGE REQUIREMENTS

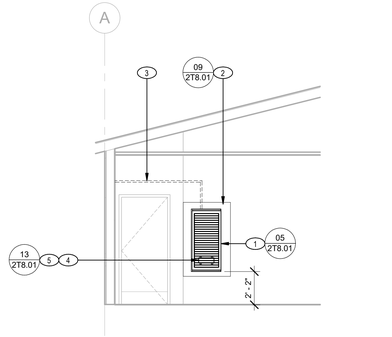
IDF-1.4

TECHNOLOGY IDF-1.4 RACK ELEVATION AND EQUIPMENT SCHEDULE | SCALE: NTS | 17



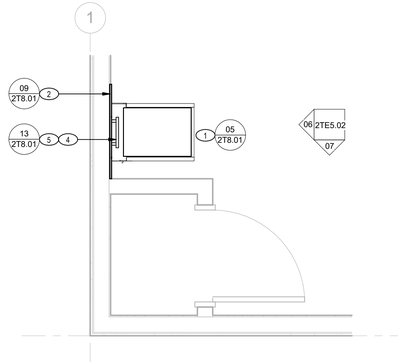
0 4 8

TECHNOLOGY IDF 1.4 SOUTH ELEVATION | 1/4" = 1'-0" | 2TE5.02 | 07



0 4 8

TECHNOLOGY IDF 1.4 WEST ELEVATION | 1/4" = 1'-0" | 2TE5.02 | 06



TECHNOLOGY ENLARGED FLOOR PLAN - IDF 1.4 | 1/2" = 1'-0" | 2TE5.02 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW IDF EQUIPMENT RACK, WALL MOUNTED WITH VERTICAL WIRE MANAGEMENT AT BOTH SIDES. PROVIDE 1 EA. 220VAC/30A AND 1 EA. 120VAC DEDICATED CIRCUIT. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2	NEW UNUSED 4'X8'X3/4" FIRE RATED PLYWOOD, PAINTED COLOR: "WHITE". CUT PLYWOOD TO FIT LENGTH OF ALL ROOM WALLS. RATED PLYWOOD "AC" GRADE SIDE WALL BE FACING THE INTERIOR OF THE ROOM AND ALL FIRE RATED MARKINGS SHALL NOT BE PAINTED.
3	NEW WIREMOLD SURFACE MOUNTED RACEWAY TO DEVICE AT BUILDING WALLS, BUILDING SHELL TYP. U.N.O.
4	NEW LOW VOLTAGE TECHNOLOGY GROUND BUS BAR. GROUND LOW VOLTAGE TECHNOLOGY BUS BAR TO MAIN ELECTRICAL SYSTEM. SEE ELECTRICAL DOCUMENTS FOR ADDITIONAL INFORMATION.
5	ALL LOW VOLTAGE TECHNOLOGY EQUIPMENT AND PATHWAYS SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH ANSI/TIA-607.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
SAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

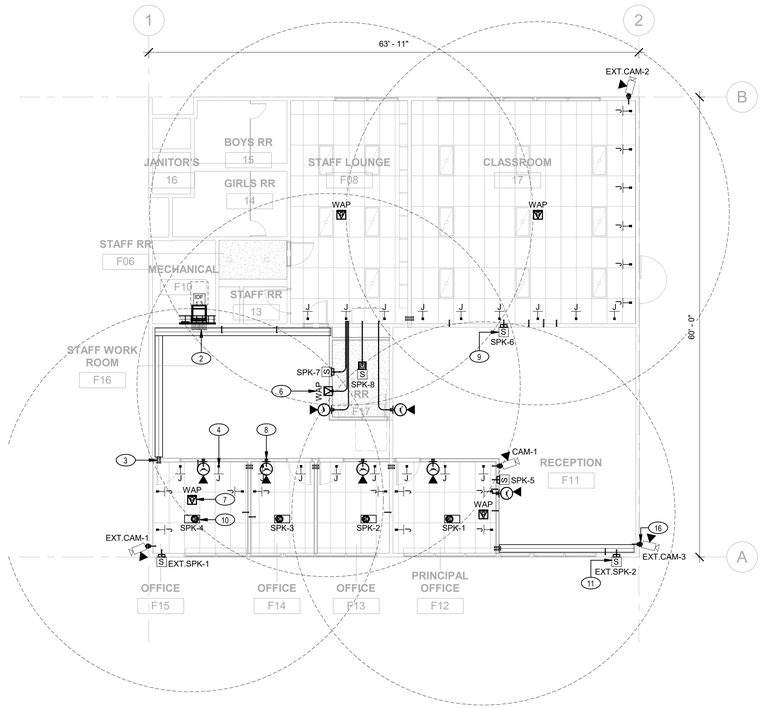
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	06/25/2025
100% DSA/OSHPD SUBMIT	01/16/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

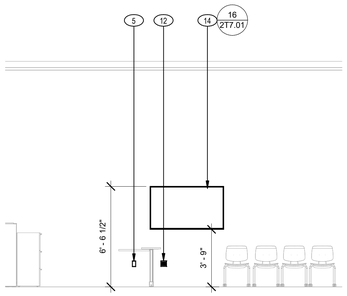
Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY IDF 1.4 RACK ELEVATION & SCHEDULE - BLDG E

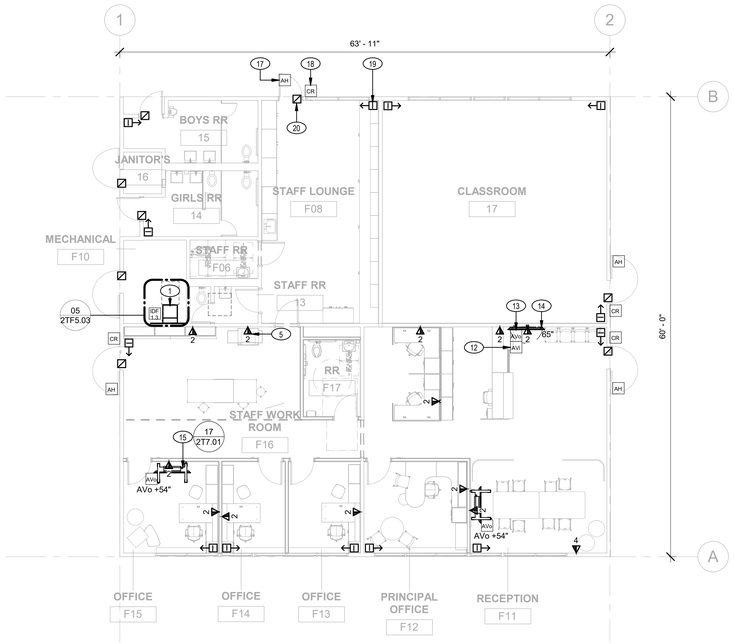
2TE5.02

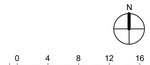


TECHNOLOGY REFLECTED CEILING PLAN - BLDG F | 1/8" = 1'-0" | 2TF2.01 | 07



TECHNOLOGY TV / MONITOR WALL MOUNT ELEVATION VIEW | 1/4" = 1'-0" | 2TF2.01 | 17





TECHNOLOGY FLOOR PLAN - BLDG F | 1/8" = 1'-0" | 2TF2.01 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW IDF EQUIPMENT RACK, WALL MOUNTED ENCLOSURE. PROVIDE 1 EA. 120VAC/20A DEDICATED CIRCUIT. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2	NEW 4 EA. 4" CONDUITS.
3	NEW 2 EA. 2" CONDUITS.
4	NEW OPEN ENDED NON-CONTINUOUS PATHWAY J-HOOKS W/ COLOR CLIP, WALL MOUNTED. J-HOOKS SHALL BE SPACED STAGGERED AT 36"-MIN. - 60"-MAX. SPACING.
5	NEW WALL NETWORK DATA / VOICE WORK AREA OUTLET (RJ45-F). PROVIDE JACK QTY. AS NOTED ON PLANS. INSTALL HORIZONTAL PATHWAYS, CATEGORY CABLING, JACKS, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, AND TEST PERMANENT LINK. CABLES SHALL MAINTAIN PROPER BEND RADIUS AND BE KINK-FREE.
6	NEW WALL WIRELESS ACCESS POINT STATION DROP (RJ45-F). PROVIDE 2 EA. CABLES AT ALL LOCATIONS. INSTALL HORIZONTAL PATHWAYS, CATEGORY CABLING, JACKS, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, AND TEST PERMANENT LINK. CABLES SHALL MAINTAIN PROPER BEND RADIUS AND BE KINK-FREE.
7	NEW CEILING WIRELESS ACCESS POINT STATION DROP (RJ45-F). PROVIDE 2 EA. CABLES AT ALL LOCATIONS. INSTALL HORIZONTAL PATHWAYS, CATEGORY CABLING, JACKS, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, AND TEST PERMANENT LINK. CABLES SHALL MAINTAIN PROPER BEND RADIUS AND BE KINK-FREE.
8	NEW 12" ANALOG WALL CLOCK. INSTALL HORIZONTAL PATHWAYS, CLOCK CABLING, CLOCK, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE TO MASTER CLOCK, AND TEST TIME DISPLAY ACCURACY.
9	NEW WALL INTERCOM / PAGING SPEAKER. INSTALL HORIZONTAL PATHWAYS, BACK BOX, SPEAKER CABLING, SPEAKER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
10	NEW CEILING LAY-IN INTERCOM / PAGING SPEAKER. INSTALL HORIZONTAL PATHWAYS, BACK BOX, SPEAKER CABLING, SPEAKER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
11	NEW EXTERIOR WALL INTERCOM / PAGING SPEAKER. INSTALL HORIZONTAL PATHWAYS, BACK BOX, SPEAKER CABLING, SPEAKER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST. CAULK AND SEAL BACK BOX AT ALL EXTERIOR WALL FINISH EDGES AND BOX FASTENER LOCATIONS FOR WATER-TIGHT CONNECTION.
12	NEW AUDIOVISUAL INPUT PLATE. INSTALL HORIZONTAL PATHWAYS, INPUT PLATE CABLING, INPUT PLATE, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
13	NEW AUDIOVISUAL OUTPUT PLATE. INSTALL HORIZONTAL PATHWAYS, INPUT PLATE CABLING, INPUT PLATE, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
14	NEW LED TV/MONITOR WITH MOUNT. INSTALL HORIZONTAL PATHWAYS, LED TV/MONITOR WALL MOUNT. LED TV/MONITOR, AV SYSTEM CABLING, AND WALL PLATES. PROVIDE 1 EA. 120VAC/15A DEDICATED CIRCUIT. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
15	NEW OWNER FURNISHED / OWNER INSTALLED LED TV/MONITOR WITH CART. PROVIDE 1EA. 120VAC/ 15A DEDICATED CIRCUIT. SEE ELECTRICAL DRAWING FOR ADDITIONAL INFORMATION.
16	NEW EXTERIOR WALL SURVEILLANCE CAMERA WITH IR SENSOR, SMOKED DOME VANDAL COVER AND SUN SHIELD. INSTALL HORIZONTAL PATHWAYS, EXTERIOR BACK BOX, CAMERA CABLING, CAMERA, ACCESSORIES, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
17	NEW ACCESS CONTROLLED DOOR. INSTALL HORIZONTAL PATHWAYS, HARDWARE CABLING, DOOR HARDWARE (AS SPECIFIED BY DIVISION 08 CONSULTANT), ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST
18	NEW ACCESS CONTROL PROXIMITY CARD READER. INSTALL HORIZONTAL PATHWAYS, PROXIMITY READER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
19	NEW INTRUSION ALARM PROXIMITY MOTION SENSOR. INSTALL HORIZONTAL PATHWAYS, HARDWARE CABLING, MOTION SENSOR, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.
20	NEW INTRUSION ALARM DOOR CONTACT. INSTALL HORIZONTAL PATHWAYS, HARDWARE CABLING, CONCEALED DOOR CONTACT AT UPPER FRAME, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

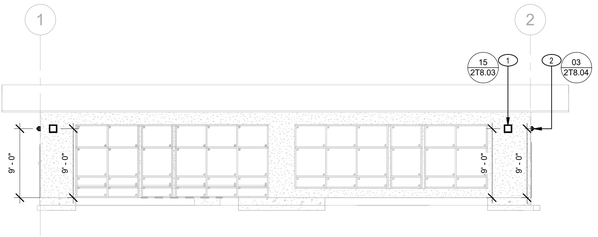
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	Checker
Scale	

TECHNOLOGY FLOOR & REFLECTED CEILING PLAN - BLDG F

2TF2.01

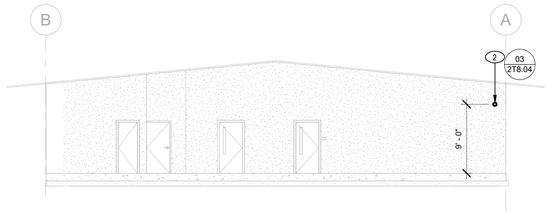


0 4 8 12 16

TECHNOLOGY EXTERIOR SOUTH ELEVATION - BLDG F | 1/8" = 1'-0" | 2TF3.01 | 08

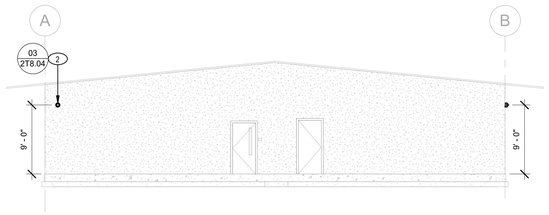
0 4 8 12 16

TECHNOLOGY EXTERIOR NORTH ELEVATION - BLDG F | 1/8" = 1'-0" | 2TF3.01 | 07



0 4 8 12 16

TECHNOLOGY EXTERIOR EAST ELEVATION - BLDG F | 1/8" = 1'-0" | 2TF3.01 | 06



0 4 8 12 16

TECHNOLOGY EXTERIOR WEST ELEVATION - BLDG F | 1/8" = 1'-0" | 2TF3.01 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW EXTERIOR WALL INTERCOM / PAGING SPEAKER. INSTALL HORIZONTAL PATHWAYS, BACK BOX, SPEAKER CABLING, SPEAKER, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST. CAULK AND SEAL BACK BOX AT ALL EXTERIOR WALL FINISH EDGES AND BOX FASTENER LOCATIONS FOR WATER-TIGHT CONNECTION.
2	NEW EXTERIOR WALL SURVEILLANCE CAMERA WITH IR SENSOR, SMOKED DOME VANDAL COVER AND SUN SHIELD. INSTALL HORIZONTAL PATHWAYS, EXTERIOR BACK BOX, CAMERA CABLING, CAMERA, ACCESSORIES, ALL ASSOCIATED EQUIPMENT AND CABLE LABELS, CONFIGURE, AND TEST.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0775
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

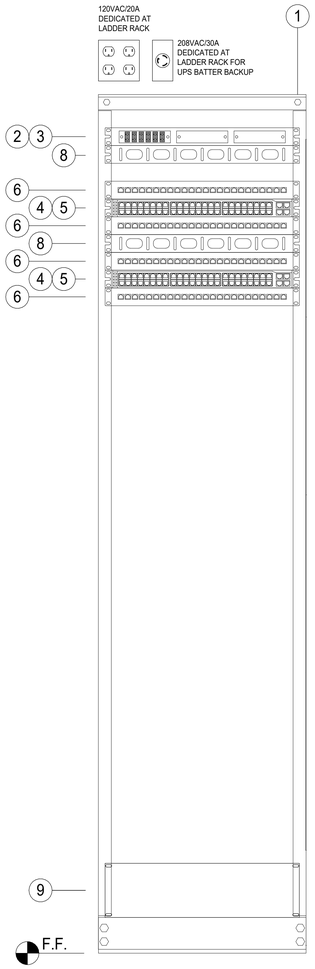
Job Number	31942
Checked By	Checker
Scale	

TECHNOLOGY EXTERIOR ELEVATION - BLDG F

2TF3.01

EQUIPMENT SCHEDULE

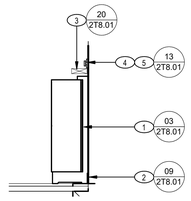
TAG ID	DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	UL LOAD CAPACITY (RACK W/ EQUIPMENT)
1	TECHNOLOGY EQUIPMENT RACK, FLOOR / SWING (40RU)	MIDDLE ATLANTIC	SR-40-32	500 LBS.
2	FIBER OPTIC TERMINATION HOUSING (1RU)	CORNING	CCH-01U	N/A
3	FIBER OPTIC ADAPTER CASSETTE FOR ABOVE, TYPE LC	CORNING	CCH-CS12-A9-P00RE	N/A
4	DATA SWITCH - 48 PORT POE (1RU)	OWNER FURNISHED / OWNER INSTALLED		N/A
5	FIBER TRANSCIEVER MODULE, LC (2 EA)			N/A
6	PATCH PANEL - WITH REAR WIRE MANAGER (24-PORT) (1RU)	PANDUIT	CPP24WBLY	N/A
7	PATCH PANEL - WITH REAR WIRE MANAGER (48-PORT) (2RU)	PANDUIT	CPPL48WBLY	N/A
8	HORIZONTAL WIRE MANAGER (1RU)	PANDUIT	WMPF1E	N/A
9	SMART UPS BATTERY BACKUP, 2200VA (120VAC/20A)	APC	SRT2200RMXLA	N/A
	NETWORK MANAGEMENT CARD	APC	9641	N/A



SEE DETAIL FOR RACK ANCHORAGE REQUIREMENTS

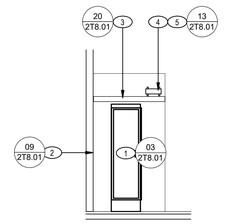
03 / 2T8.01 — IDF-1.3

TECHNOLOGY IDF-1.3 RACK ELEVATION AND EQUIPMENT SCHEDULE | SCALE: NTS | 17



0 4 8

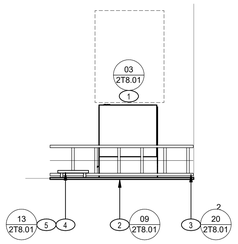
TECHNOLOGY IDF 1.3 - EAST ELEVATION | 1/4" = 1'-0" | 2TF5.03 | 07



0 4 8

TECHNOLOGY IDF 1.3 SOUTH ELEVATION | 1/4" = 1'-0" | 2TF5.03 | 06

2TF5.03 / 06



1 0 1 2

TECHNOLOGY ENLARGED IDF 1.3 FLOOR PLAN - BLDG F | 1/2" = 1'-0" | 2TF5.03 | 05

TECHNOLOGY GENERAL SHEET NOTES:

A. ALL KEYNOTES ARE TYPICAL UNLESS STATED OTHERWISE.

B. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING PLANS AND DIMENSIONS.

C. REFER TO ELECTRICAL DRAWINGS FOR ALL TECHNOLOGY POWER CIRCUIT REQUIREMENTS.

D. ALL EQUIPMENT SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE NEW, CONTRACTOR FURNISHED/CONTRACTOR INSTALLED UNLESS SPECIFIED ON DRAWINGS AND/OR SCHEDULES.

E. ALL TECHNOLOGY SYSTEMS MUD RINGS SHALL BE PAINTED BLUE FOR A PRE-DRYWALL / FINISH INSPECTION OF IN-WALL INFRASTRUCTURE.

F. ALL EXPOSED CONDUITS SHALL BE PRIMED WHITE AND PAINTED TO MATCH SURROUNDING AREA.

G. NETWORK STATION CABLING SHALL BE TERMINATED IN PATCH PANEL(S) IN SEQUENTIAL ORDER OF ROOM NUMBER, DROP ID. CABLES SHALL BE MACHINE LABELED AT PATCH PANEL FACE, AND AT CATEGORY CABLE (BOTH ENDS AS SHOWN ON DETAILS/SPECIFICATIONS).

KEY NOTES

#	
1	NEW IDF EQUIPMENT RACK, FLOOR MOUNTED ENCLOSURE. INSTALL PER INCREMENT 2.
2	NEW UNUSED 4'X8'X3/4" FIRE RATED PLYWOOD, PAINTED COLOR: "WHITE". CUT PLYWOOD TO FIT LENGTH OF ALL ROOM WALLS. RATED PLYWOOD "AC" GRADE SIDE WALL BE FACING THE INTERIOR OF THE ROOM AND ALL FIRE RATED MARKINGS SHALL NOT BE PAINTED.
3	NEW OVERHEAD 18"-WIDE LADDER RACK, COLOR: "BLACK".
4	NEW LOW VOLTAGE TECHNOLOGY GROUND BUS BAR. GROUND LOW VOLTAGE TECHNOLOGY BUS BAR TO MAIN ELECTRICAL SYSTEM. SEE ELECTRICAL DOCUMENTS FOR ADDITIONAL INFORMATION.
5	ALL LOW VOLTAGE TECHNOLOGY EQUIPMENT AND PATHWAYS SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH ANSI/TIA-607.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LP CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

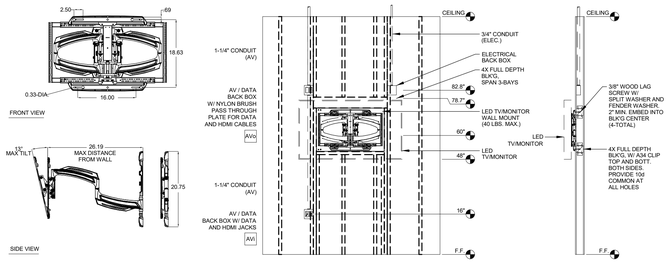
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

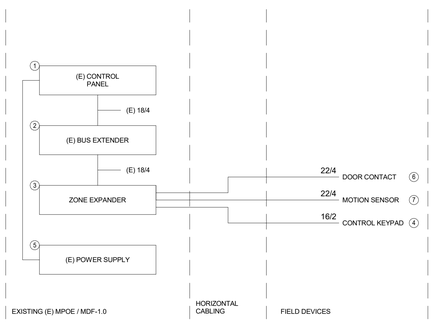
Job Number	31942
Checked By	Checker
Scale	

TECHNOLOGY IDF 1.3
RACK ELEVATION &
SCHEDULE - BLDG F

2TF5.03



LED TV/MONITOR WALL MOUNT (40 LBS. MAX. TV WEIGHT) | SCALE N.T.S | 16

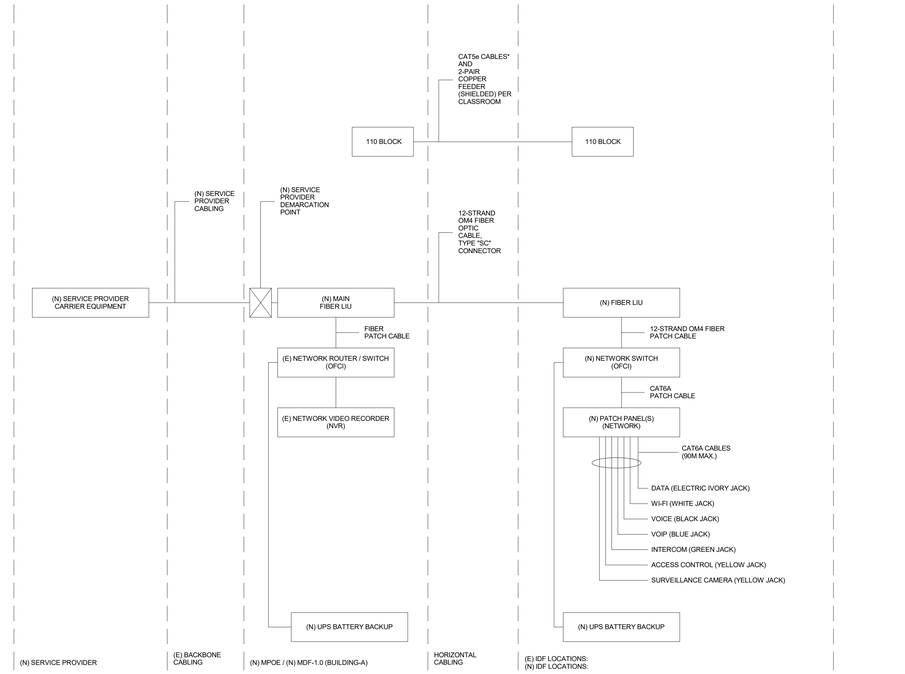


MAJOR EQUIPMENT SCHEDULE

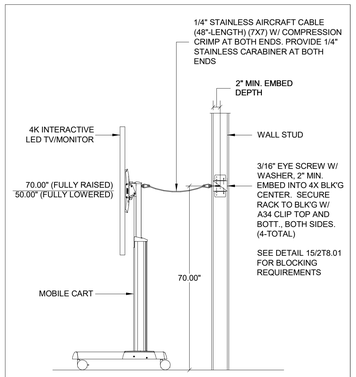
TAG ID	DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	MAX. LOAD
1	INTRUSION ALARM CONTROL PANEL WITH ENCLOSURE	EXISTING	EXISTING	N/A
2	INTRUSION BUS EXTENDER, 4,000 FT. MAX DISTANCE	EXISTING	EXISTING	N/A
3	16-ZONE EXPANDER MODULE	MATCH EXISTING MFR.	MATCH EXISTING MODEL	N/A
4	INTRUSION CONTROL KEYPAD	EXISTING	EXISTING	N/A
5	12VDC POWER SUPPLY W/ BATTERY AND CABINET	EXISTING	EXISTING	N/A
6	INTRUSION DOOR CONTACT	ABLOY	EA500	N/A
7	INTRUSION MOTION DETECTOR	BOSCH	ISC-CDL1-W15G	N/A
	CABLES AND CONNECTOR AS REQUIRED	LOT	LOT	N/A

INTRUSION ALARM SYSTEM ONE-LINE DIAGRAM | SCALE N.T.S | 15

* COPPER TERMINATION NOTE:
A MINIMUM OF 25 PAIRS OF CABLE SHALL BE USED TO ANY BUILDING ENCOMPASSING AN OFFICE.



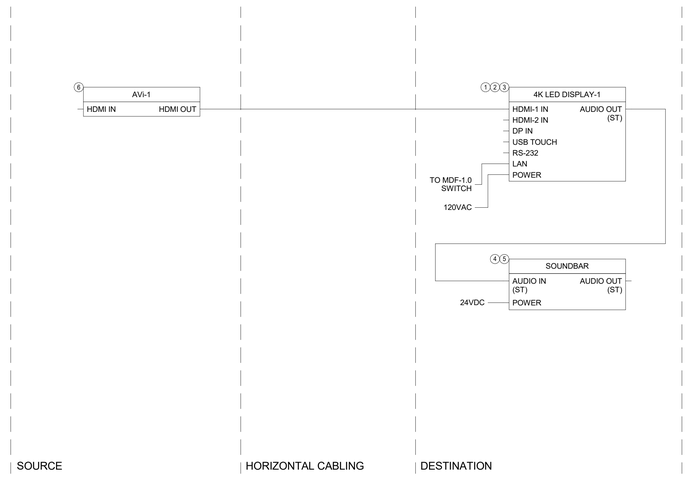
TECHNOLOGY NETWORK SYSTEM ONE-LINE DIAGRAM | SCALE N.T.S | 03



AUDIO-VIDEO MOBILE CART WALL ATTACHMENT | SCALE N.T.S | 17

BID ALTERNATE - 1
AUDIO-VIDEO MAJOR EQUIPMENT SCHEDULE

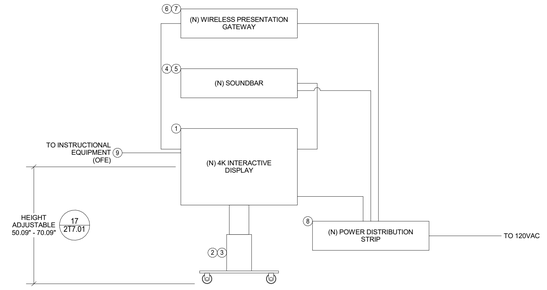
ROW ID	PRODUCT DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	MAX. LOAD
1	65" 4K LED TV/MONITOR, (36.2 LBS.)	SHARP	4P-B65EJ2U	N/A
2	LED TV / MONITOR WALL MOUNT BRACKET, TILT	CHIEF	TS525TU	40 LBS.
3	IN-WALL BRACKET MOUNT	CHIEF	TA500	N/A
4	SOUNDBAR W/ BLUETOOTH	BOSE	838309-1100	N/A
5	UNIVERSAL MOUNT FOR SOUNDBAR	MONOPRICE	44900	N/A
6	HDMI WALL TRANSMITTER, PASSIVE (WHITE)	COMPREHENSIVE	WP-HMIPT	N/A
	CABLES AND CONNECTOR AS REQUIRED	LOT	LOT	N/A



AUDIO-VIDEO LED TV/MONITOR MESSAGE BOARD ONE-LINE SCHEMATIC | SCALE N.T.S | 09

BID ALTERNATE - 1
AUDIO-VIDEO MAJOR EQUIPMENT SCHEDULE

ROW ID	PRODUCT DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	MAX. LOAD
1	86" 4K INTERACTIVE LED TV/MONMOTIOR, (139.8 LBS.)	PROMETHEAN	ACTIVEPANEL LX	N/A
2	MOBILE CART W/ FIXED HEIGHT	CHIEF	LPAUB	200 LBS.
3	MOBILE CART REMOTE	CHIEF	PACREM	N/A
4	SOUNDBAR W/ BLUETOOTH	BOSE	838309-1100	N/A
5	UNIVERSAL MOUNT FOR SOUNDBAR	MONOPRICE	44900	33 LBS.
6	WIRELESS PRESENTATION GATEWAY	APPLE TV	4K 3RD GEN.	N/A
7	APPLE TV MOUNT	TOTALMOUNT	TOTALMOUNT PRO	N/A
8	POWER DISTRIBUTION STRIP, 7-OUTLET - 15A W/ 12' POWER CABLE	TRIPPLITE	TLP712B	N/A
9	HIGH SPEED ACTIVE HDMI CABLE W/ ETHERNET, 35'	KRAMER	CA-HM-35	N/A
	CABLES AND CONNECTOR AS REQUIRED	LOT	LOT	N/A



AUDIO-VIDEO MOBILE CART ONE-LINE DIAGRAM | SCALE N.T.S | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

NOT FOR CONSTRUCTION

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0775
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN S. ZEIGER
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

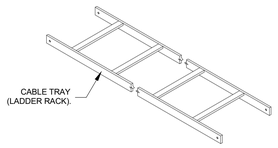
Revision / Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

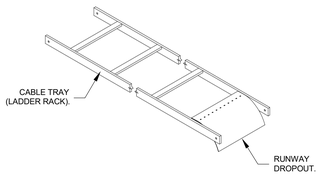
Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY SYSTEM ONE LINE DIAGRAM

2T7.01

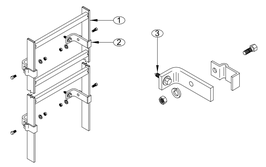


LADDER RUNWAY | SCALE N.T.S | 20



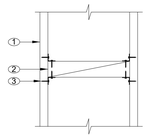
LADDER RUNWAY, CABLE WATERFALL | SCALE N.T.S | 23

1. CABLE LADDER PER DRAWINGS
2. VERTICAL WALL BRACKETS, CHATSWORTH PN: 10608-001 OR EQUAL
3. 3/8" DIA. WOOD SCREW INTO 4X BLK'G, 2" MIN. EMBED INTO BLK'G CENTER TOP AND BOTT., BOTH SIDES (4-TOTAL)
   SEE DETAIL 15/2T8.01 FOR BLOCKING REQUIREMENTS

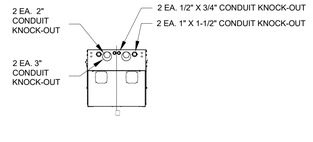


LADDER RUNWAY, RISER | SCALE N.T.S | 19

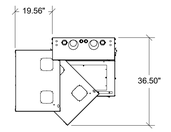
1. WALL STUD
2. 4X BLK'G
3. SIMPSON A34 CLIP W/ 8d COMMON AT ALL HOLES, TOP AND BOTT., BOTH SIDES (4-TOTAL)



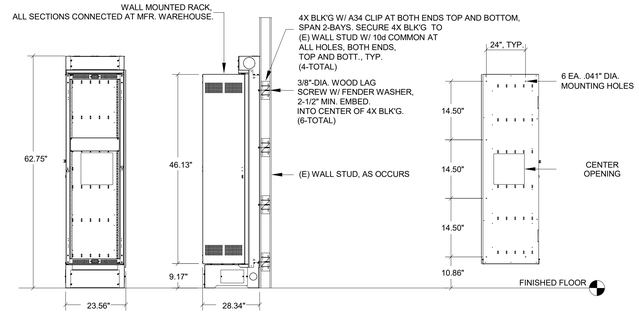
IN-WALL BLOCKING W/ SIMPSON A34 | SCALE N.T.S | 15



TOP VIEW



TOP VIEW - SWING OPEN CLEARANCE



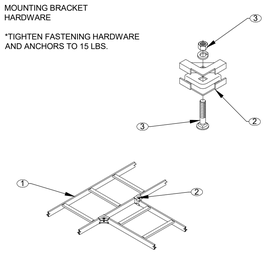
FRONT VIEW | SIDE VIEW | REAR MOUNTING PANEL

NOTE:
500 Lbs.
UL LOAD CAPACITY
(RACK W/ EQUIPMENT)

WALL MOUNTED RACK (500 MAX. LOADING) | SCALE N.T.S | 03

1. (N) 18" LADDER RACK ASSEMBLY
2. MOUNTING BRACKET FOR 90 DEGREE ATTACHMENT
3. MOUNTING BRACKET HARDWARE

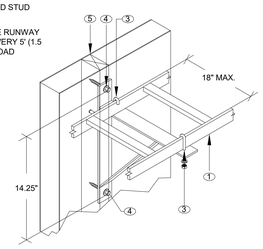
*TIGHTEN FASTENING HARDWARE AND ANCHORS TO 15 LBS.



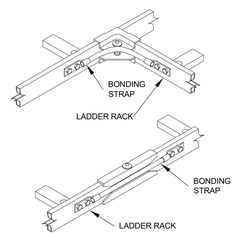
LADDER RUNWAY, TRANSITION TEE | SCALE N.T.S | 22

1. 18" WIDE LADDER RACK*, COLOR: BLACK
2. MOUNTING BRACKET, CHATSWORTH PN: 11746-718. 60" O.C. MAXIMUM SPACING BETWEEN BRACKETS
3. MFR. J-HOOK HARDWARE FOR ATTACHMENT OF LADDER RUNWAY TO WALL BRACKET
4. 3/16" LAG SCREW W/ FENDER WASHER, 2" MIN. EMBED INTO STUD CENTER
5. (E) 2X WOOD STUD

*MFR: WITH THE RUNWAY SUPPORTED EVERY 5' (1.5 m), MAXIMUM LOAD IS 132 LB/FT (196 kg/m).

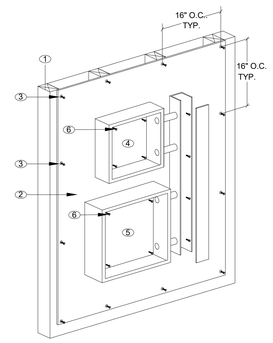


LADDER RUNWAY, PARALLEL | SCALE N.T.S | 18

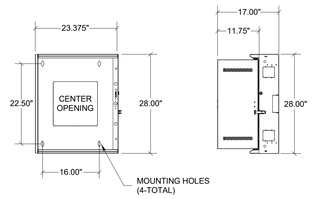


CABLE RUNWAY BONDING | SCALE N.T.S | 14

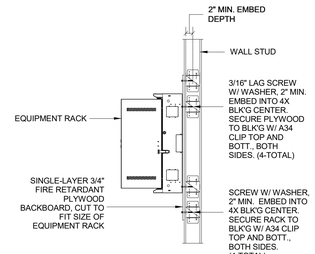
1. 2X WALL STUD
2. SINGLE-LAYER 3/4" FIRE RETARDANT PLYWOOD BACKPLANE CUT TO FIT LENGTH OF WALL
3. PLYWOOD BACKPLANE TO STUD CENTERS USE; 3/16" WOOD SCREWS. VERIFY CENTERLINE TO (E) 2X STUD. 1-1/2" MIN. EMBED INTO STUD CENTER. (16-TOTAL)
4. ENCLOSURE UNDER 20 LBS (IF REQUIRED)
5. ENCLOSURE 20 LBS TO 100 LBS (IF REQUIRED)
6. 3/16"x1-1/2" WOOD SCREW W/ FENDER WASHER AT EACH CORNER OF ENCLOSURE INTO PLYWOOD. 3/4" MIN. EMBED. (4-TOTAL)



FIRE RATED PLYWOOD | SCALE N.T.S | 09

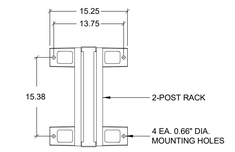


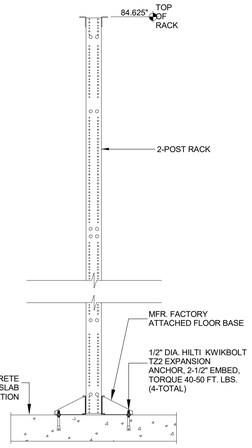
FRONT VIEW | SIDE VIEW



NOTE:
300 Lbs.
UL LOAD CAPACITY
(RACK W/ EQUIPMENT)

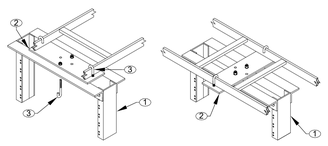
EQUIPMENT RACK, WALL MOUNT (300 LBS. MAX.) | SCALE N.T.S | 05





NOTE:
1600 Lbs.
UL LOAD CAPACITY
(RACK W/ EQUIPMENT)

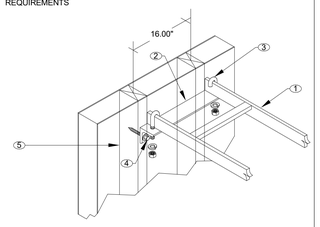
2-POST EQUIPMENT RACK, FLOOR MOUNT | SCALE N.T.S | 01



1	DATA RACK ASSEMBLIES.
2	TOP PLATE MOUNTING BRACKET.
3	TOP PLATE MOUNTING BRACKET, J-HOOK HARDWARE. TIGHTEN TO MANUFACTURER'S RECOMMENDED TORQUE IN FT/LBS.

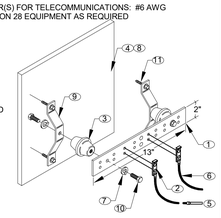
LADDER RUNWAY, RACK SUPPORT | SCALE N.T.S | 21

1. LADDER RACK ASSEMBLY PER DRAWINGS (MAX. LOAD 132 LBS. PER LF, BRACING 60" O.C. MAX. SPAN)
2. MOUNTING BRACKET, CHATSWORTH PN: 11421-718 FOR WALL
3. MOUNTING BRACKET J-HOOK HARDWARE
4. #12 WOOD SCREW W/ WASHER, 2" EMBED INTO STUD CENTER
5. WALL STUD ADD STUD AS REQUIRED FOR BRACKET FASTENERS. SEE DETAIL 15/2T8.01 FOR BLOCKING REQUIREMENTS



LADDER RUNWAY, PERPENDICULAR | SCALE N.T.S | 17

1. BARE COPPER GROUND BUS BAR
2. TYPICAL 2 HOLE LUGS. SECURE TO BAR WITH 2-5/6" BOLTS, WITH NAMEPLATES MOUNTED ABOVE. PROVIDE NUMBER OF LUGS AS REQUIRED
3. PROVIDE ISOLATION SUPPORT SPACERS AS REQUIRED
4. 1" FIRE RATED PLYWOOD BACKBOARD, ALL FASTENERSTHROUGH TREATED BACKBOARDS SHALL BE COATED IN COMPLICANCE WITH THE FIRE-TREATMENT EVALUATION REPORTS
5. MAIN BONDING CONDUCTOR FOR TELECOMMUNICATIONS: #4 AWG TO GROUNDING ELECTRODE SYSTEM (PER ELECTRICAL)
6. BONDING CONDUCTOR(S) FOR TELECOMMUNICATIONS: #6 AWG TO DIVISION 27, DIVISION 28 EQUIPMENT AS REQUIRED
7. 3/8" LOCK WASHER
8. MOUNTING LOCATION PER PLAN
9. SUPPORT BRACKET
10. 3/8" WOOD LAG SCREW, 1" MIN. EMBED
11. 3/8" WOOD LAG SCREW INTO PLYWOOD,TYP OF 4



GROUND BUS | SCALE N.T.S | 13

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LP CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0775
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY MDF/IDF EQUIPMENT DETAILS

2T8.01

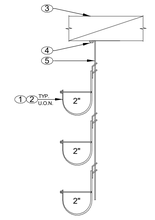
① J-HOOK, COOPER INDUSTRIES: BCH32 (2")
MAX. WEIGHT LOADING: 25 LBS.

② J-HOOK COLOR ID CLIP, COOPER INDUSTRIES
BCHID-(COLOR ID)32/64

③ WOOD JOIST / BEAM / BLK'G

④ 3/16" LAG SCREW, W/ SPLIT WASHER
AND FENDER WASHER

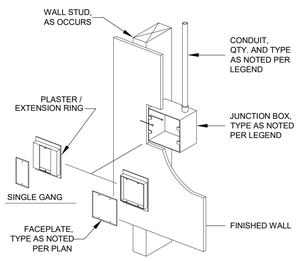
⑤ CONSTRUCTION ENGINEERED
ATTACHMENT SOLUTIONS (CEAS).
1/4" STIFFY THREADED ROD, MAX.
LOAD PER SUPPORT: 70 LBS. 60"
LENGTH, CUT TO FIT



CEILING MOUNTED
J-HOOK

SCALE N.T.S

04



4" SQ. / 4-11/16" / 5" SQ.

BACK BOX
W/ PLASTER RING

SCALE N.T.S

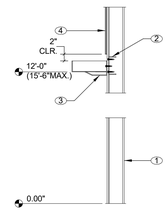
03

① 16-GAUGE LIGHT GAUGE STEEL
STUD

② 6", 16-GAUGE HORIZONTAL
LIGHT GAUGE STEEL TRACK,
SPAN CONTINUOUS LENGTH OF
CABLE TRAY. FASTEN LIGHT
GAUGE STEEL TRACK TO EACH
VERTICAL STUD W/ 2 EACH
#12-DIA., ZINC PLATED STS

③ SOLID BOTTOM CABLE TRAY

④ ACOUSTICAL PANEL, AS OCCURS



SOLID CABLE TRAY,
WALL MOUNT (LGS)

SCALE N.T.S

06

① DRAFT STOP OR FIRE CAULK ACCORDING TO
WALL PENETRATION DETAILS

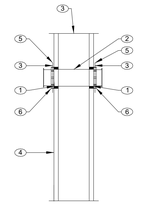
② THREADED, RIGID,
OR IMC CONDUIT

③ SCREW ON BUSHING

④ WALL STUD

⑤ REDUCING WASHER
OR PLATE

⑥ SCREW ON LOCKING
RINGS FRONT &
BACK (TYP.)



CONDUIT SLEEVE
PENETRATION

SCALE N.T.S

02

Ⓐ (1) EA. 2" CONDUIT

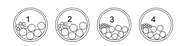
Ⓑ (1) EA. 4" CONDUIT

Ⓒ (1) EA. 1" INNER-DUCT, INSTALL
INNER-DUCT AT INTERIOR BACKBONE
SLEEVES AND CONTINUOUS AT
CABLE TRAY

Ⓓ 1/2" NYLON MULE STRING,
PN: NEPTCO WP900P

CONDUIT FILL CHART 40% FILL RATIO MAXIMUM	
CONDUIT DIA.	FILL RATIO (0.250" DIA.)
1"	6-CABLES
1-1/4"	10-CABLES
2"	26-CABLES
4"	102-CABLES

NOTE: CONTRACTOR SHALL BE REQUIRED
TO UPSIZE CONDUIT AND/OR QTY AS NOTED
PER FILL RATIO CABLE CAPACITY.



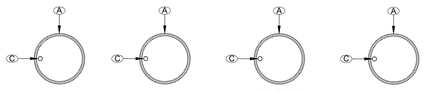
NOTE: AT ALL GROUND BOX, PULL BOX AND JUNCTION
BOX LOCATIONS, THE ENDS OF CONDUITS SHALL BE
PAINTED AND LABELED WITH A NUMBER.
(SEE DETAIL FOR COLOR AND NUMBER).

①② FIBER / DATA CABLES
(CONDUIT COLOR YELLOW)

③ INTRUSION CABLES
(CONDUIT COLOR WHITE)

④ AUDIO-VISUAL / MISC CABLES
(CONDUIT COLOR BLUE)

⑤ ACCESS CONTROL
(CONDUIT COLOR PURPLE)



HORIZONTAL CONDUIT SLEEVE,
SYSTEMS LAYOUT

SCALE N.T.S

01

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

916-287-2400 Office

LPADesignStudios.com

431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS

MEP & FS / Sustainability / CxA

1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0775

www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for LODI UNIFIED SCHOOL DISTRICT

Revision

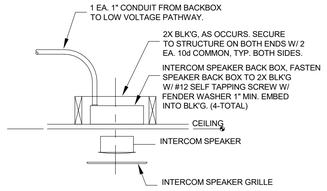
Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

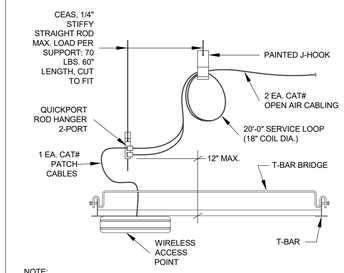
TECHNOLOGY
HORIZONTAL
PATHWAYS DETAILS

2T8.02



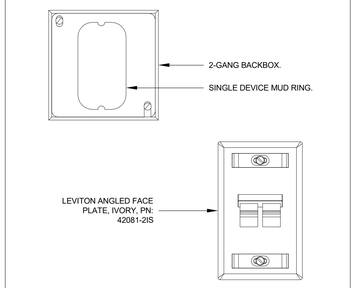
NOTE:
1. TOTAL ASSEMBLY WEIGHT BELOW 20 LBS.

INTERIOR CEILING HARD LID SPEAKER | SCALE N.T.S | 16

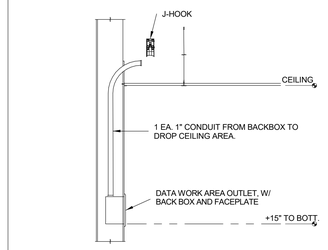


NOTE:
1) ASSEMBLY NOT TO EXCEED 20 LBS.

ABOVE CEILING WIRELESS ACCESS POINT | SCALE N.T.S | 12

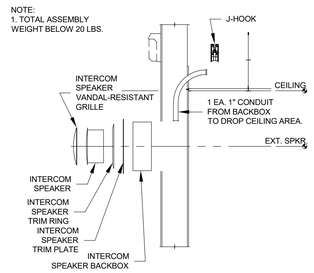


1-PORT | SCALE N.T.S | 08

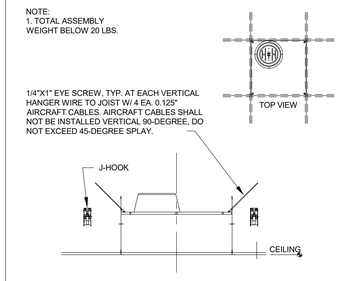


NOTE:
1) ASSEMBLY NOT TO EXCEED 20 LBS.

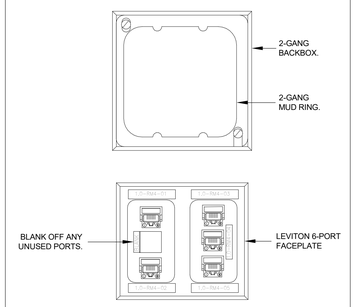
DATA / VOICE WORK AREA OUTLET | SCALE N.T.S | 04



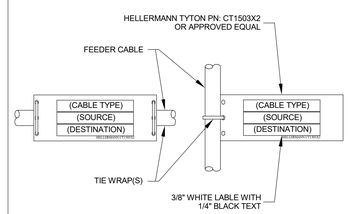
EXTERIOR WALL RECESS MOUNTED SPEAKER | SCALE N.T.S | 15



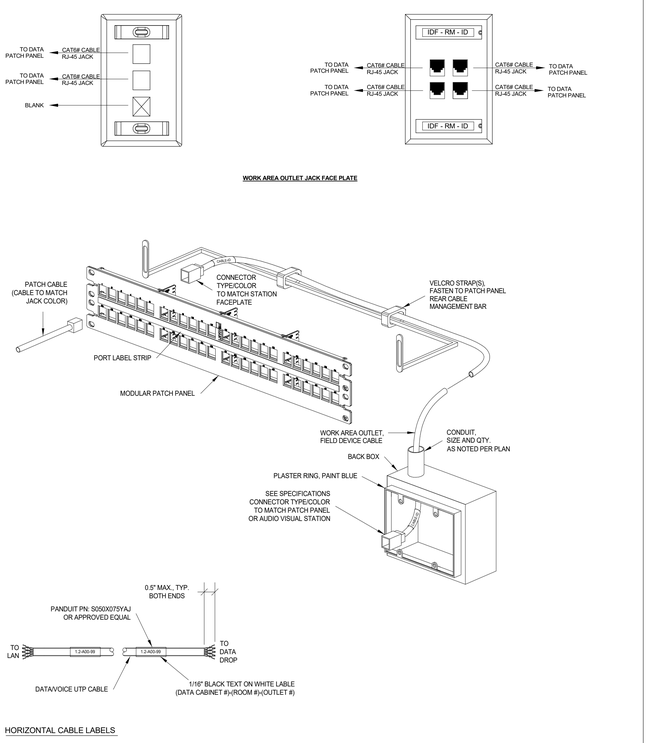
INTERIOR CEILING LAY-IN SPEAKER | SCALE N.T.S | 11



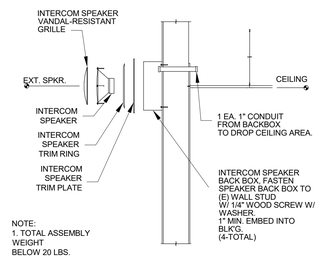
6-PORT | SCALE N.T.S | 07



COPPER FEEDER BACKBONE LABELING | SCALE N.T.S | 03

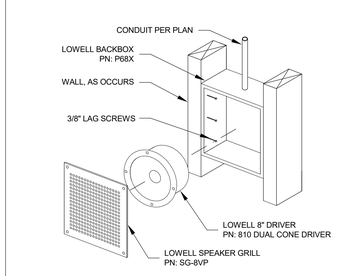


TWISTED PAIR, HORIZONTAL DISTRIBUTION - TRANSMISSION CHANNEL - HORIZONTAL CABLE LABELS | SCALE N.T.S | 17

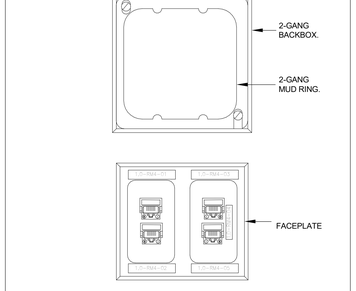


NOTE:
1. TOTAL ASSEMBLY WEIGHT BELOW 20 LBS.

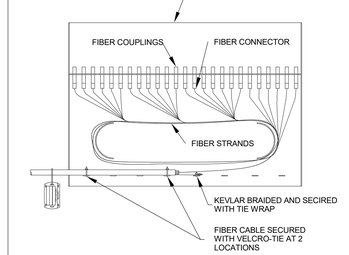
EXTERIOR WALL SURFACE MOUNTED SPEAKER | SCALE N.T.S | 14



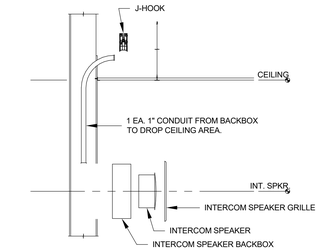
INTERCOM SPEAKER (WALL) | SCALE N.T.S | 10



4-PORT | SCALE N.T.S | 06

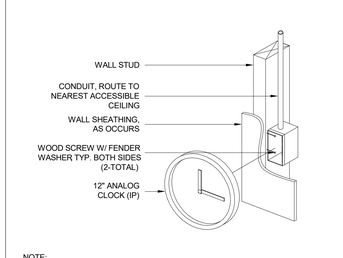


FIBER OPTIC ENCLOSURE TERMINATION | SCALE N.T.S | 02



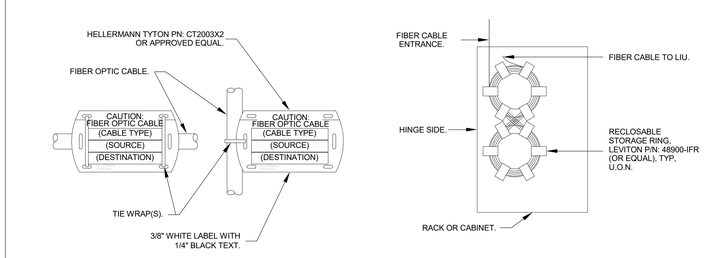
NOTE:
1. TOTAL ASSEMBLY WEIGHT BELOW 20 LBS.

INTERIOR WALL RECESS MOUNTED SPEAKER | SCALE N.T.S | 13



NOTE:
1) CLOCK SHIPPING WEIGHT: 4.0 LBS.

ANALOG CLOCK | SCALE N.T.S | 09



CATEGORY CABLE LABELING | SCALE N.T.S | 01

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0775
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA 95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

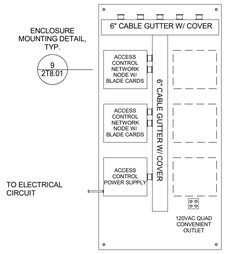
Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
100% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

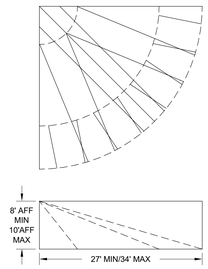
Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY DETAILS

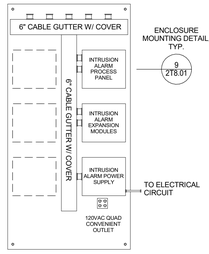
2T8.03



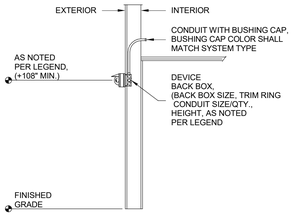
ACCESS CABINET LAYOUT | SCALE N.T.S | 08



WALL MOUNTED MOTION SENSOR COVERAGE | SCALE N.T.S | 04



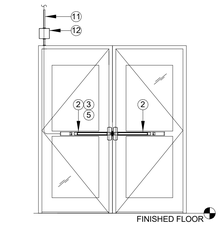
INTRUSION CABINET LAYOUT | SCALE N.T.S | 07



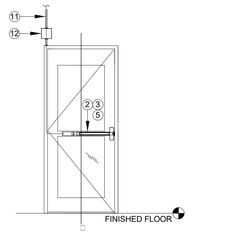
SURVEILLANCE CAMERA EXTERIOR WALL | SCALE N.T.S | 03

1. ELECTRIFIED LATCH/TRIM
2. PANIC, DOOR HARDWARE
3. PANIC LATCH RETRACTION MOTOR
4. CARD READER, MULLION (TYP, U.N.O. OR WALL MOUNT AS NOTED PER PLAN)
5. RX SWITCH
6. ELECTRIFIED DOOR POSITION HINGE
7. HANDLE, DOOR HARDWARE
8. LOCKSET
9. ADJACENT WALL, AS SHOWN ON PLANS
10. BACK BOX
11. CONDUIT (TYPE PER PLAN), ROUTE TO NEAREST PULL BOX, CABLE TRAY AS SHOWN PER PLAN
12. 4" SQUARE JUNCTION BOX

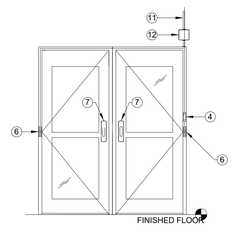
NOTE: MIRROR SINGLE DOOR ORIENTATION AT CENTERLINE FOR RIGHT/LEFT HAND DOOR SWING AS OCCURS AT DOOR CONDITION.



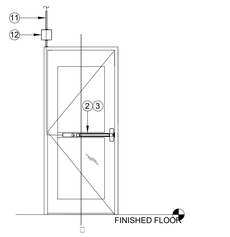
F — ELECTRIFIED PANIC W/ LATCH RETRACTION MOTOR, ADA PUSH BUTTON, AND DOOR AUTO-OPENER
INTERIOR SIDE, DOUBLE DOOR



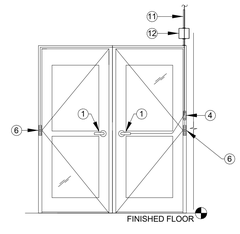
C — ELECTRIFIED PANIC W/ LATCH RETRACTION MOTOR, ADA PUSH BUTTON, AND DOOR AUTO-OPENER
INTERIOR SIDE, SINGLE DOOR



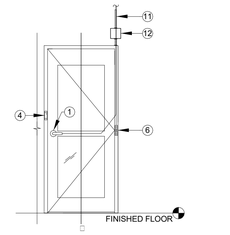
E — HANDLE W/ READER/ADA PUSH BUTTON MOUNTED ON WALL, AND DOOR POSITION HINGE
EXTERIOR SIDE, DOUBLE DOOR



B — ELECTRIFIED PANIC W/ LATCH RETRACTION MOTOR
INTERIOR SIDE, SINGLE DOOR



D — ELECTRIFIED LEVER W/ READER MOUNTED ON WALL, AND DOOR POSITION HINGE
EXTERIOR SIDE, DOUBLE DOOR



A — ELECTRIFIED LEVER W/ READER MOUNTED ON WALL, AND DOOR POSITION HINGE
EXTERIOR SIDE, SINGLE DOOR

ACCESS CONTROL AND INTRUSION ALARM HARDWARE | SCALE N.T.S | 09

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

LPCE CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.
© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/17/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY SECURITY DETAILS

2T8.04

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814)
and ANSI/UL263 (ASTM E119)

CLIV R14288
Wall-opening Protective Materials

SpecSeal Power Shield Box Inserts, for use with flush device UL Listed Metallic Outlet Boxes without internal clamps installed with steel mud rings in framed wall assemblies. When protective material is used in outlet boxes on both sides of the wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the boxes are not installed back-to-back. Installation shall comply with the National Electrical Code (NFPA 70). The max outlet box dimensions, hourly rating, type of stud, use of stud cavity insulation and type of faceplate are tabulated below. Additional general construction features shall comply as follows:

A. Studs - Unless otherwise specified, the minimum stud width is 3-1/2 in. (89 mm).

B. Stud Cavity Insulation - Where indicated in the table below, stud cavity insulation to consist of min 3-1/2 in. (89 mm) thick fiberglass (min 0.5 pcf or 8 kg/m3) or mineral fiber (min 4 pcf or 64 kg/m3). Unless indicated as required, stud cavity insulation is optional.

C. Wall Design - Stud composition is indicated in the table below. Wall construction shall comply with the individual U300, U400 or V400 Series Wall and Partition Design in the Fire Resistance Directory.

D. Pad Dimensions - The minimum dimensions of the insert pad are shown in the table below. Pads may be cut to achieve dimensions shown in table and partial insert pads may be utilized.

Product	Max Outlet Box Size, in. (mm)	Outlet Box Type	Outlet Box Mfr	Pad Size, in. (mm)	Rating, hr	Stud	Cavity Insulation	Face Plate Type	Putty Ball
EP 23	2 x 3 x 2-1/4 (51 x 76 x 57) deep	-	-	1-7/8 x 2-3/4 (48 x 70)	2	Steel	No	Steel	-
EP 23	2 x 3 x 2-1/4 (51 x 76 x 57) deep	-	-	1-7/8 x 2-3/4 (48 x 70)	2	Steel	Yes	Plastic	-
EP 23	2 x 3 x 2-1/4 (51 x 76 x 57) deep	-	-	1-7/8 x 2-3/4 (48 x 70)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	2	Steel	No	Steel	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	2	Steel	Yes	Plastic	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	2	Steel	No	Steel	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	2	Steel	Yes	Plastic	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 45	4-11/16 x 4-11/16 x 2-1/8 (119 x 119 x 54) deep	-	-	4-1/2 x 4-1/2 (114 x 114)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-
EP 45	4-1/2 x 9 x 2-3/8 (114 x 127 x 60) deep	-	-	4-1/2 x 4-1/2 (114 x 114)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-
EP 45	6-1/2 x 14 x 2-1/2 (114 x 356 x 64) deep	-	-	4-1/2 x 13-3/4 (114 x 349)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-

SpecSeal Putty Pads, for use with flush device UL Listed Metallic Outlet Boxes installed with steel mud rings or UL Listed Nonmetallic Outlet Boxes in framed wall assemblies. When protective material is used on outlet boxes on both sides of the wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the boxes are not installed back-to-back. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box. When nonmetallic box is used with Type NM cable, a 3/16 in. (5 mm) thickness of putty shall be formed around the cable at its connection to the box and extending a min of 1 in. (25 mm). The box composition, max device dimensions, hourly rating, type of stud and type of faceplate are tabulated below. Additional general construction features shall comply as follows:

A. Studs - Unless otherwise specified, the minimum stud width is 3-1/2 in. (89 mm).

B. Stud Cavity Insulation - Unless indicated as required, stud cavity insulation is optional and may consist of min 3-1/2 in. (89 mm) thick fiberglass (min 0.5 pcf or 8 kg/m3) or mineral fiber (min 4 pcf or 64 kg/m3).

C. Wall Design - Stud composition is indicated in the table below. Wall construction shall comply with the individual U300, U400 or V400 Series Wall and Partition Design in the Fire Resistance Directory.

D. Metallic Outlet Boxes - Except as indicated in the table below, when steel outlet boxes are used and the boxes are interconnected by means of electrical metallic tube or conduit, a ball of putty is to be installed to plug the open end of each electrical metallic tube (EMT) or conduit within the outlet box. When MC cable is used and/or when the outlet boxes are not interconnected, the ball of putty is not required.

E. Nonmetallic Outlet Boxes - The box manufacturer is indicated in the table below. Boxes shall bear a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory.

Model	Max Outlet Box in. (mm)	Outlet Box Type	Outlet Box Mfr	Pad Size in. (mm)	Rating, hr	Stud	Cavity Insulation	Face Plate Type	Putty Ball
-	4 x 4 x 2-1/8 (102 x 102 x 54) deep	Steel	N.A.	-	1	Steel or Wood	-	Steel	No
-	4 x 4 x 2-1/8 (102 x 102 x 54) deep	Steel	N.A.	-	1	Steel or Wood	-	Plastic	Yes
-	4-11/16 x 4-11/16 x 2-1/8 (119 x 119 x 54) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	4-1/2 x 9 x 2-3/8 (114 x 127 x 60) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	4-1/2 x 14 x 2-1/2 (114 x 127 x 60) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	3-3/4 x 4 x 3 (95 x 102 x 76) deep	Polyvinyl Chloride	Lamson & Sessions or Carlon Allied Moulded Prods	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	3-3/4 x 4 x 3 (95 x 102 x 76) deep	Phenolic	Thomas & Betts	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	3-3/4 x 4 x 3 (95 x 102 x 76) deep	Polycarbonate	Thomas & Betts	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	3-3/4 x 4 x 3 (95 x 102 x 76) deep	Phenolic	Thomas & Betts	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	2-1/4 x 3-3/4 x 2-3/8 (57 x 95 x 70) deep	Polyvinyl Chloride	Pass & Seymour	-	1 or 2	Wood	-	Plastic or Steel	N.A.

SpecSeal Putty Pads , for use with maximum 4 by 4 by 2-1/8 in. (102 by 102 by 54 mm) deep flush device UL Listed Metallic Outlet Boxes installed with steel mud rings and with steel faceplates in 1 hr or 2 hr fire rated gypsum board wall assemblies constructed with min 5-1/2 in. (140 mm) wide wood or steel studs and with stud cavities filled with fiberglass (nom 0.5 pcf or 8 kg/m3) or mineral fiber (nom 4 pcf or 64 kg/m3) insulation. When protective material is used on outlet boxes on both sides of the wall as directed, the boxes may be installed back-to-back provided that the boxes on opposite sides of the wall are not interconnected with conduit or, when interconnected, the open end of the conduit within the outlet box is filled with a ball of putty. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box.

SpecSeal EP23, EP24 and EP44 Power Shield Box Inserts and SpecSeal Putty Pads, for use with maximum 4 by 4 by 1-1/2 or 2-1/8 in. (102 by 102 by 38 or 54 mm) deep flush device UL Listed Metallic Outlet Boxes installed with steel mud rings and with steel or plastic faceplates in 1 hr or 2 hr fire rated gypsum board wall assemblies constructed with min 3-1/2 in. (89 mm) wide wood or steel studs. When both protective materials are used with outlet boxes on both sides of the wall as directed, the boxes may be installed back-to-back provided that the backs of the boxes are minimum 1/2 in. (13 mm) apart and provided that the boxes are not interconnected. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box. An insert pad shall be installed to completely cover the back inside surface of each outlet box.

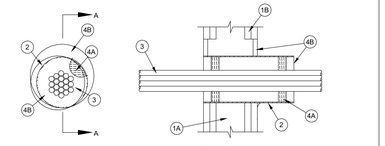
SpecSeal Putty Pads, for use with max.5 by 5 by 2 7/8 in. (127 by 127 by 73 mm) deep flush device UL Listed Metallic Outlet Boxes or UL Listed Communications-Circuit Accessories manufactured by Randl Industries Inc for use in 1 hr or 2 hr fire rated gypsum board wall assemblies framed with min 3-5/8 in. (92 mm) wide wood or steel studs and constructed as specified in the individual U300, U400, or V400 or W400 Series Wall and Partition Designs in the Fire Resistance Directory. Metallic outlet boxes to be provided with UL Listed Signal Appliance with steel cover plate manufactured by Cooper Wheelock Inc. Moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud unless otherwise noted) including nailing tabs and to completely seal against the stud within the stud cavity. Multiple moldable putty pads may be installed on an outlet box to attain the required minimum thickness of putty material. Additional putty material used to seal around each conduit and/or cable fitting on the exterior of each box. A min 3/16 in. (4.8 mm) thickness of putty material is required on the exterior surfaces of flush device boxes in 1 and 2 hr fire rated Wall and Partition Designs. When the moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the outlet boxes are not installed back to back, except as noted.

SpecSeal EP55 Power Shield Box Inserts, for use with max 5 by 5 by 2 7/8 in. (127 by 127 by 73 mm) deep flush device UL Listed Metallic Outlet Boxes or UL Listed Communications-Circuit Accessories manufactured by Randl Industries Inc for use in 1 hr or 2 hr fire rated gypsum board wall assemblies framed with min 3-5/8 in. (92 mm) wide wood or steel studs and constructed as specified in the individual U300, U400, or V400 or W400 Series Wall and Partition Designs in the Fire Resistance Directory. Metallic outlet boxes to be provided with UL Listed Signal Appliance with steel cover plate manufactured by Cooper Wheelock Inc. Power Shield Box Insert is to be applied to the back surface of the box and may be slit to accommodate communications-circuit accessories. When the Power Shield Box Insert is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the outlet boxes are not installed back to back, except as noted.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-3210

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 3/4 Hr	FT Rating - 3/4 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Rating - 3/4 Hr



1. Wall Assembly - The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (76 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* - Thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, V300, U400 , V400 or W400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 6-1/2 in. (165 mm) when sleeve (Item 2) is installed. Max diam of opening is 4 in. (102 mm) when sleeve is not used.

      The hourly F rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Steel Sleeve - (Optional) - Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT), steel conduit, Schedule 5 (or heavier) steel pipe sleeve or min 0.016 in. thick (0.41 mm, No. 28 ga) galv steel sleeve installed flush with wall surfaces. The annular space between the steel sleeve and periphery of opening shall be min 0 in. (continuous point contact) to max 2 in. (51 mm). When Schedule 5 steel pipe or EMT is used, sleeve may be installed flush with or extend up to 18 in. (46 cm) beyond one or both wall surfaces. Steel sleeve may be installed at an angle not greater than 45 degrees from perpendicular. Schedule 5 steel pipe or EMT sleeves may extend continuously beyond one wall surface. Sleeve to be rigidly supported when extending from the wall surfaces.

3. Cables - Aggregate cross-sectional area of cables in steel sleeve to be max 48 percent of the aggregate cross-sectional area of the opening or sleeve. Cables to be bundled and rigidly supported on both sides of wall assembly. When the sleeve (Item 2) is installed, the annular space between the cables and the sleeve shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). When the sleeve (Item 2) is not used, the annular space between the cables and the opening shall be a min 0 in. (point contact) to a max 1/2 in. (13 mm). Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cable may be used:
   A. Max 200 pair No. AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor service entrance cable with PVC insulation and jacket.
   C. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
   D. Max 7/C No. 2/0 AWG (or smaller) multiconductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.
   E. Max RG/U (or smaller) coaxial cable with fluorinated ethylene or plenum-rated insulation and jacketing.
   F. Max 62.5/48 fiber optic cable with PVC or plenum-rated insulation and jacketing.
   G. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with PVC or plenum-rated insulation and jacket.
   H. Max 4/C No. 2/0 aluminum or copper conductor aluminum or steel Metal-Clad® or Armored-Clad® cable.
   I. Max ¾-in. (19 mm) copper ground cable with or without a PVC jacket.
4. Firestop System - The firestop system shall consist of the following:
   A. Packing Material - When required (See table in Item 4B), min 1 in. (25 mm) thickness of min 4.0 pcf (64 kg/m3) mineral wool batt insulation firmly packed into each end of sleeve as a permanent form. Packing material to be recessed from each end of sleeve as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* - Sealant or Putty - Fill material applied to appropriate thickness within steel sleeve, flush with edges of steel sleeve on both surfaces of wall. Min 1/2 in. (13 mm) thickness of fill material installed into annular space between sleeve and wall flush with both surfaces of the wall. Min 1/2 in. (13 mm) diam bead of sealant or "rope" of putty shall be applied around the perimeter of the sleeve on each side of the wall when sleeve extends beyond surface of wall and is installed at continuous point contact. See table below for fill material thickness requirements around cables.

Sealant or Putty Type	Thickness, In. (mm)	Packing Material Required
SpecSeal Series SSS Sealant or LCI Sealant	1/2 in. (13)	Yes
SpecSeal Series SSS Sealant or LCI Sealant	1 in. (25)	No
SpecSeal Putty	1 in. (25)	No

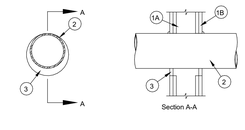
SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal Putty

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-1049

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



1. Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* - 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26 in. (660 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

      The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

1A. Metallic Sleeve - (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) to max 0.105 in. (2.7 mm) thick sheet steel. Length of steel sleeve to be equal to the thickness of wall. Longitudinal seam of sleeve welded or overlapped min 1 in. (25 mm). The ends of the steel sleeve shall be flush or recessed max 1/4 in. (6 mm) from wall surfaces.

2. Through Penetrant - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between pipe, conduit or tubing and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). For maximum 16 in. (406 mm) diam (or smaller) pipes, annular space shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe - Nom 36 in. (914 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe - Nom 36 in. (914 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit - Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing, nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.
   D. Copper Tubing - Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe - Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* - Sealant - Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall.

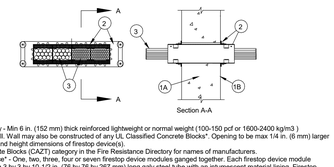
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-J-3098

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 4 Hr (See Item 3)	F Ratings - 2 and 4 Hr (See Item 3)
T Ratings - 3/4 and 1 Hr (See Item 3)	FT Ratings - 3/4 and 1 Hr (See Item 3)
L Rating At Ambient - Less Than 1, 1.3, 4 or 7 CFM/Device Module (See Item 3)	FH Ratings - 2 and 4 Hr (See Item 3)
L Rating At 400 F - Less Than 1, 2 or 3 CFM/Device Module (See Item 3)	FTH Ratings - 3/4 and 1 Hr (See Item 3)
	L Rating At Ambient - Less Than 1, 1.3, 4 or 7 CFM/Device Module (See Item 3)
	L Rating At 400 F - Less Than 1, 2 or 3 CFM/Device Module (See Item 3)



1. Wall Assembly - Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Opening to be max 1/4 in. (6 mm) larger than width and height dimensions of firestop device(s).
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Firestop Device* - One, two, three, four or seven firestop device modules ganged together. Each firestop device module consists of a 3 by 3 by 10-1/2 in. (76 by 76 by 267 mm) long galv steel tube with an intumescent material lining. Firestop device modules to be installed in accordance with the accompanying installation instructions. The space between the firestop device module(s) and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1/8 in. (3.2 mm). In round openings, the space between the firestop device and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Firestop device module(s) secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device by means of steel set screws provided with device. Each firestop device module is to be installed with its projecting an equal distance beyond each surface of the wall assembly. As an option, devices may be cast or grouted into wall assembly. When device is cast or grouted in place, the steel wall plates are optional.
   SPECIFIED TECHNOLOGIES INC - EZ PATH Series 33 Fire Rated Pathway

2A. Firestop Device* - Extension Module - (Optional, Not Shown) - Module attached to ends of 3 by 3 by 10-1/2 in. (76 by 76 by 267 mm) long firestop device (Item 3) to increase its length to facilitate installation in thicker walls. Each module consists of a 3 by 3 by 6 in. (76 by 76 by 152 mm) long galv steel tube with an intumescent material lining. Extension module to be installed in accordance with the accompanying installation instructions. When module is used, firestop device (Item 2) and extension module(s) secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device or extension module(s) by means of steel set screws provided with wall plates. Firestop device and extension module(s) assembly to be installed with ends projecting an equal distance beyond each surface of the wall assembly.
   SPECIFIED TECHNOLOGIES INC - EZ PATH Extension

3. Cables - Cables may represent a 0 to 100 percent visual fill within the loading area for each firestop device module. Cables to be rigidly supported on both sides of the wall assembly. Any combination of the following types of cables may be used:
   A. Max 400 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
   B. Max 350 kcmil single copper conductor power cable with XLPE jacket and insulation
   C. Max 7/C No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
   D. Max 3/C No. 10 AWG metal clad or armored cable with steel or aluminum jacket.
   E. Max 3/C No. 8 AWG NM cable (Romex) with PVC insulation and jacket.
   F. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   G. Max RG/U coaxial cable with fluorinated ethylene insulation and jacketing.
   H. Optical fiber cable with PVC or polyethylene (PE) jacket and insulation and having a max diam of 5/8 in. (16 mm).

      When Item 3A, 3B, 3C, 3D or 3E is used, the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 3/4 hr. When max 200 pair No. 24 AWG telecommunication cable is used or when Item 3F, 3G or 3H is used, the F and FH Ratings are 4 hr and the T, FT and FTH Ratings are 1 hr.

      The L Rating for each empty firestop device module is less than 1 cfm at ambient and at 400F. When Item 3A is used, the L Rating for each firestop device module with 100 percent visual fill is 4 cfm at ambient and 3 cfm at 400F. When Item 3F is used, the L Rating for each firestop device module with 100 percent visual fill is 1.3 cfm at ambient and less than 1 cfm at 400F.When Item 3G or 3H is used, the L Rating for each firestop device module with 100 percent visual fill is 7 cfm at ambient and 2 cfm at 400F.

      * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

LPA
ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING
916-287-2400 Office
LPADesignStudios.com
431 I Street, Suite 107
Sacramento, California 95814

CONSULTING ENGINEERS
MEP & FS / Sustainability / CxA
1209 Pleasant Grove Blvd.
Roseville, CA 95678
p 916-771-0778
www.lpengineers.com

This document and all other project documents, ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are copyright protected, are the property of LPA, Inc. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as set forth in the contractual agreement between LPA and its Client. The unauthorized disclosure and/or use of the project documents (including the creation of derivative works), may give rise to liability for copyright infringement, unlawful disclosure, use or misappropriation of property rights held by LPA. The unauthorized use of the project documents will give rise to the recovery of monetary losses and damages including attorney fees and costs for which the unauthorized user will be held liable.
Project documents describe the design intent of the work and are not a representation of as-built or existing conditions. LPA is not responsible for any discrepancies between the project documents and the existing conditions.

© LPA, Inc.

REGISTERED PROFESSIONAL ENGINEER
RAMI S. ZEIDAN
No. E 16762
EXP. 9-30-26
ELECTRICAL
STATE OF CALIFORNIA

ELKHORN ELEMENTARY SCHOOL
CAMPUS MODERNIZATION INCREMENT 2

10505 DAVIS ROAD, STOCKTON, CA
95209

Developed for
LODI UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date
100% SCHEMATIC DESIGN	08/29/2025
100% DESIGN DEVELOPMENT	01/09/2026
50% CONSTRUCTION DOCUMENT	03/27/2026
DSA SUBMITTAL	04/24/2026

Job Number	31942
Checked By	LPCE
Scale	

TECHNOLOGY RATED ASSEMBLY PENETRATIONS

2T8.05

RATED ASSEMBLY PENETRATIONS | SCALE N.T.S | 01

PRELIMINARY

PROJECT MANUAL

LPA

IRVINE • SAN DIEGO • SAN JOSE
SACRAMENTO DALLAS • SAN ANTONIO

ELKHORN ELEMENTARY CAMPUS MODERNIZATION

10505 DAVIS ROAD, STOCKTON, CA 95209

DSA RESUBMITTAL INCREMENT 2

08/14/2026

LPA Project No.: 31943

© Copyright 2026

PROJECT MANUAL

AUGUST 14, 2026

DOCUMENT 00 01 10
TABLE OF CONTENTS

Procurement and Contracting Requirements

Division 0	Section	Title
	00 01 01	Project Title Page
	00 01 10	Table of Contents
	00 01 15	List of Drawings and Tables
	00 01 20	List of Schedules

Solicitation

Division 0	Section	Title
	00 11 16	Notice to Bidders

Instructions for Procurement

Division 0	Section	Title
	00 21 13	Instructions to Bidders
	00 21 13.1	Bidder Information and Forms

Available Information

Division 0	Section	Title
	00 31 19	Existing Conditions
	00 31 32	Geotechnical Data

Procurement Forms and Supplements

Division 0	Section	Title
	00 41 13	Bid Form and Proposal
	00 43 13	Bid Bond
	00 43 36	Designated Subcontractors List
	00 45 01	Site Visit Certification
	00 45 19	Non-Collusion Declaration
	00 45 19.01	Iran Contracting Act Certification
	00 45 19.02	Off-Road Diesel-Fueled Fleet Certification
	00 45 26	Workers' Compensation Certification
	00 45 46.01	Prevailing Wage and Related Labor Requirements Certification
	00 45 46.02	Disabled Veteran Business Enterprise Participation Certification
	00 45 46.03	Drug-Free Workplace Certification
	00 45 46.04	Tobacco-Free Environment Certification
	00 45 46.05	Hazardous Materials Certification
	00 45 46.06	Lead-Based Materials Certification
	00 45 46.07	Imported Materials Certification
	00 45 46.08	Criminal Background Investigation/Fingerprinting Certification
	00 45 46.09	Drug and Alcohol-Free Schools Certification
	00 45 46.10	Roofing Project Certification
	00 45 46.11	Federal Debarment Certification

	00 45 46.12	Federal Byrd Anti-Lobbying Certification
	00 45 49	Registered Subcontractors List
	00 45 90	Post Bid Interview

Contracting Forms and Supplements

Division 0	Section	Title
	00 51 00	Notice of Award
	00 52 13	Agreement Form
	00 55 00	Notice to Proceed
	00 56 00	Escrow Bid Documentation
	00 57 00	Escrow Agreement in Lieu of Retention

Project Forms

Division 0	Section	Title
	00 61 13.13	Performance Bond
	00 61 13.16	Payment Bond
	00 63 40	Contingency Expenditure Directive Form
	00 63 40.1	Allowance Expenditure Directive Form
	00 63 47	Daily Force Account Report
	00 63 57	Proposed Change Order Form
	00 63 63	Change Order Form
	00 65 19.26	Agreement and Release of Any and All Claims
	00 65 36	Guarantee Form

Conditions of the Contract

Division 0	Section	Title
	00 72 13	General Conditions
	00 73 13	Special Conditions
	00 73 56	Hazardous Materials Procedures and Requirements

General Requirements

Division 1	Section	Title
	01 11 00	Summary of Work

Price and Payment Procedures

Division 1	Section	Title
	01 21 00	Allowance
	01 22 00	Alternatives and Unit Prices
	01 25 13	Product Options and Substitutions
	01 26 00	Changes in the Work
	01 29 00	Application for Payment and Conditional and Unconditional Waiver and Release Forms

Administrative Requirements

Division 1	Section	Title
	01 31 19	Project Meetings
	01 32 13	Scheduling of Work

	01 33 00	Submittals
	01 35 13.23	Site Standards

Quality Requirements

Division 1	Section	Title
	01 41 00	Regulatory Requirements
	01 42 13	Abbreviations and Acronyms
	01 42 16	Definitions
	01 42 19	References
	01 43 00	Materials and Equipment
	01 45 00	Quality Control

Temporary Facilities and Controls

Division 1	Section	Title
	01 50 00	Temporary Facilities and Controls
	01 50 13	Construction Waste Management and Disposal
	01 52 13	Field Offices

Product Requirements

Division 1	Section	Title
	01 64 00	Owner-Furnished Products
	01 66 00	Product Delivery, Storage and Handling

Execution and Closeout Requirements

Division 1	Section	Title
	01 71 23	Field Engineering
	01 73 29	Cutting and Patching
	01 76 00	Alteration Project Procedures
	01 77 00	Contract Closeout and Final Cleaning
	01 78 23	Operation and Maintenance Data
	01 78 36	Warranties
	01 78 39	Record Documents

Life Cycle Activities

Division 1	Section	Title
	01 91 00	Commissioning

DOCUMENT 00 01 15
LIST OF DRAWINGS AND TABLES

GENERAL

ARCHITECTURAL

STRUCTURAL

END OF DOCUMENT

DOCUMENT 00 01 20
LIST OF SCHEDULES

The following schedule summarizes the major activity dates (Dates are approximate and actual start dates are subject to change):

a. Bid Dates
1. Advertise to Bid (first) August 10, 2024
2. Advertise to Bid (second) August 13, 2024
3. Pre-Bid Conference/walk Thursday, August 15, 2024 at 1:00 P.M.
4. RFI Due Tuesday, August 27, 2024, by 1:00 P.M.
5. Addendum (last) Tuesday, September 10, 2024, by 1:00 P.M.
6. Bids Due Tuesday, September 17, 2024 1:00 P.M.
7. Board Award Tuesday, October 1, 2024

b. Contracts

1. Bond Preparation October 2-9, 2024
2. Contract Execution October 9, 2024

c. Pre-Construction Activities

1. Start Date October 9, 2024
2. Submittals and Approvals October 9, 2024 – October 30, 2024
3. Materials Ordering/Stockpiling October 2024 – November 2024

d. Construction

1. Date of facility availability October 9, 2024
2. Begin turning over spaces to District July 15, 2025

e. Occupancy: The Contractor will turn the grounds over for occupancy as follows:

1. Occupancy - July 15, 2025

f. Completion/Close-out

1. Substantial Completion Date Friday July 15, 2025
2. Complete Minor Finish Work July 29, 2025
3. Complete Punch List Work August 12, 2025
4. Closeout/Completion September 2, 2025

END OF DOCUMENT

DOCUMENT 00 11 16
NOTICE TO BIDDERS

1. Notice is hereby given that the governing board ("Board") of the Lodi Unified School District ("District") will receive sealed bids for the following project, _____ Project No. _____ ("Project" or "Contract"):

2. The Project consists of: _____

3. To bid on this Project, the Bidder is required to possess one or more of the following State of California contractors' license(s)**:**

   "A, B, and/or C-__"

   The Bidder's license(s) must remain active and in good standing throughout the term of the Contract.

4. To bid on this Project, the Bidder is required to be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code.

5. Contract Documents will be available on or after _____, 20__, for review at the District Facilities Office, and may be downloaded from the District's website, www.lodiusd.net/about/projects#facilities, under the **"Facilities & Planning"** section. In addition, Contract Documents are available for bidders' review at the following builders' exchanges:

   a. Central California Builders Exchange: (559) 237-1831

   b. Builder's Exchange of Stockton: (209) 478-1000

   c. Builder's Exchange of Sacramento: (916) 442-8991

   d. Valley Builders Exchange: (209) 522-9031

6. RESERVED

7. Sealed bids will be received until _a.m./p.m., , 20___, at the District Facilities & Planning Office, 880 N Guild Avenue, Lodi, California 95240 at or after which time the bids will be opened and publicly read aloud. Any bid that is submitted after this time shall be nonresponsive and returned to the bidder. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code.

8. The District reserves the right to prequalify bidders for this Project pursuant to Public Contract Code section 20111.5, as deemed necessary by the District. When prequalification is applied, only prequalified Bidders will be eligible to submit a Bid for this Project. Any Bid submitted by a Bidder who has not been prequalified shall be deemed nonresponsive and will not be considered. Pre-qualification is completed on the web at https://pqbids.com/lodi.

9. Pursuant to Public Contract Code section 20111.6, only prequalified bidders will be eligible to submit a bid for **a public project involving a projected expenditure of $1 million or more using or planning to use state general fund or state**

school bond funds. Any bid submitted by a bidder who is not prequalified shall be non-responsive and returned unopened to the bidder. Moreover, any bid listing subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses for the performance of electrical, mechanical or plumbing components who have not been prequalified shall be deemed nonresponsive.

10. All bids shall be on the form provided by the District. Each bid must conform and be responsive to all pertinent Contract Documents, including, but not limited to, the Instructions to Bidders.

11. A bid bond by an admitted surety insurer on the form provided by the District a cashier's check or a certified check, drawn to the order of the Lodi Unified School District, in the amount of ten percent (10%) of the total bid price, shall accompany the Bid Form and Proposal, as a guarantee that the Bidder will, within seven (7) calendar days after the date of the Notice of Award, enter into a contract with the District for the performance of the services as stipulated in the bid.

12. A mandatory pre-bid conference and site visit will be held on __, 20, at : _.m. at _____, California ("Site Visit"). All participants in a mandatory site visit are required to sign-in. Failure to attend, or tardiness at, a mandatory site visit will render a bid ineligible for consideration. The Site Visit Certification, provided at the end of the Site Visit, must be submitted with the Bid when a site visit is required.

13. The successful Bidder shall be required to furnish a 100% Performance Bond and a 100% Payment Bond if it is awarded the Contract for the Work.

14. The inclusion of an owner-controlled or wrap-up insurance program ("OCIP") for this Project is at the discretion of the District. When the District elects to provide an OCIP, the policy limits, known exclusions, and the duration for which the policy is intended to remain effective are detailed in the OCIP Manual. In such cases, it is mandatory for all bidders to comply with the following minimum requirements: no serious and willful violations of Labor Code section 6300 et seq., a workers' compensation experience modification factor of 1.00 or less, and an instituted injury prevention program pursuant to Labor Code section 3201.5 or 6401.7.

15. Bidders are required to submit the Off-Road Diesel-Fueled Fleet Certification along with their Bids, but only in cases where the project involves the use of off-road diesel-fueled vehicles and equipment subject to regulation. Bids submitted without the Off-Road Diesel-Fueled Fleet Certification, when this certification is applicable to the project, shall be deemed non-responsive and will not be considered.

16. The successful Bidder may substitute securities for any monies withheld by the District to ensure performance under the Contract, in accordance with the provisions of section 22300 of the Public Contract Code.

17. If applicable or required by the District for projects utilizing funds from the State of California School Facility Program, as outlined in Section 17076.11 of the Education Code, there is a mandate to achieve a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) annually of the overall dollar amount expended on state-funded projects. To fulfill this mandate by demonstrating a good faith effort, Bidders must actively seek DVBE-certified subcontractors and suppliers prior to bid submission. For any state-funded project, the selected Bidder must, upon contract award, certify compliance with DVBE

participation goal procedures. The DVBE Certification Participation Form, provided for this purpose, should not be submitted with the Bid but is required with the execution of the Contract.

This requirement is contingent upon the specific funding and requirements of a project as determined by the District.

18. The Contractor and all Subcontractors under the Contractor shall pay all workers on all Work performed pursuant to this Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to section 1770 et seq. of the California Labor Code. Prevailing wage rates are also available from the District or on the Internet at: <http://www.dir.ca.gov>.

19. This Project is subject to labor compliance monitoring and enforcement by the Department of Industrial Relations pursuant to Labor Code section 1771.4 and subject to the requirements of Title 8 of the California Code of Regulations. The successful Bidder shall comply with all requirements of Division 2, Part 7, Chapter 1, Articles 1-5 of the Labor Code.

20. The District's Board may, pursuant to Public Contract Code section 3400(c), find and determine that certain item(s) must be used on this Project for the reasons outlined below. This designation is subject to Board Resolution and will only be applied based on one of the statutorily allowed bases:

    a. Field Test or Experiment: To determine the product's suitability for future use, the following item(s) have been designated.

    b. Matching Products: To match other products in use on a particular public improvement either completed or in the course of completion, the following item(s) have been designated.

    c. Sole Source Availability: To obtain a necessary item that is only available from one source, the following item(s) have been designated.

    d. Emergency Response: To respond to an emergency declared by a local agency, the following item(s) have been designated.

    The Board has identified the following items which must be used on this Project: [LIST, OR STATE "N/A"].

21. This Project may be funded, in whole or in part, with federal funds. In instances where federal funding is utilized, the Contractor and all Subcontractors under the Contractor are required to comply with the Davis-Bacon Act, applicable reporting requirements, and any other relevant federal funding requirements. Should a conflict arise between state and federal requirements, the more stringent provision shall control to ensure compliance with all applicable regulations..

22. The District shall award the Contract, if it awards it at all, to the lowest responsive responsible bidder based on:

A. The base bid amount.

23. The Board reserves the right to reject any and all bids and/or waive any irregularity in any bid received. If the District awards the Contract, the security of unsuccessful bidder(s) shall be returned within sixty (60) days from the time the award is made. Unless otherwise required by law, no bidder may withdraw its bid for ninety (90) days after the date of the bid opening.

END OF DOCUMENT

DOCUMENT 00 21 13
INSTRUCTIONS TO BIDDERS

Bidders shall follow the instructions in this document, and shall submit all documents, forms, and information required for consideration of a bid.

Lodi Unified School District ("District") will evaluate information submitted by the apparent low Bidder and, if incomplete or unsatisfactory to District, Bidder's bid may be rejected at the sole discretion of District.

1. Bids are requested for a general construction contract, or work described in general, for the following project ("Project" or "Contract"):

   Project Name

2. A Bidder and its subcontractors must possess the appropriate State of California contractors' license and must maintain the license throughout the duration of the project. Bidders must also be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code. Bids submitted by a contractor who is not properly licensed or registered shall be deemed nonresponsive and will not be considered.

3. The District reserves the right to prequalify bidders for this Project pursuant to Public Contract Code section 20111.5, as deemed necessary by the District. When prequalification is applied, only prequalified Bidders will be eligible to submit a Bid for this Project. Any Bid submitted by a Bidder who has not been prequalified shall be deemed nonresponsive and will not be considered.

4. Pursuant to Public Contract Code section 20111.6, only prequalified bidders will be eligible to submit a bid for **a public project involving a projected expenditure of $1 million or more using or planning to use state general fund or state school bond funds**. Any bid submitted by a bidder who is not prequalified shall be non-responsive and returned unopened to the bidder. Moreover, any bid listing subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses for the performance of electrical, mechanical or plumbing components who have not been prequalified shall be deemed nonresponsive.

5. District will receive sealed bids from bidders as stipulated in the Notice to Bidders.

   a. All bids must be sealed in an envelope, marked with the name and address of the Bidder, name of the Project, the Project Number and/or bid number, and time of bid opening.

   b. Bids must be submitted to the **Facilities and Planning Office, 880 N. Guild Avenue, Lodi California 95240** by date and time shown in the Notice to Bidders.

   c. Bids must contain all documents as required herein.

6. Bidders are advised that on the date that bids are opened, telephones will not be available at the District Offices for use by bidders or their representatives.

7. Bids will be opened at or after the time indicated for receipt of bids.

8. Bidders must submit bids on the documents titled Bid Form and Proposal and must submit all other required District forms. Bids not submitted on the District's required forms shall be deemed nonresponsive and shall not be considered. Additional sheets required to fully respond to requested information are permissible.

9. Bidders shall not modify the Bid Form and Proposal or qualify their bids. Bidders shall not submit to the District a re-formatted, re-typed, altered, modified, or otherwise recreated version of the Bid Form and Proposal or other District-provided document.

10. Bids shall be clearly written and without erasure or deletions. District reserves the right to reject any bid containing erasures, deletions, or illegible contents.

11. Bidders must supply all information required by each Bid Document. Bids must be full and complete. District reserves the right in its sole discretion to reject any bid as nonresponsive as a result of any error or omission in the bid. Bidders must complete and submit all of the following documents with the Bid Form and Proposal:

    a. Bid Bond on the District's form, or other security.

    b. Designated Subcontractors List.

    c. Site Visit Certification, if applicable.

    d. Non-Collusion Declaration.

    e. Iran Contracting Act Certification, if applicable.

    f. Off-Road Diesel-Fueled Fleet Certification.

    g. Federal Debarment Certification, if federal funds used.

    h. Federal Byrd Anti-Lobbying Certification, if federal funds used.

    i. OCIP Insurance forms, if District has elected to use OCIP.

12. Bidders must submit with their bids cash, a cashier's check or a certified check payable to District, or a bid bond by an admitted surety insurer of not less than ten percent (10%) of amount of Base Bid, plus all additive alternates ("Bid Bond"). If Bidder chooses to provide a Bid Bond as security, Bidder must use the required form of corporate surety provided by District. The Surety on Bidder's Bid Bond must be an insurer admitted in the State of California and authorized to issue surety bonds in the State of California. Bids submitted without necessary bid security will be deemed nonresponsive and will not be considered.

13. If Bidder to whom the Contract is awarded fails or neglects to enter into the Contract and submit required bonds, insurance certificates, and all other required documents, within **SEVEN (7)** calendar days after the date of the Notice of Award, District may deposit Bid Bond, cash, cashier's check, or certified check for collection, and proceeds thereof may be retained by District as liquidated damages for failure of Bidder to enter into Contract, in the sole discretion of District. It is agreed that calculation of damages District may suffer as a result of Bidder's failure to enter into the Contract would be extremely difficult and impractical to determine and that the

amount of the Bidder's required bid security shall be the agreed and conclusively presumed amount of damages.

14. Bidders must submit with the bid the Designated Subcontractors List for those subcontractors who will perform any portion of Work, including labor, rendering of service, or specially fabricating and installing a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of total bid. Failure to submit this list when required by law shall result in bid being deemed nonresponsive and the bid will not be considered.

15. All of the listed subcontractors are required to be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code.

    a. An inadvertent error in listing the California contractor license number on the Designated Subcontractors List shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the correct contractor's license number is submitted to the District within 24 hours after the bid opening and the corrected number corresponds with the submitted name and location for that subcontractor.

    b. An inadvertent error listing an unregistered subcontractor shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive provided that any of the following apply:

        (1) The subcontractor is registered prior to the bid opening.

        (2) The subcontractor is registered and has paid the penalty registration fee within 24 hours after the bid opening.

        (3) The subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

16. If a mandatory pre-bid conference and site visit ("Site Visit") is required as referenced in the Notice to Bidders, then Bidders must submit the Site Visit Certification with their Bid. District will transmit to all prospective Bidders of record such Addenda as District in its discretion considers necessary in response to questions arising at the Site Visit. Oral statements shall not be relied upon and will not be binding or legally effective. Addenda issued by the District as a result of the Site Visit, if any, shall constitute the sole and exclusive record and statement of the results of the Site Visit.

17. Bidders shall submit the Non-Collusion Declaration with their bids. Bids submitted without the Non-Collusion Declaration shall be deemed nonresponsive and will not be considered.

18. Bidders are required to submit the Off-Road Diesel-Fueled Fleet Certification along with their Bids, but only in cases where the Project involves the use of off-road diesel-fueled vehicles and equipment subject to regulation. Bids submitted without the Off-Road Diesel-Fueled Fleet Certification, when this certification is applicable to the Project, shall be deemed non-responsive and will not be considered.

This requirement applies solely to projects for which Off-Road Diesel-Fueled Fleet Certification is relevant due to the nature of the work and the equipment used.

19. The Contractor and all Subcontractors under the Contractor shall pay all workers on all work performed pursuant to the Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to sections 1770 et seq. of the California Labor Code. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the Department of Industrial Relations, are available upon request at the District's principal office. Prevailing wage rates are also available on the internet at http://www.dir.ca.gov.

    This Project may be funded, in whole or in part, with federal funds. In instances where federal funding is utilized, the Contractor and all Subcontractors under the Contractor are required to comply with the Davis-Bacon Act, applicable reporting requirements, and any other relevant federal funding requirements. Should a conflict arise between state and federal requirements, the more stringent provision shall control to ensure compliance with all applicable regulations.

20. If applicable, pursuant to Education Code section 17550, the District may require the Bidder to purchase and to remove from the school grounds all old materials required by the specifications to be removed from any existing school building on the same school grounds and not required for school purposes and to state in his or her bid the amount which he or she will deduct from the price bid for the work as the purchase price of the old materials. In this instance, the board shall let the contract to any responsible bidder whose net bid is the lowest, or shall reject all bids.

21. If the District has elected to provide an owner-controlled insurance policy ("OCIP"), the policy limits, known exclusions, and the duration for which the policy is intended to remain effective are detailed in the OCIP Manual. In such cases, it is mandatory for all bidders to comply with the following minimum requirements: no serious and willful violations of Labor Code section 6300 et seq., a workers' compensation experience modification factor of 1.00 or less, and an instituted injury prevention program pursuant to Labor Code section 3201.5 or 6401.7.

22. If applicable or required by the District for projects utilizing funds from the State of California School Facility Program, as outlined in Section 17076.11 of the Education Code, there is a mandate to achieve a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) annually of the overall dollar amount expended on state-funded projects. To fulfill this mandate by demonstrating a good faith effort, Bidders must actively seek DVBE-certified subcontractors and suppliers prior to bid submission. For any state-funded project, the selected Bidder must, upon contract award, certify compliance with DVBE participation goal procedures. The DVBE Certification Participation Form, provided for this purpose, should not be submitted with the Bid but is required with the execution of the Contract.

23. Submission of bid signifies careful examination of Contract Documents and complete understanding of the nature, extent, and location of Work to be performed. Bidders must complete the tasks listed below as a condition to bidding, and submission of a

bid shall constitute the Bidder's express representation to District that Bidder has fully completed the following:

a. Bidder has visited the Site, if required, and has examined thoroughly and understood the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as-built conditions, and all local conditions and federal, state and local laws, and regulations that in any manner may affect cost, progress, performance, or furnishing of Work or that relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto;

b. Bidder has conducted or obtained and has understood all examinations, investigations, explorations, tests, reports, and studies that pertain to the subsurface conditions, as-built conditions, underground facilities, and all other physical conditions at or contiguous to the Site or otherwise that may affect the cost, progress, performance, or furnishing of Work, as Bidder considers necessary for the performance or furnishing of Work at the Contract Sum, within the Contract Time, and in accordance with the other terms and conditions of Contract Documents, including specifically the provisions of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies, or similar information or data are or will be required by Bidder for such purposes;

c. Bidder has correlated its knowledge and the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents;

d. Bidder has given the District prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and the actual conditions, and the written resolution(s) thereof by the District is/are acceptable to Bidder;

e. Bidder has made a complete disclosure in writing to the District of all facts bearing upon any possible interest, direct or indirect, that Bidder believes any representative of the District or other officer or employee of the District presently has or will have in this Contract or in the performance thereof or in any portion of the profits thereof;

f. Bidder must, prior to bidding, perform the work, investigations, research, and analysis required by this document and that Bidder represented in its Bid Form and Proposal and the Agreement that it performed prior to bidding. Contractor under this Contract is charged with all information and knowledge that a reasonable bidder would ascertain from having performed this required work, investigation, research, and analysis. Bid prices must include entire cost of all work "incidental" to completion of the Work.

g. Conditions Shown on the Contract Documents: Information as to underground conditions, as-built conditions, or other conditions or obstructions, indicated in the Contract Documents, e.g., on Drawings or in Specifications, has been obtained with reasonable care, and has been recorded in good faith. However, District only warrants, and Bidder may only rely, on the accuracy of limited types of information.

(1) As to above-ground conditions or as-built conditions shown or indicated in the Contract Documents, there is no warranty, express or implied, or any representation express or implied, that such information is correctly shown or indicated. This information is verifiable by independent investigation and Bidder is required to make such verification as a condition to bidding. In submitting its Bid, Bidder shall rely on the results of its own independent investigation. In submitting its Bid, Bidder shall not rely on District-supplied information regarding above-ground conditions or as-built conditions.

(2) As to any subsurface condition shown or indicated in the Contract Documents, Bidder may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated. District is not responsible for the completeness of such information for bidding or construction; nor is District responsible in any way for any conclusions or opinions that the Bidder has drawn from such information; nor is the District responsible for subsurface conditions that are not specifically shown (for example, District is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown).

h. Conditions Shown in Reports and Drawings Supplied for Informational Purposes: Reference is made to the document entitled Geotechnical Data, and the document entitled Existing Conditions, for identification of:

(1) Subsurface Conditions: Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that have been utilized by Architect in preparing the Contract Documents; and

(2) Physical Conditions: Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that has been utilized by Architect in preparing the Contract Documents.

(3) These reports and drawings are **not** Contract Documents and, except for any "technical" data regarding subsurface conditions specifically identified in Geotechnical Data and Existing Conditions, and underground facilities data, Bidder may not in any manner rely on the information in these reports and drawings. Subject to the foregoing, Bidder must make its own independent investigation of all conditions affecting the Work and must not rely on information provided by District.

24. Bids shall be based on products and systems specified in Contract Documents or listed by name in Addenda. Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Bidder may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified. The District is not responsible and/or liable in any way for a Contractor's damages and/or claims related, in any way, to that Contractor's basing its bid on any requested substitution that the District has not approved in advance and in writing.

Contractors and materials suppliers who submit requests for substitutions prior to the award of the Contract must do so in writing and in compliance with Public Contract Code section 3400. All requests must comply with the following:

a. District must receive any notice of request for substitution of a specified item a minimum of **TEN (10)** calendar days prior to bid opening. The Successful Bidder will not be allowed to substitute specified items unless properly noticed.

b. Within 35 days after the date of the Notice of Award, the Successful Bidder shall submit data substantiating the request(s) for all substitution(s) containing sufficient information to assess acceptability of product or system and impact on Project, including, without limitation, the requirements specified in the Special Conditions and the Specifications. Insufficient information shall be grounds for rejection of substitution.

c. Approved substitutions, if any, shall be listed in Addenda. District reserves the right not to act upon submittals of substitutions until after bid opening.

d. Substitutions may be requested after Contract has been awarded only if indicated in and in accordance with requirements specified in the Special Conditions and the Specifications.

25. Bidders may examine any available "as-built" drawings of previous work by giving District reasonable advance notice. District will not be responsible for accuracy of "as-built" drawings. The document entitled Existing Conditions applies to all supplied "as-built" drawings.

26. All questions about the meaning or intent of the Contract Documents are to be directed via email to the District to _____. Interpretations or clarifications considered necessary by the District in response to such questions will be issued in writing by Addenda and emailed, faxed, mailed, or delivered to all parties recorded by the District as having received the Contract Documents or posted on the District's website https://www.lodiusd.net/about/bonds#facilities. Questions received less than **SEVEN (7)** calendar days prior to the date for opening bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

27. Addenda may also be issued to modify other parts of the Contract Documents as deemed advisable by the District.

28. Each Bidder must acknowledge each Addendum in its Bid Form and Proposal by number or its Bid shall be considered non-responsive. Each Addendum shall be part of the Contract Documents. A complete listing of Addenda may be secured from the District.

29. This Contract may include alternates. Alternates are defined as alternate products, materials, equipment, systems, methods, or major elements of the construction that may, at the District's option and under terms established in the Contract and pursuant to section 20103.8 of the Public Contract Code, be selected for the Work.

30. The District shall award the Contract, if it awards it at all, to the lowest responsive responsible bidder based on the criteria as indicated in the Notice to Bidders. In the

event two or more responsible bidders submit identical bids, the District shall select the Bidder to whom to award the Contract by lot.

31. Discrepancies between written words and figures, or words and numerals, will be resolved in favor of figures or numerals.

32. Bidders in contention for contract awards shall be required to attend a Post-Bid interview, which will be set within three (3) calendar days following bid opening. A duly authorized representative of the apparent low bidder is required to attend the Post Bid Interview, in person. The apparent low bidder's authorized representative(s) must have (1) knowledge of how the bid submitted was prepared, (2) the person responsible for supervising performance of the Work, and (3) the authority to bind the apparent low bidder. Failure to attend the Post Bid Interview as scheduled will be considered just cause for the District to reject the Bid as nonresponsive.

33. Any bid protest by any Bidder regarding any other bid must be submitted in writing to the District, before 5:00 p.m. of the **THIRD (3rd)** business day following bid opening.

    a. Only a Bidder who has actually submitted a bid, and who could be awarded the Contract if the bid protest is upheld, is eligible to submit a bid protest. Subcontractors are not eligible to submit bid protests. A Bidder may not rely on the bid protest submitted by another Bidder.

    b. A bid protest must contain a complete statement of any and all bases for the protest and all supporting documentation. Materials submitted after the bid protest deadline will not be considered.

    c. The protest must refer to the specific portions of all documents that form the basis for the protest.

        (1) Without limitation to any other basis for protest, an inadvertent error in listing the California contractor's license number on the Designated Subcontractors List shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the correct contractor's license number is submitted to the District within 24 hours after the bid opening and the corrected number corresponds with the submitted name and location for that subcontractor.

        (2) Without limitation to any other basis for protest, an inadvertent error listing an unregistered subcontractor shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive provided that any of the following apply:

            (a) The subcontractor is registered prior to the bid opening.

            (b) The subcontractor is registered and has paid the penalty registration fee within 24 hours after the bid opening.

            (c) The subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

d. The protest must include the name, address and telephone number of the person representing the protesting party.

e. The party filing the protest must concurrently transmit a copy of the protest and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

f. The procedure and time limits set forth in this paragraph are mandatory and are each bidder's sole and exclusive remedy in the event of bid protest. Failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

34. The Bidder to whom Contract is awarded shall execute and submit the following documents by 5:00 p.m. of the **SEVENTH (7th)** calendar day following the date of the Notice of Award. Failure to properly and timely submit these documents entitles District to reject the bid as nonresponsive.

a. Agreement: To be executed by successful Bidder. Submit four (4) copies, each bearing an original signature. If approved by the District, a facsimile or electronic signature shall be deemed to be the equivalent of the actual original signature.

b. Escrow of Bid Documentation: This must include all required documentation. See the document titled Escrow Bid Documentation for more information.

c. Performance Bond (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.

d. Payment Bond (Contractor's Labor and Material Bond) (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.

e. Insurance Certificates and Endorsements as required.

f. Workers' Compensation Certification.

g. Prevailing Wage and Related Labor Requirements Certification.

h. Disabled Veteran Business Enterprise Participation Certification. *(If applicable)*

i. Drug-Free Workplace Certification. *(If applicable)*

j. Tobacco-Free Environment Certification. *(If applicable)*

k. Drug and Alcohol-Free Schools Certification. *(If applicable)*

l. Hazardous Materials Certification. *(If applicable)*

m. Lead-Based Materials Certification. *(If applicable)*

n. Imported Materials Certification. *(If applicable)*

o. Criminal Background Investigation/Fingerprinting Certification.

p. Roofing Project Certification: from Contractor, Material Manufacturer and/or Vendor. *(If applicable)*

q. Registered Subcontractors List: Must include Department of Industrial Relations (DIR) registration number of each subcontractor for all tiers.

35. Time for Completion: District may issue a Notice to Proceed within **NINETY (90)** days from the date of the Notice of Award. Once Contractor has received the Notice to Proceed, Contractor shall complete the Work within the period of time indicated in the Contract Documents.

a. In the event that the District desires to postpone issuing the Notice to Proceed beyond this 90-day period, it is expressly understood that with reasonable notice to the Contractor, the District may postpone issuing the Notice to Proceed.

b. It is further expressly understood by Contractor that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed beyond a 90-day period. If the Contractor believes that a postponement of issuance of the Notice to Proceed will cause a hardship to the Contractor, the Contractor may terminate the Contract. Contractor's termination due to a postponement beyond this 90-day period shall be by written notice to District within **TEN (10)** calendar days after receipt by Contractor of District's notice of postponement.

c. It is further understood by the Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement and which the District had in writing authorized Contractor to perform prior to issuing a Notice to Proceed.

d. Should the Contractor terminate the Contract as a result of a notice of postponement, District shall have the authority to award the Contract to the next lowest responsive responsible bidder.

36. District reserves the right to reject any or all bids, including without limitation the right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional bids, to re-bid, and to reject the bid of any bidder if District believes that it would not be in the best interest of the District to make an award to that bidder, whether because the bid is not responsive or the bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by District. District also reserves the right to waive any inconsequential deviations or irregularities in any bid. For purposes of this paragraph, an "unbalanced bid" is one having nominal prices for some work items and/or enhanced prices for other work items.

37. It is the policy of the District that no qualified person shall be excluded from participating in, be denied the benefits of, or otherwise be subjected to discrimination in any consideration leading to the award of contract, based on race, religious creed, color, national origin, ancestry, physical disability, mental disability, reproductive health decision-making, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or veteran or military status. The Successful Bidder and its subcontractors shall comply with applicable federal and state laws, including, but not limited to the California Fair Employment and Housing Act, beginning with Government Code section 12900, and Labor Code section 1735.

38. Prior to the award of Contract, District reserves the right to consider the responsibility of the Bidder. District may conduct investigations as District deems necessary to assist in the evaluation of any bid and to establish the responsibility, including, without limitation, qualifications and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to District's satisfaction within the prescribed time.

END OF DOCUMENT

DOCUMENT 00 21 13.1

BIDDER INFORMATION AND FORMS

[INTENTIONALLY LEFT BLANK UNLESS PROVIDED IN SPECIAL CONDITIONS – SEPARATE PREQUALIFICATION PROCESS RECOMMENDED]

END OF DOCUMENT

DOCUMENT 00 31 19
EXISTING CONDITIONS

1. Summary

This document describes existing conditions at or near the Project, and use of information available regarding existing conditions. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

2. Reports and Information on Existing Conditions

a. Documents providing a general description of the Site and conditions of the Work may have been collected by the Lodi Unified School District ("District"), its consultants, contractors, and tenants. These documents may, but are not required to, include previous contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding underground facilities.

b. Information regarding existing conditions may be inspected at the District offices or the Construction Manager's offices, if any, and copies may be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports, documents, and other information are **not** part of the Contract Documents. These reports, documents, and other information do **not** excuse Contractor from fulfilling Contractor's obligation to independently investigate any or all existing conditions or from using reasonable prudent measures to avoid damaging existing improvements.

c. Information regarding existing conditions may also be included in the Project Manual, but shall **not** be considered part of the Contract Documents.

d. Prior to commencing this Work, Contractor and the District's representative shall survey the Site to document the condition of the Site. Contractor will record the survey in digital videotape format and provide an electronic copy to the District within fourteen (14) days of the survey.

e. Contractor may also document any pre-existing conditions in writing, provided that both the Contractor and the District's representative agree on said conditions and sign a memorandum documenting the same.

f. The reports and other data or information regarding existing conditions and underground facilities at or contiguous to the Project are the following:

(1) Original Construction Drawings.
(2) Survey of Site.
(3) Geotechnical Report(s).
(4) Hazardous Material Report(s).
(5) Videotaped Survey(s).

3. Use of Information

a. Information regarding existing conditions was obtained only for use of District and its consultants, contractors, and tenants for planning and design and is **not** part of the Contract Documents.

b. District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any information regarding existing conditions. Bidder represents and agrees that in submitting a bid it is not relying on any information regarding existing conditions supplied by District.

c. Under no circumstances shall District be deemed to warrant or represent existing above-ground conditions, as-built conditions, or other actual conditions, verifiable by independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform as a condition to bidding and Bidder should not and shall not rely on this information or any other information supplied by District regarding existing conditions.

d. Any information shown or indicated in the reports and other data supplied herein with respect to existing underground facilities at or contiguous to the Project may be based upon information and data furnished to District by the District's employees and/or consultants or builders of such underground facilities or others. District does not assume responsibility for the completeness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information.

e. District shall be responsible only for the general accuracy of information regarding underground facilities, and only for those underground facilities that are owned by District, and only where Bidder has conducted the independent investigation required of it pursuant to the Instructions to Bidders, and discrepancies are not apparent.

4. **Investigations/Site Examinations**

a. Before submitting a bid, each Bidder is responsible for conducting or obtaining any additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site or otherwise, that may affect cost, progress, performance, or furnishing of Work or that relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or that Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of Contract Documents.

b. On request, District will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a bid. Bidders must fill all holes and clean up and restore the Site to its former condition upon completion of its explorations, investigations, tests, and studies. Such investigations and Site examinations may be performed during any and all Site visits indicated in the Notice to Bidders and only under the provisions of the Contract Documents, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work, and District’s prior approval.

END OF DOCUMENT

DOCUMENT 00 31 32
GEOTECHNICAL DATA

1. Summary

This document describes geotechnical data at or near the Project that is in the District's possession available for Contractor's review, and use of data resulting from various investigations. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

2. Geotechnical Reports

a. Geotechnical reports may have been prepared for and around the Site and/or in connection with the Work by soil investigation engineers hired by Lodi Unified School District ("District"), and its consultants, contractors, and tenants.

b. Geotechnical reports may be inspected at the District offices or the Construction Manager's offices, if any, and copies may be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports are **not** part of the Contract Documents.

c. The reports and drawings of physical conditions that may relate to the Project are the following:

_____

3. Use of Data

a. Geotechnical data were obtained only for use of District and its consultants, contractors, and tenants for planning and design and are **not** a part of Contract Documents.

b. Except as expressly set forth below, District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting a bid it is not relying on any geotechnical data supplied by District, except as specifically allowed below.

c. Under no circumstances shall District be deemed to make a warranty or representation of existing above ground conditions, as-built conditions, geotechnical conditions, or other actual conditions verifiable by independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder should perform as a condition to bidding and Bidder must not and shall not rely on information supplied by District.

4. **Limited Reliance Permitted on Certain Information**

a. Reference is made herein for identification of:

Reports of explorations and tests of subsurface conditions at or contiguous to the Site that have been utilized by District in preparation of the Contract Documents.

Drawings of physical conditions in or relating to existing subsurface structures (except underground facilities) that are at or contiguous to the Site and have been utilized by District in preparation of the Contract Documents.

b. Bidder may rely upon the general accuracy of the "technical data" contained in the reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required pursuant to Instructions to Bidders, and discrepancies are not apparent. The term "technical data" in the referenced reports and drawings shall be limited as follows:

(1) The term "technical data" shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment or structures that were encountered during subsurface exploration. The term "technical data" does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures.

(2) The term "technical data" shall not include the location of underground facilities.

(3) Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the "technical data" contained in such reports or drawings.

(4) Bidder is solely responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information provided in the identified reports and drawings.

5. **Investigations/Site Examinations**

a. Before submitting a bid, each Bidder is responsible for conducting or obtaining any additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site or otherwise, that may affect cost, progress, performance, or furnishing of Work or that relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or that Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of Contract Documents.

b. On request, District will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a bid. Bidders must fill all holes and clean up and restore the Site to its former condition upon completion of its explorations, investigations, tests, and studies. Such investigations and Site examinations may be performed during any and all Site visits indicated in the Notice to Bidders and only under the provisions of the Contract Documents, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work, and District's prior approval.

END OF DOCUMENT

DOCUMENT 00 41 13

BID FORM AND PROPOSAL

To: Governing Board of the Lodi Unified School District ("District" or "Owner")

From: _____
(Proper Name of Bidder)

The undersigned declares that Bidder has read and understands the Contract Documents, including, without limitation, the Notice to Bidders and the Instructions to Bidders, and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Drawings and Specifications for the following project known as:

PROJECT NAME PROJECT NO.

("Project" or "Contract") and will accept in full payment for that Work the following total lump sum amount, all taxes included:

_____ dollars $	_____
BASE BID WITHOUT CONTINGENCY	
_____ dollars $	_____
10% OWNER-CONTROLLED CONTINGENCY	
_____ dollars $	_____
TOTAL BID WITH CONTINGENCY	

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Additional Detail Regarding Calculation of Base Bid

1. **Contingency**. A 10% owner-controlled contingency shall be added to the Base Bid ("Contingency"). For example, a $10 Contingency should be added to a $100 Base Bid, for a Total Bid of $110. The Contingency shall apply to potential additional construction costs for unforeseen conditions that occur over the course of construction and/or scope gaps between the subcontract categories of the Work. The Contingency is not intended for such things as scope changes. The Contingency shall not be used without the agreement of the District. The unused portion of the Contingency shall be considered as cost savings and retained by the District at the end of the Project.

2. The undersigned has reviewed the Work outlined in the Contract Documents and fully understands the scope of Work required in this Proposal, understands the construction and project management function(s) is described in the Contract Documents, and that each Bidder who is awarded a contract shall be in fact a prime contractor, not a subcontractor, to the District, and agrees that its Proposal, if accepted by the District, will be the basis for the Bidder to enter into a contract with the District in accordance with the intent of the Contract Documents.

3. The undersigned has notified the District in writing of any discrepancies or omissions or of any doubt, questions, or ambiguities about the meaning of any of the Contract Documents and has contacted the Construction Manager before bid date to verify the issuance of any clarifying Addenda.

4. The undersigned agrees to commence work under this Contract on the date established in the Contract Documents and to complete all work within the time specified in the Contract Documents.

5. The liquidated damages clause of the General Conditions and Agreement is hereby acknowledged.

6. It is understood that the District reserves the right to reject this bid and that the bid shall remain open to acceptance and is irrevocable for a period of ninety (90) days.

7. The following documents are attached hereto:

   - Bid Bond on the District's form or other security
   - Addendum Acknowledgement
   - Registered Subcontractors List
   - Site Visit Certification *(If applicable)*
   - Non-Collusion Declaration
   - Off-Road Diesel-Fueled Fleet Certification
   - OCIP Insurance forms *(If applicable)*
   - Federal Debarment Certification *(If applicable)*
   - Federal Byrd Anti-Lobbying Certification *(If applicable)*

8. Receipt and acceptance of the following Addenda is hereby acknowledged:

No. _____, Dated _____	No. _____, Dated _____
No. _____, Dated _____	No. _____, Dated _____
No. _____, Dated _____	No. _____, Dated _____

9. Bidder acknowledges that the license required for performance of the Work is a(n) "A, B, and/or C-__" license.

10. Bidder hereby certifies that Bidder is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.

11. Bidder specifically acknowledges and understands that if it is awarded the Contract, that it shall perform the Work of the Project while complying with all requirements of the Department of Industrial Relations.

12. Bidder hereby certifies that its bid includes sufficient funds to permit Bidder to comply with all local, state or federal labor laws or regulations during the Project, including payment of prevailing wage, and that Bidder will comply with the provisions of Labor Code section 2810(d) if awarded the Contract.

13. If the District has entered into a Project Labor Agreement, Bidder agrees to comply with all requirements of the Project Labor Agreement.

14. In instances where the project is funded, in whole or in part, by federal funds, Bidder specifically acknowledges and understands that if it is awarded the Contract, that it shall perform the Work of the Project while complying with the Davis Bacon Act, applicable reporting requirements, and any and all other applicable requirements for federal funding. If a conflict exists, the more stringent requirement shall control.

15. Bidder represents that it is competent, knowledgeable, and has special skills with respect to the nature, extent, and inherent conditions of the Work to be performed. Bidder further acknowledges that there are certain peculiar and inherent conditions existent in the construction of the Work that may create, during the Work, unusual or peculiar unsafe conditions hazardous to persons and property.

16. Bidder expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to adequately and safely perform the Work with respect to such hazards.

17. Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Gov. Code, § 12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

18. The undersigned Bidder certifies that it is, at the time of bidding, and shall be throughout the period of the Contract, licensed by the State of California to do the type of work required under the terms of the Contract Documents and registered as a public works contractor with the Department of Industrial Relations. Bidder further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.

Bidder hereby certifies to the District that all representations, certifications, and statements made by Bidder, as set forth in this bid form, are true and correct and are made under penalty of perjury.

Dated this _____ day of _____ 20 ____

Name of Bidder: _____

Type of Organization: _____

Signature: _____

Print Name: _____

Title: _____

Address of Bidder: _____

Taxpayer Identification No. of Bidder: _____

Telephone Number: _____

Fax Number: _____

E-mail: _____ Web Page: _____

Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class:_____ Expiration Date: _____

No.: _____ Class:_____ Expiration Date: _____

Public Works Contractor Registration No.: _____

END OF DOCUMENT

DOCUMENT 00 43 13
BID BOND

(Note: If Bidder is providing a bid bond as its bid security, Bidder must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

That the undersigned,_____, as Principal ("Principal"),

and _____, as Surety ("Surety"), a corporation organized and existing under and by virtue of the laws of the State of California and authorized to do business as a surety in the State of California, are held and firmly bound unto the Lodi Unified School District ("District") of San Joaquin County, State of California, as Obligee, in an amount equal to ten percent (10%) of the Base Bid plus alternates, in the sum of

_____ Dollars ($ _____)

lawful money of the United States of America, for the payment of which sum well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted a bid to the District for all Work specifically described in the accompanying bid for the following project: _____ ("Project" or "Contract").

NOW, THEREFORE, if the Principal is awarded the Contract and, within the time and manner required under the Contract Documents, after the prescribed forms are presented to Principal for signature, enters into a written contract, in the prescribed form in accordance with the bid, and files two bonds, one guaranteeing faithful performance and the other guaranteeing payment for labor and materials as required by law, and meets all other conditions to the Contract between the Principal and the Obligee becoming effective, or if the Principal shall fully reimburse and save harmless the Obligee from any damage sustained by the Obligee through failure of the Principal to enter into the written contract and to file the required performance and labor and material bonds, and to meet all other conditions to the Contract between the Principal and the Obligee becoming effective, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. The full payment of the sum stated above shall be due immediately if Principal fails to execute the Contract within seven (7) days of the date of the District's Notice of Award to Principal.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or the call for bids, or to the work, or to the specifications.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorneys' fee to be fixed by the Court.

If the District awards the bid, the security of unsuccessful bidder(s) shall be returned within sixty (60) days from the time the award is made. Unless otherwise required by law, no bidder may withdraw its bid for ninety (90) days after the date of the bid opening.

IN WITNESS WHEREOF, this instrument has been duty executed by the Principal and Surety above named, on the _____ day of _____, 20___.

_____
Principal

_____
By

_____
Surety

_____
By

_____
Name of California Agent of Surety

_____
Address of California Agent of Surety

_____
Telephone Number of California Agent of Surety

Bidder must attach Power of Attorney and Certificate of Authority for Surety and a Notarial Acknowledgment for all Surety's signatures. The California Department of Insurance must authorize the Surety to be an admitted Surety Insurer.

END OF DOCUMENT

DOCUMENT 00 43 36

DESIGNATED SUBCONTRACTORS LIST

(Public Contact Code Sections 4100-4114)

PROJECT: **Project Name Project No.**

Bidder acknowledges and agrees that it must clearly set forth below the name, location and California contractor license number of each subcontractor who will perform work or labor or render service to the Bidder in or about the construction of the Work or who will specially fabricate and install a portion of the Work according to detailed drawings contained in the plans and specifications in an amount in excess of one-half of one percent (0.5%) of Bidder's total Base Bid and the kind of Work that each will perform. Vendors or suppliers of materials only do not need to be listed.

Bidder acknowledges and agrees that, if Bidder fails to list as to any portion of Work, or if Bidder lists more than one subcontractor to perform the same portion of Work, Bidder must perform that portion itself or be subjected to penalty under applicable law. In case more than one subcontractor is named for the same kind of Work, state the portion of the kind of Work that each subcontractor will perform.

If alternate bid(s) is/are called for and Bidder intends to use subcontractors different from or in addition to those subcontractors listed for work under the Base Bid, Bidder must list subcontractors that will perform Work in an amount in excess of one half of one percent (0.5%) of Bidder's total Base Bid plus alternate(s).

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 01

SITE VISIT CERTIFICATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
IF SITE VISIT WAS MANDATORY

PROJECT: **Project Name Project No.**

Check option that applies:

_____ I certify that I visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. I fully understand the facilities, difficulties, and restrictions attending the execution of the Work under contract.

_____ I certify that _____ (Bidder's representative) visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. The Bidder's representative fully understood the facilities, difficulties, and restrictions attending the execution of the Work under contract.

Bidder fully indemnifies the Lodi Unified School District, its Architect, its Engineers, its Construction Manager, and all of their respective officers, agents, employees, and consultants from any damage, or omissions, related to conditions that could have been identified during my visit and/or the Bidder's representative's visit to the Site.

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

ATTACHMENTS:

1.
2.
3.

END OF DOCUMENT

DOCUMENT 00 45 19

NON-COLLUSION DECLARATION

(Public Contract Code Section 7106)

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.
[Title] [Name of Firm]

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____,
[Date]

at _____, _____.
[City] [State]

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 19.01

IRAN CONTRACTING ACT CERTIFICATION

(Public Contract Code Sections 2202-2208)

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Prior to bidding on or submitting a proposal for a contract for goods or services of $1,000,000 or more, the bidder/proposer must submit this certification pursuant to Public Contract Code section 2204.

The bidder/proposer must complete **ONLY ONE** of the following two options. To complete OPTION 1, check the corresponding box **and** complete the certification below. To complete OPTION 2, check the corresponding box, complete the certification below, and attach documentation demonstrating the exemption approval.

☐ **OPTION 1.** Bidder/Proposer is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b), and we are not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

☐ **OPTION 2.** Bidder/Proposer has received a written exemption from the certification requirement pursuant to Public Contract Code sections 2203(c) and (d). *A copy of the written documentation demonstrating the exemption approval is included with our bid/proposal.*

CERTIFICATION:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to the OPTION selected above. This certification is made under the laws of the State of California.

Vendor Name/Financial Institution (Printed)	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	*Date Executed*

END OF DOCUMENT

DOCUMENT 00 45 19.02

OFF-ROAD DIESEL-FUELED FLEET CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Title 13 CCR sections 2449, 2449.1, and 2449.2, in compliance with Government Code sections 11346.2, subdivision (a)(3), and 11346.8, subdivision (c), applies to construction contractors who own or operate within California any vehicles with a diesel-fueled or alternative diesel fueled off-road compression-ignition engine with maximum power (max hp) of 25 horsepower (hp) or greater provided that the vehicle cannot be registered and driven safely on-road or was not designed to be driven on-road, even if it has been modified so that it can be driven safely on-road.

Section 2449(i), in relevant part, provides:

(1) For a project involving the use of vehicles subject to this regulation, the prime contractor must obtain copies of the valid Certificate of Reported Compliance with the Regulation for In-Use Off-Road Diesel-Fueled Fleets for the fleet selected for the contract and their listed subcontractors, if applicable, prior to entering into a new or renewed contract with that fleet.

(2) No prime contractor or public works awarding body, as applicable, shall enter into a contract with a fleet for which it does not have a valid Certificate of Reported Compliance for the fleet and its listed subcontractors, if applicable, prior to entering into a new or renewed contract with that fleet.

(3) The Certificates of Reported Compliance received by the prime contractor for a project must be retained for three (3) years after that project's completion. Upon request by California Air Resources Board ("CARB"), these records must be provided to CARB within five (5) business days of the request.

(4) Situations in which prime contractors or public works awarding bodies, as applicable, are contracting for projects that are considered emergency operations, as defined in section 2449(c)(18), are exempt from the requirements in section 2449(i)(1)-(3), but must still retain records verifying vehicles subject to the regulation that are operating on the emergency operations project are actually being operated on the project for emergency operations only. These records must include a description of the emergency, the address or a description of the specific location of the emergency, the dates on which the emergency operations were performed, and an attestation by the fleet that the vehicles are operated on the project for emergency operations only.

Section 2449(j), in relevant part, also states:

(1) Between March 1 and June 1 of each year, a prime contractor must collect new valid Certificates of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing

contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement.

(2) Prime contractors shall only allow fleets with valid Certificates of Reported Compliance on the prime contractor's job sites.

(3) If the prime contractor discovers that any fleet intending to operate vehicles subject to this regulation for the prime contractor does not have a valid Certificate of Reported Compliance, as defined in section 2449(n), or if the prime contractor observes any noncompliant vehicles subject to the regulation on the prime contractor's job site, then the prime contractor must report specified information regarding the fleet to CARB within five (5) business days of such discovery.

(4) Upon request by CARB, the prime contractor must immediately disclose to CARB the name and contact information of each responsible party for all vehicles subject to this regulation operating at the job site or for the prime contractor.

(5) The prime contractor shall prominently display signage for any project where vehicles subject to this regulation will operate for eight (8) calendar days or more. The signage must be posted by the eighth calendar day from which the first vehicle operates. The signage will be in lettering larger than size 14-point type and displayed in a conspicuous place where notices to employees are customarily posted at the job site or where there is employee foot traffic. If one of the above locations is also viewable by the public, it should be posted at that location. The signage must include specified information regarding idling regulations for In-Use Off-Road Diesel-Fueled Fleets with directions on how to report observed noncompliance of the provided regulations to CARB.

I am aware of the provisions of Title 13 CCR sections 2449, 2449.1, and 2449.2, which apply to every contractor who owns or operates off-road diesel fleet vehicles in California, and I will comply with such provisions, including providing Certificate(s) of Reported Compliance for In-Use Off-Road Diesel-Fueled Fleets for the fleet selected for the contract and their listed subcontractors, if applicable, with its bid.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

Bidder must attach valid Certificate(s) Reported Compliance with the Regulation for In-Use Off-Road Diesel-Fueled Fleets provided by CARB for the fleet selected for the contract and their listed subcontractors, if applicable, to this form.

END OF DOCUMENT

DOCUMENT 00 45 26

WORKERS' COMPENSATION CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Labor Code section 3700, in relevant part, provides:

> Every employer except the State shall secure the payment of compensation in one or more of the following ways:
>
> a. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state; and/or
>
> b. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

I am aware of the provisions of section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work of this Contract.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

(In accordance with Labor Code sections 1860 and 1861, the above certificate must be signed and filed with the awarding body prior to performing any Work under this Contract.)

END OF DOCUMENT

DOCUMENT 00 45 46.01

PREVAILING WAGE AND RELATED LABOR REQUIREMENTS CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the above Project including, without limitation, labor compliance monitoring and enforcement by the Department of Industrial Relations.

I hereby certify that, if this Project utilizes federal funds, I will also conform to the Federal Labor Standards Provisions regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon and Related Act requirements, Contract Work Hours and Safety Standards Act requirements, and any and all other applicable requirements for federal funding for all Work on the above Project.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.02

DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

GENERAL INSTRUCTIONS

Section 17076.11 of the Education Code requires school districts using, or planning to use, funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended each year by the school district on projects that receive state funding. Therefore, the lowest responsive responsible Bidder awarded the Contract must submit this document to the District with its executed Agreement, identifying the steps contractor took to solicit DVBE participation in conjunction with this Contract. **Do not submit this form with your bids.**

PART I – Method of Compliance with DVBE Participation Goals. Check the appropriate box to indicate your method of committing the contract dollar amount.

YOUR BUSINESS ENTERPRISE IS:	**AND YOU WILL**	**AND YOU WILL**
A. ☐ Disabled veteran owned and your forces will perform at least 3% of this Contract	Include a copy of your DVBE letter from Office of Small Business and Disabled Veterans Business Enterprise Services ("OSDS")*	Complete Part 1 of this form and the Certification
B. ☐ Disabled veteran owned but is unable to perform 3% of this Contract with your forces	Use DVBE subcontractors /suppliers to bring the Contract participation to at least 3%	Include a copy of each DVBE's letter from OSDS (including yours, if applicable), and complete Part 1 of this form and the Certification
C. ☐ **NOT** disabled veteran owned	Use DVBE subcontractors /suppliers for at least 3% of this Contract	
D. ☐ Unable to meet the required participation goals after good faith efforts	Make good faith efforts, including contacts, advertisement and DVBE solicitation	Complete all of this form and the Certification

* A DVBE letter from OSDS is obtained from the participating DVBE.

You must complete the following table to show the dollar amount of DVBE participation:

	TOTAL CONTRACT PRICE
A. Prime Bidder, if DVBE (own participation)	$
B. DVBE Subcontractor or Supplier	
1.	
2.	
3.	
4.	
C. Subtotal (A & B)	
D. Non-DVBE	
E. Total Bid	

PART II – Contacts. To identify DVBE subcontractors/suppliers for participation in your contract, you must contact each of the following categories. You should contact several DVBE organizations.

CATEGORY	**TELEPHONE NUMBER**	**DATE CONTACTED**	**PERSON CONTACTED**
1. The District, if any			*
2. OSDS, provides assistance locating DVBEs at https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx	(916) 375-4940		*
3. DVBE Organization (List)			*

*Write "recorded message" in this column, if applicable.

PART III – Advertisement. You must advertise for DVBE participation in both a trade and focus paper. List the advertisement you place to solicit DVBE participation. Advertisements should be published at least fourteen (14) days prior to bid/proposal opening; if you cannot advertise fourteen (14) days prior, advertisements should be published as soon as possible. Advertisements must include that your firm is seeking DVBE participation, the project name and location, and your firm's name, your contact person, and telephone number. Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	**CHECK ONE**		**DATE OF ADVERTISEMENT**
	TRADE	**FOCUS**	

PART IV – DVBE Solicitations. List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.

IF THE DVBE…..	**THEN…..**	**AND…..**
was selected to participate	Check "YES" in the "SELECTED" column	include a copy of their DVBE letter(s) from OSDS
was **NOT** selected to participate	Check "NO" in the "SELECTED" column	state why in the "REASON NOT SELECTED" column
did not respond to your solicitation	Check the "NO RESPONSE" column.	

DVBE CONTACTED	**SELECTED**		**REASON NOT SELECTED**	**NO RESPONSE**
	YES	**NO**		

A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____, certify that I am the bidder's _____ and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of section 12650 et seq. of the Government Code providing for the imposition of treble damages for making false claims.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.03

DRUG-FREE WORKPLACE CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This Drug-Free Workplace Certification form is required from the successful Bidder pursuant to Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any state agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a state agency may be subject to suspension of payments or termination of the contract or grant, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of the Drug-Free Workplace Act of 1990.

Contractor must also comply with the provisions of Health & Safety Code section 11362.3 which prohibits the consumption or possession of cannabis or cannabis products in any public place, including school grounds, and specifically on school grounds while children are present.

Contractor shall certify that it will provide a drug-free workplace by doing all of the following:

a. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition.

b. Establishing a drug-free awareness program to inform employees about all of the following:

   (1) The dangers of drug abuse in the workplace.

   (2) The person's or organization's policy of maintaining a drug-free workplace.

   (3) The availability of drug counseling, rehabilitation, and employee-assistance programs.

   (4) The penalties that may be imposed upon employees for drug abuse violations.

c. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will publish a statement notifying employees concerning (a) the prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by section 8355(a), and requiring that the employee agree to abide by the terms of that statement.

I also understand that if the District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of section 8355, that the Contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of the aforementioned Act.

I acknowledge that I am aware of the provisions of and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990 and Health and Safety Code section 11362.3.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.04

TOBACCO-FREE ENVIRONMENT CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This Tobacco-Free Environment Certification form is required from the successful Bidder.

Pursuant to, without limitation, 20 U.S.C. section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., Business and Professions Code section 22950 et seq., and District Board policies (if applicable), all District sites, including the Project site, are tobacco-free environments. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property. The prohibition on smoking includes the use of any electronic smoking device that creates an aerosol or vapor, in any manner or in any form, and the use of any oral smoking device for the purpose of circumventing the prohibition of tobacco smoking. Further, Health & Safety Code section 11362.3 prohibits the smoking or use of cannabis or cannabis products in any place where smoking tobacco is prohibited.

I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.05

HAZARDOUS MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

1. Contractor hereby certifies that no asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations, ("New Hazardous Material"), shall be furnished, installed, or incorporated in any way into the Project or in any tools, devices, clothing, or equipment used to affect any portion of Contractor's work on the Project for District.

2. Contractor further certifies that it has instructed its employees with respect to the above-mentioned standards, hazards, risks, and liabilities.

3. Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.

4. Any disputes involving the question of whether or not material is New Hazardous Material shall be settled by electron microscopy or other appropriate and recognized testing procedure, at the District's determination. The costs of any such tests shall be paid by Contractor if the material is found to be New Hazardous Material.

5. All Work or materials found to be New Hazardous Material or Work or material installed with equipment containing New Hazardous Material will be immediately rejected and this Work will be removed at Contractor's expense at no additional cost to the District.

6. Contractor has read and understood the document titled, "Hazardous Materials Procedures & Requirements" and shall comply with all the provisions outlined therein.

7. Contractor certifies that it is knowledgeable of, and shall comply with, all laws applicable to the Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.06

LEAD-BASED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This certification provides notice to the Contractor that:

(1) Contractor's work may disturb lead-containing building materials.

(2) Contractor shall notify the District if any work may result in the disturbance of lead-containing building materials.

(3) Contractor shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

1. Lead as a Health Hazard

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburses when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the Contractor and its employees will be providing services for the District, and because the Contractor's work may disturb lead-containing building materials, CONTRACTOR IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

8. Overview of California Law

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

Any school that undertakes any action to abate existing risk factors for lead is required to utilize trained and state-certified contractors, inspectors, and workers.

(Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and solders, or other potential sources of lead contamination, shall not be utilized in the construction of any new school facility or the modernization or renovation of any existing school facility. (Ed. Code, § 32244.)

Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and the California Division of Occupational Safety and Health ("Cal/OSHA") have implemented safety orders applicable to all construction work where a contractor's employee may be occupationally exposed to lead.

The OSHA Regulations apply to all construction work where a contractor's employee may be occupationally exposed to lead. The OSHA Regulations contain specific and detailed requirements imposed on contractors subject to those regulations. The OSHA Regulations define construction work as work for construction, alteration, and/or repair, including painting and decorating. Regulated work includes, but is not limited to, the following:

a. Demolition or salvage of structures where lead or materials containing lead are present;

b. Removal or encapsulation of materials containing lead;

c. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;

d. Installation of products containing lead;

e. Lead contamination/emergency cleanup;

f. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and

g. Maintenance operations associated with the construction activities described in the subsection.

Because it is assumed by the District that all painted surfaces (interior as well as exterior) within the District contain some level of lead, it is imperative that the Contractor, its workers and subcontractors fully and adequately comply with all applicable laws, rules and regulations governing lead-based materials (including title 8, California Code of Regulations, section 1532.1).

Contractor shall notify the District if any Work may result in the disturbance of lead-containing building materials. Any and all Work that may result in the disturbance of lead-containing building materials shall be coordinated through the District. A signed copy of this Certification shall be on file prior to beginning Work on the Project, along with all current insurance certificates.

1. Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic Substances Control Act

   The EPA requires lead safe work practices to reduce exposure to lead hazards created by renovation, repair and painting activities that disturb lead-based paint. Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes, childcare facilities, and schools built prior to 1978 must be conducted by certified renovations firms, using renovators with training by a EPA-accredited training provider, and fully and adequately complying with all applicable laws, rules and regulations governing lead-based materials, including those rules and regulations appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR 745).

   The RRP requirements apply to all contractors who disturb lead-based paint in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If a DPH-certified inspector or risk assessor determines that a home constructed before 1978 is lead-free, the federal certification is not required for anyone working on that particular building.

2. Contractor's Liability

   If the Contractor fails to comply with any applicable laws, rules, or regulations, and that failure results in a site or worker contamination, the Contractor will be held solely responsible for all costs involved in any required corrective actions, and shall defend, indemnify, and hold harmless the District, pursuant to the indemnification provisions of the Contract, for all damages and other claims arising therefrom.

   If lead disturbance is anticipated in the Work, only persons with appropriate accreditation, registrations, licenses, and training shall conduct this Work.

   It shall be the responsibility of the Contractor to properly dispose of any and all waste products, including, but not limited to, paint chips, any collected residue, or any other visual material that may occur from the prepping of any painted surface. It will be the responsibility of the Contractor to provide the proper disposal of any hazardous waste by a certified hazardous waste hauler. This company shall be registered with the Department of Transportation (DOT) and shall be able to issue a current manifest number upon transporting any hazardous material from any school site within the District.

   The Contractor shall provide the District with any sample results prior to beginning Work, during the Work, and after the completion of the Work. The District may request to examine, prior to the commencement of the Work, the lead training records of each employee of the Contractor.

THE CONTRACTOR HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE OWNER'S PROPERTY;

2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF OF AND BIND THE CONTRACTOR. THE DISTRICT MAY REQUIRE PROOF OF SUCH AUTHORITY.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.07

IMPORTED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This form shall be executed by all entities that, in any way, provide or deliver and/or supply any soils, aggregate, or related materials ("Fill") to the Project Site and shall be provided to the District at least ten (10) days before delivery. All Fill shall satisfy all requirements of any environmental review of the Project performed pursuant to the statutes and guidelines of the California Environmental Quality Act, section 21000 et seq. of the Public Resources Code ("CEQA"), and all requirements of section 17210 et seq. of the Education Code, including requirements for a Phase I environmental assessment acceptable to the State of California Department of Education and Department of Toxic Substances Control.

Certification of:
- □ Delivery Firm/Transporter
- □ Wholesaler
- □ Distributor
- □ Supplier
- □ Broker
- □ Other _____
- □ Manufacturer
- □ Retailer

Type of Entity
- □ Corporation
- □ Limited Partnership
- □ Sole Proprietorship
- □ General Partnership
- □ Limited Liability Company
- □ Other _____

Name of firm ("Firm"): _____

Mailing address: _____

Addresses of branch office used for this Project: _____

If subsidiary, name and address of parent company: _____

_____

By my signature below, I hereby certify that I am aware of section 25260 of the Health and Safety Code and the sections referenced therein regarding the definition of hazardous material. I further certify on behalf of the Firm that all soils, aggregates, or related materials provided, delivered, and/or supplied or that will be provided, delivered, and/or supplied by this Firm to the Project Site are free of any and all hazardous material as defined in section 25260 of the Health and Safety Code. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Proper Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.08

CRIMINAL BACKGROUND INVESTIGATION/FINGERPRINTING CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

The undersigned does hereby certify to the District that I am a representative of the Contractor currently under contract with the District; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Contractor.

Contractor certifies that it has taken at least one of the following actions (check all that apply):

☐ Pursuant to Education Code section 45125.2(a), Contractor has installed or will install, prior to commencement of Work, a physical barrier at the Work Site, that will limit contact between Contractor's employees, Subcontractors or suppliers and District pupils at all times; and/or

☐ Pursuant to Education Code section 45125.2(a), Contractor certifies that all employees will be under the continual supervision of, and monitored by, an employee of the Contractor who the California Department of Justice ("DOJ") has ascertained, or as described below, will ascertain, has not been convicted of a violent or serious felony. The name and title of the employee who will be supervising Contractor's and its subcontractors' or suppliers' employees is:

Name: _____

Title: _____

NOTE: If Contractor is a sole proprietor, and elects the above option, Contractor must have the above-named employee's fingerprints prepared and submitted by District for submission to the DOJ, in accordance with Education Code section 45125.1(h). No work shall commence until such determination by DOJ has been made.

☐ Pursuant to Education Code section 45125.2(a), the District will take appropriate steps to protect the safety of any pupils that may come in contact with Contractor's employees, subcontractors or suppliers so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.2 shall not apply to Contractor under the Contract.

☐ The Work on the Contract is either (i) at an unoccupied school site and no employee of Contractor and/or subcontractor or supplier of any tier of the Contract shall come in contact with the District pupils or (ii) if Contractor's employees or any subcontractor or supplier of any tier of the Contract interacts with pupils, such interaction shall only take place under the immediate supervision and control of the pupil's parent or guardian or a school employee, so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.1 shall not apply to Contractor under the Contract.

☐ The Contractor, who is not a sole proprietor, has complied with the fingerprinting requirements of Education Code section 45125.1 with respect to all Contractor's employees and all of its Subcontractors' employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and the DOJ has determined (A) that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). When the Contractor performs the criminal background check, it shall immediately provide any subsequent arrest and conviction information it receives to the District pursuant to the subsequent arrest service. No work shall commence until the Department of Justice ascertains that Contractor's employees and any subcontractors' employees have not been convicted of a felony as defined in Education Code Section 45122.1.

A complete and accurate list of Contractor's employees and of all of its subcontractors' employees who may come in contact with District pupils during the course and scope of the Contract is attached hereto as ATTACHMENT "A;" and/or

☐ The Contractor is a sole proprietor and intends to comply with the fingerprinting requirements of Education Code section 45125.1(h) with respect to all Contractor's employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and hereby agrees to the District's preparation and submission of fingerprints such that the DOJ may determine (A) that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). No work shall commence until the Department of Justice ascertains that Contractor's employees and any subcontractors' employees have not been convicted of a felony as defined in Education Code Section 45122.1.

Contractor's responsibility for background clearance extends to all of its employees, Subcontractors or suppliers, and employees of Subcontractors or suppliers coming into contact with District pupils regardless of whether they are designated as employees or acting as independent contractors of the Contractor.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

[CONTINUED ON NEXT PAGE]

ATTACHMENT "A"

List of Employees/Subcontractors

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

If further space is required for the list of employees/subcontractors, attach additional copies of this page.

END OF DOCUMENT

DOCUMENT 00 45 46.09

DRUG AND ALCOHOL-FREE SCHOOLS CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Pursuant to, without limitation, District Board policies, all District sites, including the Project site, are drug and alcohol-free schools. Possession, use, or dale of drugs and alcohol is prohibited at any time in district-owned or leased buildings, on district property, and in district vehicles unless otherwise permitted by law.

I acknowledge that I am aware of the District's policy regarding drug and alcohol-free schools, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to possess, use or sell:

1. Any substance which may not lawfully be possessed, used, or sold in California.

2. Cannabis or cannabis products (Health and Safety Code, § 11362.3; 21 USC §§ 812, 844).

3. Alcohol beverages, unless approved by the Superintendent or designee for limited purposes specified in Business and Professions Code section 25608.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.10

ROOFING PROJECT CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Pursuant to Public Contract Code section 3000, et seq. this form shall be executed by all contractors, materials manufacturers, or vendors involved in a bid or proposal for the repair or replacement of a roof of a public school building where the project is either for repair of more than 25% of the roof or that has a total cost more than $21,000 ("roofing project") and submitted to the District when the award is made.

Certification of: □ Contractor □ Materials Manufacturer
□ Vendor □ Other _____

I, _____, _____, certify that I have not
[Name] [Name of Firm]
offered, given, or agreed to give, received, accepted, or agreed to accept, any gift, contribution, or any financial incentive whatsoever to or from any person in connection with the roofing project contract. As used in this certification, "person" means any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Furthermore, I, _____, _____, certify that
[Name] [Name of Firm]
I do not have, and throughout the duration of the contract, I will not have, any financial relationship in connection with the performance of this contract with any architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor that is not disclosed below.

I, _____, _____, have the following
[Name] [Name of Firm]
financial relationships with an architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor, or other person in connection with the following roofing project contract (provide Name and Address of Building, and Contract Date and Number):

_____

_____

_____

_____

_____

_____

_____

By my signature below, I hereby certify that, to the best of my knowledge, the contents of this disclosure are true, or are believed to be true. I further certify on behalf of the Firm that I am aware of section 3000 et seq. of the California Public Contract Code, and the sections referenced therein regarding the penalties for providing false information or failing to disclose a financial relationship in this disclosure. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Proper Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.11

FEDERAL DEBARMENT CERTIFICATION

PROJECT/CONTRACT NO.: **Project Name Project No.** between the Lodi Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

1. Bidder certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or Board;

b. Have not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

d. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where Bidder is unable to certify to any of the statements in this certification, Bidder shall attach an explanation to this certification.

3. Bidder agrees to include the following certification in all subcontracts, for all lower tiers:

"Debarment and Suspension Certification – By submission of its proposal, the contractor (or vendor, or consultant, depending on the transaction) certifies to the best of its knowledge and belief that it and its principals are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency in accordance with 2 CFR 200.213 and 2 CFR 180."

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 46.12

BYRD ANTI-LOBBYING CERTIFICATION

(For federally funded contracts exceeding $100,000)

Applicable to Grants, Subgrants, Cooperative Agreements, and Contracts Exceeding $100,000 in Federal Funds

Submission of this certification is a prerequisite for making or entering into this transaction and is imposed by section 1352, Title 31, U.S. Code. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The undersigned certifies, to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents of all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub- recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, United States Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____

Contractor

_____

Address

_____

Certified by: (type or print)

_____

Title

_____

Signature

_____

Date

Disclosure of Lobbying Activities Approved by OMB 0348-004

Complete this form to disclose lobbying activities pursuant to 31 U.S.C.1352

(See following page for public burden disclosure)

1. Type of Federal Action: ☐ contract ☐ grant ☐ cooperative agreement loan ☐ loan guarantee ☐ loan insurance	**2. Status of Federal Action:** ☐ proposal/offer/application ☐ initial award ☐ post-award	**3. Report Type:** ☐ initial filing ☐ material change For material change only: **Year_____quarter _____** **Date of last report_____**

4. Name and Address of Reporting Entity: **_____Prime _____Subawardee** **Tier_____, if Known:** **Congressional District**, *if known*:	**5. If Reporting Entity in No. 4 is Subawardee,** Enter Name and Address of Prime: **Congressional District**, if known:
6. Federal Department/Agency:	**7. Federal Program Name/Description:** CFDA Number, *if applicable*: _____
8. Federal Action Number, *if known:*	**9. Award Amount,** *if known:* $
10a. Name and Address of Lobbying Registrant *(if individual, last name, first name, MI):*	**10b. Individuals Performing** Services *(including address if different from No. 10a)* *(last name, first name, MI):*
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	**Signature: _____** **Print Name: _____** **Title: _____** **Telephone No.: _____ Date: ____**
Federal Use Only	**Authorized for Local Reproduction** **Standard Form - LLL (Rev. 7-97)**

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to Title 31, U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitations for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Included prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.
    (b) Enter the full names of the individual(s) performing services, and include full address if different from 10(a). Enter Last Name, First Name, and Middle Initial (MI).

11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB control Number. The valid OMB control number for this

information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.

END OF DOCUMENT

DOCUMENT 00 45 49

REGISTERED SUBCONTRACTORS LIST

(Labor Code Section 1771.1)

(Not required for construction projects less than $25,000 or maintenance projects less than $15,000)

PROJECT: **Project Name Project No.**

Date Submitted (for Updates): _____

Contractor acknowledges and agrees that it must clearly set forth below the name and Department of Industrial Relations (DIR) registration number of each subcontractor **for all tiers** who will perform work or labor or render service to Contractor or its subcontractors in or about the construction of the Work **at least two (2) weeks before the subcontractor is scheduled to perform work**. This document is to be updated as all tiers of subcontractors are identified.

Contractor acknowledges and agrees that, if Contractor fails to list as to any subcontractor of any tier who performs any portion of Work, the Contract is subject to cancellation and the Contractor will be subjected to penalty under applicable law.

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 90
POST BID INTERVIEW

PART 1 – GENERAL

1.01 SUMMARY

If requested by the District, this Section requires the apparent low bidder to attend and participate in a Post Bid Interview with the Construction Manager, prior to award of any contract by the District. The Post Bid Interview will be scheduled by the Construction Manager within three (3) calendar days after the date of bid.

1.02 REQUIRED ATTENDANCE

A. A duly authorized representative of the apparent low bidder is required to attend the Post Bid Interview, in person.

B. The apparent low bidder's authorized representative(s) must have (1) knowledge of how the bid submitted was prepared, (2) the person responsible for supervising performance of the Work, and (3) the authority to bind the apparent low bidder.

C. Failure to attend the Post Bid Interview as scheduled will be considered just cause for the District to reject the Bid as nonresponsive.

1.03 POST BID INTERVIEW PROCEDURE

A. The Construction Manager will review the Bid with the attendees.

B. The Construction Manager will review the Contract Documents with the attendees, including but not limited to:

(1) Insurance
(2) Bonding
(3) Addenda
(4) Pre-Bid Clarifications
(5) Scope of Work
(6) Bid Packages Descriptions
(7) Bid Alternates
(8) Contract Plans
(9) Contract Specifications
(10) Project Schedule and Schedule Requirements
(11) Critical Dates Requirement for Other Bid Packages
(12) Prevailing Wage Requirements
(13) Liquidated Damages
(14) Required Documentation for Contract Administration
(15) Contract Coordination Requirements

1.04 POST BID INTERVIEW DOCUMENTATION

The Construction Manager will document the Post Bid Interview on the form attached to this Section. Both the apparent low bidder and the Construction Manager are required to sign the Post Bid Interview Documentation.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

POST BID INTERVIEW

CONSTRUCTION MANAGER

[Name]
[Address 1]
[Address 2]
[Phone] [Fax]

BIDDER: _____

DATE: _____ TIME: _____PHONE: _____

I. INTRODUCTIONS:

A. Present

_____
CONTRACTOR CONTRACTOR

_____

_____
[CM] [CM]

II. PROPOSED CONTRACT:

III. PURPOSE OF INTERVIEW IS TO ASSURE A MUTUAL UNDERSTANDING OF THE FOLLOWING:

A. Do you acknowledge submission of a complete and accurate bid? Yes No

B. Do you acknowledge the Bid Document submittal timelines after NOA and NTP and can you meet those timelines? Yes No

C. Do you acknowledge the requirements for the escrow of bid documents? Yes No

D. Are you comfortable with your listed subcontractors? Yes No

IV. CONTRACTUAL REQUIREMENTS:

A. Do you understand you are a prime contractor? Yes No

B. Can you meet specified insurance requirements? Yes No

1. Do any of your policies that require Additional Insured endorsements exceed the minimum coverage requirements? Yes No

2. Are you requesting that the District accept an Excess Liability Insurance Policy to meet the policy limit? Yes No

3. Will there be a gap between the per occurrence amount of any underlying policy and the start of the coverage under the Umbrella or Excess Liability Insurance Policy? Yes No

C. Will you provide the Performance Bond and Labor and Material Bond for 100% of the Contract Price as stipulated? Yes No

1. Cost for bonds: _____% Yes No

2. Is the cost of your bonds in your base bid? Yes No

3. Is your surety licensed to issue bonds in California? Yes No

D. Do you understand the fingerprinting requirements? Yes No

E. Is it understood that all workers must be paid prevailing wage? Yes No

F. Is it understood that all subcontractors of every tier must be registered as a public works contractor with the Department of Industrial Relations? Yes No

V. SCOPE OF WORK:

A. Acknowledged Receipt of Addenda #1-_____ Yes No

B. Are the costs for addenda items included in your bid? (if applicable) Yes No

C. Do you have a complete understanding of your Scope of Work under the proposed Agreement? Yes No

D. You have re-reviewed the documents and understand the Scope of the Work. Are there any items that require clarification? Yes No

If yes, please identify them.

1. _____

_____

2. _____

_____

3. _____

Is (are) there additional cost(s) for the above item(s)? Yes No

E. Is the cost for owner-controlled contingency included in your bid? Yes No

F. Have you reviewed bid alternative(s) #1-_____? (if applicable) Yes No

G. Are the costs for bid alternatives included in your bid? Yes No

H. Are the plans and specifications clear and understandable to your satisfaction? Yes No

I. Do you acknowledge that the time to submit notice of requests for substitution of specified materials has expired? Yes No

VI. SCHEDULE:

A. Do you acknowledge and agree to the stipulated completion dates and milestones in the contract? Yes No

1. Will you provide a detailed construction schedule to _____ within the required ten (10) days of the Notice to Proceed, per the contract? Yes No
2. Can you meet the submittal deadline? Yes No
3. It is understood that the Project schedule is critical and that that weekend and overtime work may be required to meet the milestones. Yes No
4. It is understood that if rain does occur, then all dewatering and protection of work is required, per the contract. If not, what do you believe must change and why? Yes No

_____

_____

_____

B. Identify critical materials, deliveries, long lead items and other dependencies, including Owner Furnished items that could affect the completion of your work. Yes No

1. _____
2. _____
3. _____
4. _____
5. _____

C. Do you understand that there is going to be maintenance and other construction taking place on site during the course of the project? Yes No

VII. EXECUTION OF WORK

A. Do you understand the access to the site? Yes No

B. Do you understand the staging area restrictions? Yes No

C. Have you included protection of [asphalt, floors, and roofs]? Yes No

D. Do you understand that the site is occupied by students, teachers, administrators, parents, etc.?

VIII. CONTRACTOR COMMENTS/SUGGESTIONS:

1. _____
2. _____
3. _____
4. _____
5. _____

IX. CONTRACTOR

You agree the information contained herein is part of your contractual obligations. Your signature acknowledges your agreement to perform all Work in the Contract Documents, and that costs for all Work are included in your bid.

The foregoing information is true and accurate, and I am authorized to sign as an officer of the company I am representing.

[Company Name]

Signature _____ Title: _____

Date: _____

X. CONSTRUCTION MANAGER

Signature _____ Title: _____

Date: _____

Title of Document: POST BID INTERVIEW
Number of Pages: _____
Date of Document: _____

END OF DOCUMENT

DOCUMENT 00 51 00
NOTICE OF AWARD

Dated: _____ 20__

To: _____ (Contractor)

_____
(Address)

From: Governing Board ("Board") of the Lodi Unified School District ("District")

Re: _____, Project No. _____ ("Project").

Contractor has been awarded the Contract for the above-referenced Project on _____ _____, 20__, by action of the District's Board.

The Contract Price is _____ Dollars ($_____), and includes alternates _____.

Three (3) copies of each of the Contract Documents (except Drawings) accompany this Notice of Award. Three (3) sets of the Drawings will be delivered separately or otherwise made available. Additional copies are available at cost of reproduction.

You must comply with the following conditions precedent within **SEVEN (7)** calendar days of the date of this Notice of Award.

The Contractor shall execute and submit the following documents by 5:00 p.m. of the **SEVENTH (7th)** calendar day following the date of the Notice of Award.

a. Agreement: To be executed by successful Bidder. Submit three (3) copies, each bearing an original signature.

b. Escrow of Bid Documentation: This must include all required documentation. See the document titled Escrow Bid Documentation for more information.

c. Performance Bond (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.

d. Payment Bond (Contractor's Labor & Material Bond) (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.

e. Insurance Certificates and Endorsements as required.

f. Workers' Compensation Certification.

g. Prevailing Wage and Related Labor Requirements Certification.

h. Disabled Veteran Business Enterprise Participation Certification. ***(If Applicable)***

i. Drug-Free Workplace Certification. ***(If Applicable)***

j. Tobacco-Free Environment Certification. ***(If Applicable)***

k. Hazardous Materials Certification. ***(If Applicable)***

l. Lead-Based Materials Certification. ***(If Applicable)***

m. Imported Materials Certification. ***(If Applicable)***

n. Criminal Background Investigation/Fingerprinting Certification.

o. Roofing Project Certification: from Contractor, Material Manufacturer and/or Vendor. ***(If Applicable)***

Failure to comply with these conditions within the time specified will entitle District to consider your bid abandoned, to annul this Notice of Award, and to declare your Bid Security forfeited, as well as any other rights the District may have against the Contractor.

After you comply with those conditions, District will return to you one fully signed counterpart of the Agreement.

LODI UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

DOCUMENT 00 52 13
AGREEMENT

THIS AGREEMENT IS MADE AND ENTERED INTO THIS _____ DAY OF _____ _____, 20___, by and between the Lodi Unified School District ("District") and _____ _____ ("Contractor") ("Agreement").

WITNESSETH: That the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree with each other, as follows:

3. **The Work**: Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, and material necessary to perform and complete in a good and workmanlike manner, the work of the following project:

   Project Name Project No.

   ("Project" or "Contract" or "Work")

   It is understood and agreed that the Work shall be performed and completed as required in the Contract Documents including, without limitation, the Drawings and Specifications and submission of all documents required to secure funding or by the Division of the State Architect for close-out of the Project, under the direction and supervision of, and subject to the approval of, the District or its authorized representative.

4. **The Contract Documents**: The complete Contract consists of all Contract Documents as defined in the General Conditions and incorporated herein by this reference. Any and all obligations of the District and Contractor are fully set forth and described in the Contract Documents. All Contract Documents are intended to cooperate so that any Work called for in one and not mentioned in the other or vice versa is to be executed the same as if mentioned in all Contract Documents.

5. **Interpretation of Contract Documents**: Should any question arise concerning the intent or meaning of Contract Documents, including the Drawings or Specifications, the question shall be submitted to the District for interpretation. If a conflict exists in the Contract Documents, valid, written modifications, beginning with the most recent, shall control over this Agreement (if any), which shall control over the Special Conditions, which shall control over any Supplemental Conditions, which shall control over the General Conditions, which shall control over the remaining Division 0 documents, which shall control over Division 1 Documents which shall control over Division 2 through Division 49 documents, which shall control over figured dimensions, which shall control over large-scale drawings, which shall control over small-scale drawings. In the case of a discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In no case shall a document calling for lower quality and/or quantity material or workmanship control. The decision of the District in the matter shall be final.

6. **Time for Completion**: It is hereby understood and agreed that the Work under this Contract shall be completed within (__) consecutive calendar days ("Contract Time") from the date specified in the District's Notice to Proceed.

7. **Completion - Extension of Time**: Should the Contractor fail to complete this Contract, and the Work provided herein, within the time fixed for completion, due allowance being made for the contingencies provided for herein, the Contractor shall become liable to the District for all loss and damage that the District may suffer on account thereof. The Contractor shall coordinate its Work with the Work of all other contractors. The District shall not be liable for delays resulting from Contractor's failure to coordinate its Work with other contractors in a manner that will allow timely completion of Contractor's Work. Contractor shall be liable for delays to other contractors caused by Contractor's failure to coordinate its Work with the Work of other contractors.

8. **Liquidated Damages**: Time is of the essence for all work under this Agreement. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage that the District will sustain in the event of and by reason of Contractor's delay; therefore, Contractor agrees that it shall pay to the District the sum of Five Hundred Dollars ($500) per day as liquidated damages for each and every day's delay beyond the time herein prescribed in completion of the Work.

   It is hereby understood and agreed that this amount is not a penalty.

   In the event that any portion of the liquidated damages is not paid to the District, the District may deduct that amount from any money due or that may become due the Contractor under this Agreement, and such deduction does not constitute a withholding or penalty. The District's right to assess liquidated damages is as indicated herein and in the General Conditions.

   The time during which the Contract is delayed for cause, as hereinafter specified, may extend the time of completion for a reasonable time as the District may grant, provided that Contractor has complied with the claims procedure of the Contract Documents. This provision does not exclude the recovery of damages by either party under other provisions in the Contract Documents.

9. **Loss Or Damage**: The District and its agents and authorized representatives shall not in any way or manner be answerable or suffer loss, damage, expense, or liability for any loss or damage that may happen to the Work, or any part thereof, or in or about the same during its construction and before acceptance, and the Contractor shall assume all liabilities of every kind or nature arising from the Work, either by accident, negligence, theft, vandalism, or any cause whatsoever; and shall hold the District and its agents and authorized representatives harmless from all liability of every kind and nature arising from accident, negligence, or any cause whatsoever.

10. **Limitation Of District Liability:** District’s financial obligations under this Contract shall be limited to the payment of the compensation provided in this Contract. Notwithstanding any other provision of this Contract, in no event shall District be liable, regardless of whether any claim is based on contract or tort, for any special, consequential, indirect or incidental damages, including, but not limited to, lost profits or revenue, lost bonding capacity, arising out of or in connection with this Contract for the services performed in connection with this Contract.

11. **Insurance and Bonds**: Prior to issuance of the Notice to Proceed by the District, Contractor shall provide all required certificates of insurance, insurance endorsements, and payment and performance bonds as evidence thereof.

For projects where the District implements an Owner-Controlled or Wrap-Up Insurance Program (OCIP), the Contractor and all Subcontractors under the Contractor are required to participate in and comply with the OCIP. In such instances, prior to the issuance of the Notice to Proceed by the District, the Contractor shall submit all necessary certificates of insurance and insurance endorsements, except for those coverages provided by the OCIP as detailed in the OCIP Manual. The requirement to provide payment and performance bonds remains applicable.

12. **Prosecution of Work**: If the Contractor should neglect to prosecute the Work properly or fail to perform any provisions of this Contract, the District, may, pursuant to the General Conditions and without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

13. **Authority of Architect, Project Inspector, and DSA**: Contractor hereby acknowledges that the Architect(s), the Project Inspector(s), and the Division of the State Architect ("DSA") have authority to approve and/or suspend Work if the Contractor's Work does not comply with the requirements of the Contract Documents, Title 24 of the California Code of Regulations, and all applicable laws and regulations. The Contractor shall be liable for any delay caused by its non-compliant Work.

14. **Assignment of Contract**: Neither the Contract, nor any part thereof, nor any moneys due or to become due thereunder, may be assigned by the Contractor without the prior written approval of the District, nor without the written consent of the Surety on the Contractor's Performance Bond (the "Surety"), unless the Surety has waived in writing its right to notice of assignment.

15. **Classification of Contractor's License**: Contractor hereby acknowledges that it currently holds valid Type "A, B, and/or C- " Contractor's license(s) issued by the State of California, Contractors' State License Board, in accordance with division 3, chapter 9, of the Business and Professions Code and in the classification called for in the Contract Documents.

16. **Registration as Public Works Contractor**: The Contractor and all Subcontractors currently are registered as public works contractors with the Department of Industrial Relations, State of California, in accordance with Labor Code section 1771.1.

17. **Payment of Prevailing Wages**: The Contractor and all Subcontractors shall pay all workers on all Work performed pursuant to this Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to sections 1770 et seq. of the California Labor Code.

    For Projects Utilizing Federal Funds: In addition to the above, the Contractor and all Subcontractors must comply with the Davis-Bacon Act, applicable reporting requirements, and any other relevant federal funding requirements. In instances where a conflict arises between state and federal wage provisions, the more

stringent requirement shall prevail. This additional compliance is required only for projects that utilize federal funds.

18. **Labor Compliance Monitoring and Enforcement**: This Project is subject to labor compliance monitoring and enforcement by the Department of Industrial Relations pursuant to Labor Code section 1771.4 and Title 8 of the California Code of Regulations. Contractor specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code, including, without limitation, the requirement that the Contractor and all of its Subcontractors shall timely submit complete and accurate electronic certified payroll records as required by the Contract Documents, or the District may not issue payment.

19. **Contract Price**: In consideration of the foregoing covenants, promises, and agreements on the part of the Contractor, and the strict and literal fulfillment of each and every covenant, promise, and agreement, and as compensation agreed upon for the Work and construction, erection, and completion as aforesaid, the District covenants, promises, and agrees that it will well and truly pay and cause to be paid to the Contractor in full, and as the full Contract Price and compensation for construction, erection, and completion of the Work hereinabove agreed to be performed by the Contractor, the following price:

_____ Dollars

($_____),

in lawful money of the United States, which sum is to be paid according to the schedule provided by the Contractor and accepted by the District and subject to additions and deductions as provided in the Contract. This amount supersedes any previously stated and/or agreed to amount(s). Contract Price includes Contingency, if any.

20. **No Representations:** No representations have been made other than as set forth in writing in the Contract Documents, including this Agreement. Each of the Parties to this Agreement warrants that it has carefully read and understood the terms and conditions of this Agreement and all Contract Documents, and that it has not relied upon the representations or advice of any other Party or any attorney not its own.

21. **Entire Agreement:** The Contract Documents, including this Agreement, set forth the entire agreement between the parties hereto and fully supersede any and all prior agreements, understandings, written or oral, between the parties hereto pertaining to the subject matter thereof.

22. **Severability**: If any term, covenant, condition, or provision in any of the Contract Documents is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the provisions in the Contract Documents shall remain in full force and effect and shall in no way be affected, impaired, or invalidated thereby.

23. **Authority of Signatories**: Each party has the full power and authority to enter into and perform this Contract, and the person signing this Contract on behalf of each party has been properly authorized and empowered to enter into this Contract. This Contract may be executed in one or more counterparts, each of which shall be

deemed an original. For this Agreement, and for all Contract Documents requiring a signature, a facsimile or electronic signature shall be deemed to be the equivalent of the actual original signature. All counterparts so executed shall constitute one Contract binding all the Parties hereto.

IN WITNESS WHEREOF, accepted and agreed on the date indicated above:

[CONTRACTOR NAME]	**LODI UNIFIED SCHOOL DISTRICT**
_____	_____
By: _____	By: _____
Title: _____	Title: _____

NOTE: If the party executing this Contract is a corporation, a certified copy of the by-laws, or of the resolution of the Board of Directors, authorizing the officers of said corporation to execute the Contract and the bonds required thereby must be attached hereto.

END OF DOCUMENT

DOCUMENT 00 55 00

NOTICE TO PROCEED

Dated: _____, 20___

TO: _____
("Contractor")

ADDRESS: _____

PROJECT:_____

PROJECT/CONTRACT NO.: _____ between the Lodi Unified School District and Contractor ("Contract").

You are notified that the Contract Time under the above Contract will commence to run on _ _____, 20___. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement executed by Contractor, the date of completion is _____, 20___.

You must submit the following documents by 5:00 p.m. of the TENTH (10th) calendar day following the date of this Notice to Proceed:

a. Contractor's preliminary schedule of construction.

b. Contractor's preliminary schedule of values for all of the Work.

c. Contractor's preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals.

d. Contractor's Safety Plan specifically adapted for the Project.

e. Registered Subcontractors List: A complete subcontractors list for all tiers, including the name, Department of Industrial Relations registration number, and portion of work.

Thank you. We look forward to a very successful Project.

LODI UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

DOCUMENT 00 56 00
ESCROW BID DOCUMENTATION

1. Requirement to Escrow Bid Documentation

a. Contractor shall submit, within **SEVEN (7)** calendar days after the date of the Notice of Award, one copy of all documentary information received or generated by Contractor in preparation of bid prices for this Contract, as specified herein. This material is referred to herein as "Escrow Bid Documentation." The Escrow Bid Documentation of the Contractor will be held in escrow for the duration of the Contract.

b. Contractor agrees, as a condition of award of the Contract, that the Escrow Bid Documentation constitutes all written information used in the preparation of its bid, and that no other written bid preparation information shall be considered in resolving disputes or claims. Contractor also agrees that nothing in the Escrow Bid Documentation shall change or modify the terms or conditions of the Contract Documents.

c. The Escrow Bid Documentation will not be opened by District except as indicated herein. The Escrow Bid Documentation will be used only for the resolution of change orders and claims disputes.

d. Contractor's submission of the Escrow Bid Documentation, as with the bonds and insurance documents required, is considered an essential part of the Contract award. Should the Contractor fail to make the submission within the allowed time specified above, District may deem the Contractor to have failed to enter into the Contract, and the Contractor shall forfeit the amount of its bid security, accompanying the Contractor's bid, and District may award the Contract to the next lowest responsive responsible bidder.

e. NO PAYMENTS WILL BE MADE, NOR WILL DISTRICT ACCEPT PROPOSED CHANGE ORDERS UNTIL THE ABOVE REQUIRED INFORMATION IS SUBMITTED AND APPROVED.

f. The Escrow Bid Documentation shall be submitted in person by an authorized representative of the Contractor to the District.

2. Ownership of Escrow Bid Documentation

a. The Escrow Bid Documentation is, and shall always remain, the property of Contractor, subject to review by District, as provided herein.

b. Escrow Bid Documentation constitute trade secrets, not known outside Contractor's business, known only to a limited extent and only by a limited number of employees of Contractor, safeguarded while in Contractor's possession, extremely valuable to Contractor, and could be extremely valuable to Contractor's competitors by virtue of reflecting Contractor's contemplated techniques of construction. Subject to the provisions herein, District agrees to safeguard the Escrow Bid Documentation, and all

information contained therein, against disclosure to the fullest extent permitted by law.

3. Format and Contents of Escrow Bid Documentation

a. Contractor may submit Escrow Bid Documentation in its usual cost-estimating format; a standard format is not required. The Escrow Bid Documentation shall be submitted in the language (e.g., English) of the specification.

b. Escrow Bid Documentation must clearly itemize the estimated costs of performing the work of each bid item contained in the bid schedule, separating bid items into sub-items as required to present a detailed cost estimate and allow a detailed cost review. The Escrow Bid Documentation shall include all subcontractor bids or quotes, supplier bids or quotes, quantity takeoffs, crews, equipment, calculations of rates of production and progress, copies of quotes from subcontractors and suppliers, and memoranda, narratives, add/deduct sheets, and all other information used by the Contractor to arrive at the prices contained in the bid proposal. Estimated costs should be broken down into Contractor's usual estimate categories such as direct labor, repair labor, equipment ownership and operation, expendable materials, permanent materials, and subcontract costs as appropriate. All labor rates must be broken down to specify any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind. Plant and equipment and indirect costs should be detailed in the Contractor's usual format. The Contractor's allocation of indirect costs, contingencies, markup, and other items to each bid item shall be identified.

c. All costs shall be identified. For bid items amounting to less than $10,000, estimated unit costs are acceptable without a detailed cost estimate, provided that labor, equipment, materials, and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and markup, as applicable, are allocated.

d. Bid Documentation provided by District should not be included in the Escrow Bid Documentation unless needed to comply with the following requirements.

4. Submittal of Escrow Bid Documentation

a. The Escrow Bid Documentation shall be submitted by the Contractor in a sealed container within **SEVEN (7)** calendar days after the date of the Notice of Award. The container shall be clearly marked on the outside with the Contractor's name, date of submittal, project name and the words "Escrow Bid Documentation – Intended to be opened in the presence of Authorized Representatives of Both District and Contractor".

b. By submitting Escrow Bid Documentation, Contractor represents that the material in the Escrow Bid Documentation constitutes all the documentary information used in preparation of the bid and that the Contractor has personally examined the contents of the Escrow Bid Documentation container and has found that the documents in the container are complete.

c. If Contractor's proposal is based upon subcontracting any part of the work, each subcontractor whose total subcontract price exceeds 5 percent of the total contract price proposed by Contractor, shall provide separate Escrow Documents to be included with those of Contractor. Those documents shall be opened and examined in the same manner and at the same time as the examination described above for Contractor.

d. If Contractor wishes to subcontract any portion of the Work after award, District retains the right to require Contractor to submit Escrow Documents for the Subcontractor before the subcontract is approved.

5. Storage, Examination and Final Disposition of Escrow Bid Documentation

a. The Escrow Bid Documentation will be placed in escrow, for the life of the Contract, in a mutually agreeable institution. The cost of storage will be paid by Contractor for the duration of the project until final Contract payment. The storage facilities shall be the appropriate size for all the Escrow Bid Documentation and located conveniently to both District's and Contractor's offices.

b. The Escrow Bid Documentation shall be examined by both District and Contractor, at any time deemed necessary by either District or Contractor, to assist in the negotiation of price adjustments and change orders or the settlement of disputes and claims. In the case of legal proceedings, Escrow Bid Documentation shall be used subject to the terms of an appropriate protective order if requested by Contractor and ordered by a court of competent jurisdiction. Examination of the Escrow Bid Documentation is subject to the following conditions:

(1) As trade secrets, the Escrow Bid Documentation is proprietary and confidential to the extent allowed by law.

(2) District and Contractor shall each designate, in writing to the other party **SEVEN (7)** calendar days prior to any examination, the names of representatives who are authorized to examine the Escrow Bid Documentation. No other person shall have access to the Escrow Bid Documentation.

(3) Access to the documents may take place only in the presence of duly designated representatives of the District and Contractor. If Contractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative may examine the Escrow Bid Documents alone upon an additional **THREE (3)** calendar days' notice if a representative of the Contractor does not appear at the time set.

(4) If a subcontractor has submitted sealed information to be included in the Escrow Bid Documents, access to those documents may take place only in the presence of a duly designated representative of the District, Contractor and that subcontractor. If that subcontractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative and/or the

Contractor may examine the Escrow Bid Documentation without that subcontractor present upon an additional **THREE (3)** calendar days' notice if a representative of that subcontractor does not appear at the time set.

c. The Escrow Bid Documentation will be returned to Contractor at such time as the Contract has been completed and final settlement has been achieved.

END OF DOCUMENT

DOCUMENT 00 57 00

ESCROW AGREEMENT IN LIEU OF RETENTION

(Public Contact Code Section 22300)

(Note: Contractor must use this form.)

This Escrow Agreement in Lieu of Retention ("Escrow Agreement") is made and entered into this _____ day of _____, 20___, by and between the Lodi Unified School District ("District"), whose address is 1305 East Vine Street, Lodi, California 95240, and _____ ("Contractor"), whose address is _____ _____ , and _____ ("Escrow Agent"), a state or federally chartered bank in the state of California, whose address is _____.

For the consideration hereinafter set forth, District, Contractor, and Escrow Agent agree as follows:

24. Pursuant to section 22300 of Public Contract Code of the State of California, which is hereby incorporated by reference, Contractor has the following two (2) options:

    ☐ Deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to the Construction Contract No.___ entered into between District and Contractor for the _____ _____ Project, in the amount of _____ Dollars ($_____) dated, _____, 20_____, (the "Contract"); **or**

    ☐ On written request of Contractor, District shall make payments of the retention earnings for the above referenced Contract directly to Escrow Agent.

    When Contractor deposits the securities as a substitute for Contract earnings (first option), Escrow Agent shall notify District within ten (10) calendar days of the deposit. The market value of the securities at the time of substitution and at all times from substitution until the termination of the Escrow Agreement shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between District and Contractor.

    Securities shall be held in the name of Lodi Unified School District, and shall designate Contractor as beneficial owner.

25. District shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified above.

26. When District makes payment of retentions earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow

Agreement and the rights and responsibilities of the Parties shall be equally applicable and binding when District pays Escrow Agent directly.

27. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. The District will charge Contractor $_____ for each of District's deposits to the escrow account. These expenses and payment terms shall be determined by District, Contractor, and Escrow Agent.

28. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to District.

29. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Contractor.

30. District shall have the right to draw upon the securities and/or withdraw amounts from the Escrow Account in the event of default by Contractor. Upon seven (7) days' written notice to Escrow Agent from District of the default, if applicable, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District. Escrow Agent shall not be authorized to determine the validity of any notice of default given by District pursuant to this paragraph, and shall promptly comply with District's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to a conflicting demand.

31. Upon receipt of written notification from District certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.

32. Escrow Agent shall rely on written notifications from District and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and District and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

33. Names of persons who are authorized to give written notice or to receive written notice on behalf of District and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of District:	On behalf of Contractor:
Title	Title
Name	Name
Signature	Signature
Address	Address

On behalf of Escrow Agent:

Title

Name

Signature

Address

At the time that the Escrow Account is opened, District and Contractor shall deliver to Escrow Agent a fully executed copy of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

On behalf of District:	On behalf of Contractor:
Title	Title
Name	Name
Signature	Signature
Address	Address

END OF DOCUMENT

DOCUMENT 00 61 13.13
PERFORMANCE BOND

(100% of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Lodi Unified School District, ("District") and _____ _____ ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

_____

("Project" or "Contract") which Contract dated _____, 20___, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of the Contract to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, the Principal and _____ _____ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of

_____

Dollars ($_____), lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

- Promptly perform all the work required to complete the Project; and
- Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Contract Price," and to pay and perform all obligations of Principals under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the District under the Contract and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. District shall not be required or obligated to accept a tender of a completion contractor from the Surety for any or no reason.

The condition of the obligation is such that, if the above bound Principal, its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in the Contract and any alteration

thereof made as therein provided, on its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warrantees of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents, as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

Surety expressly agrees that the District may reject any contractor or subcontractor proposed by Surety to fulfill its obligations in the event of default by the Principal. Surety shall not utilize Principal in completing the Work nor shall Surety accept a Bid from Principal for completion of the Work if the District declares the Principal to be in default and notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond. The Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond by any overpayment or underpayment by the District that is based upon estimates approved by the Architect. The Surety does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or to the specifications.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20___.

Principal	Surety
By	By
	Name of California Agent of Surety
	Address of California Agent of Surety
	Telephone No. of California Agent of Surety

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

DOCUMENT 00 61 13.16
PAYMENT BOND

Contractor's Labor & Material Bond
(100% Of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)
KNOW ALL PERSONS BY THESE PRESENTS:
WHEREAS, the governing board ("Board") of the Lodi Unified School District, ("District") and , ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

("Project" or "Contract") which Contract dated , 20___, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and
WHEREAS, pursuant to law and the Contract, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Contract is awarded in an amount equal to one hundred percent (100%) of the Contract price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the Civil Code, and division 2, part 7, of the Labor Code.
NOW, THEREFORE, the Principal and ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of Dollars ($), lawful money of the United States, being a sum not less than the total amount payable by the terms of Contract, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.
The condition of this obligation is that if the Principal or any of its subcontractors, or their heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, materials, provisions, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or any of his or its subcontractors of any tier under Section 13020 of the Unemployment Insurance Code with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.
It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.
Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise it shall be and remain in full force and affect.
And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of Contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the day of , 20___.

Principal	Surety
By	By
	Name of California Agent of Surety
	Address of California Agent of Surety
	Telephone No. of California Agent of Surety

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

DOCUMENT 00 63 40

CONTINGENCY EXPENDITURE DIRECTIVE

Project: _____ **Date:** _____
Bid No.: _____ **DSA File No.:**_____
PCO No.: _____ **DSA Appl. No.**_____

You are hereby directed to proceed with the following change(s) in this Contract:

(Contractor documentation supporting proper completion of work must be attached.)

Total Contract Contingency Amount:	$
Amount of Previously Approved Contingency Expenditure Directive(s):	$
Amount of this Contingency Expenditure Directive:	$

The undersigned Contractor approves the foregoing release of Contingency for completion of each specified item, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq. This Contingency Expenditure Directive must be signed by an authorized District representative. It is expressly understood that the authorized contingency expenditure granted herein represents a full accord and satisfaction for any and all cost impacts of the items herein, and Contractor waives any and all further compensation based on the items herein. The value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, and its subcontractors, both direct and indirect. Any costs, expenses, or damages not included are deemed waived.

Signatures:

DISTRICT: LODI UNIFIED SCHOOL DISTRICT Date: _____ By:_Edith Holbert, Executive Director of Ops.	**CONTRACTOR:** _____ Date: _____ By:_____ [Print Name and Title here]
ARCHITECT: _____ Date: _____ By:_____ [Print Name and Title here]	**CM:** _____ Date: _____ By:_____ [Print Name and Title here]

END OF DOCUMENT

DOCUMENT 00 63 40.1

ALLOWANCE EXPENDITURE DIRECTIVE

Project: _____ **Date:** _____
Bid No.: _____ **DSA File No.:**_____
PCO No.: _____ **DSA Appl. No.**_____

You are hereby directed to proceed with the following change(s) in this Contract:

(Contractor documentation supporting proper completion of work must be attached.)

Total Contract Allowance Amount:	$
Amount of Previously Approved Allowance Expenditure Directive(s):	$
Amount of this Allowance Expenditure Directive:	$

The undersigned Contractor approves the foregoing release of Allowance for completion of each specified item, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq. This Allowance Expenditure Directive must be signed by an authorized District representative. It is expressly understood that the authorized allowance expenditure granted herein represents a full accord and satisfaction for any and all cost impacts of the items herein, and Contractor waives any and all further compensation based on the items herein. The value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, and its subcontractors, both direct and indirect. Any costs, expenses, or damages not included are deemed waived.

Signatures:

DISTRICT: LODI UNIFIED SCHOOL DISTRICT Date: _____ By:_Edith Holbert, Executive Director of Ops.	**CONTRACTOR:** _____ Date: _____ By:_____ [Print Name and Title here]
ARCHITECT: _____ Date: _____ By:_____ [Print Name and Title here]	**CM:** _____ Date: _____ By:_____ [Print Name and Title here]

END OF DOCUMENT

DOCUMENT 00 63 47

DAILY FORCE ACCOUNT REPORT

From: Contractor
[Name/Address]

To: Owner
[Name/Address]

Project: _____

Contractor hereby submits this Daily Force Account Report for Work performed, pursuant to Force Account Directive No. _____, on _____.
[Date of Work]

Contractor attests that the material, labor, and equipment itemized herein were used only on the force account work.

A. Material: *Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.*

Description	Unit Price	Quantity	Cost

Daily subtotal (w/out markup): $_____

B. Labor: *Labor must be fully Burdened. Attach timesheets, if applicable, and complete the information below.*

Name	Craft	Regular Hrs.	Rate	OT Hrs.	Rate

Daily subtotal (w/out markup): $_____

C. **Equipment:** *Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.*

Type / Model	Hrs. Operated	Rate

Daily subtotal (w/out markup): $_____

Complete based on information reported above.

	WORK PERFORMED OTHER THAN BY CONTRACTOR	ADD
(a)	**Material**	
(b)	**Add Labor**	
(c)	**Add Equipment**	
(d)	**Subtotal**	
(e)	**Add overhead and profit for any and all tiers of Subcontractor**, the total not to exceed ten percent (10%) of Item (d)	
(f)	**Subtotal**	
(g)	**Add Overhead and Profit for Contractor**, not to exceed five percent (5%) of Item (f)	
(h)	**Subtotal**	
(i)	**Add Bond and Insurance**, not to exceed two percent (2%) of Item (h)	
(j)	**TOTAL**	

	WORK PERFORMED BY CONTRACTOR	ADD
(a)	**Material**	
(b)	**Add Labor**	
(c)	**Add Equipment**	
(d)	**Subtotal**	
(e)	**Add Overhead and Profit for Contractor**, not to exceed fifteen percent (15%) of Item (d)	
(f)	**Subtotal**	
(g)	**Add Bond and Insurance**, not to exceed two percent (2%) of Item (f)	
(h)	**TOTAL**	

Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act (Gov. Code, § 12650 et seq.).

It is expressly understood that all force account work for the date stated above must be reported herein, and Contractor may not claim any labor, equipment, material or any other costs or expenses not reported herein. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, or damages, not included are deemed waived.

SUBMITTED BY:		**REVIEWED BY:**	
Contractor:		District:	
[Name]	Date	[Name]	Date

District may require additional information from Contractor to review this Daily Force Account Report. Upon District's return of the Daily Force Account Report, Contractor may invoice the Work reflected therein. District's review and return of the Daily Force Account Report and/or payment for the force account work does not constitute acceptance of the Work or waiver of any Contract rights or criteria.

END OF DOCUMENT

DOCUMENT 00 63 63
CHANGE ORDER FORM

Lodi Unified School District
1305 East Vine Street
Lodi, CA 95240

CHANGE ORDER NO.:

CHANGE ORDER

Project: _____
Bid No.: _____

Date: _____
DSA File No.: _____
DSA Appl. No.:_____

The following parties agree to the terms of this Change Order:

Owner: _____
[Name / Address]
_____
_____

Contractor: _____
[Name / Address]
_____
_____

Architect: _____
[Name / Address]
_____
_____

Project Inspector: _____
[Name / Address]
_____
_____

Reference	**Description**	**Cost**	**Days Ext.**
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	$	
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	$	
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	$	

Contract time will be adjusted as follows: Previous Completion Date: [Date] _____[#] Calendar Days Extension (zero unless otherwise indicated) Current Completion Date: [Date]	Original Contract Amount:	$
	Amount of Previously Approved Change Order(s):	$
	Amount of this Change Order:	$
	Contract Amount:	$

The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire work as stated therein, and agrees to furnish all labor, materials

and services and perform all work necessary to complete any additional work specified for the consideration stated therein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.

This change order is subject to approval by the governing board of this District and must be signed by the District. Until such time as this change order is approved by the District's governing board and executed by a duly authorized District representative, this change order is not effective and not binding.

It is expressly understood that the compensation and time, if any, granted herein represent a full accord and satisfaction for any and all time and cost impacts of the items herein, and Contractor waives any and all further compensation or time extension based on the items herein. The value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, and its subcontractors, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project including without limitation, cumulative impacts. Any costs, expenses, damages or time extensions not included are deemed waived.

Signatures:

District:		Contractor:	
_____	_____	_____	_____
[Name]	Date	[Name]	Date
Architect:		Project Inspector:	
_____	_____	_____	_____
[Name]	Date	[Name]	Date

END OF DOCUMENT

DOCUMENT 00 65 19.26

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

THIS AGREEMENT AND RELEASE OF CLAIMS ("Agreement and Release") IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20___ by and between the LODI UNIFIED SCHOOL DISTRICT ("District") and _____ _____ ("Contractor"), whose place of business is _____ _____.

RECITALS

WHEREAS, District and Contractor entered into PROJECT/CONTRACT NO.: _____ _____ ("Contract" or "Project") in the County of San Joaquin, California; and

WHEREAS, the Work under the Contract was completed on _____, and a Notice of Completion was recorded with the County Recorder on _____.

NOW, THEREFORE, it is mutually agreed between District and Contractor as follows:

AGREEMENT AND RELEASE

34. Contractor will only be assessed liquidated damages as detailed below:

Original Contract Sum	$_____
Modified Contract Sum	$_____
Payment to Date	$_____
Liquidated Damages	$_____
Payment Due Contractor	$_____

35. Subject to the provisions hereof, District shall forthwith pay to Contractor the undisputed sum of Dollars ($) under the Contract, less any amounts represented by any notice to withhold funds on file with District as of the date of such payment.

36. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against District arising from the performance of work under the Contract, except for the claims described in Paragraph 4 and continuing obligations described in Paragraph 6. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against District and all of its respective agents, employees, trustees, inspectors, assignees, consultants and transferees, except for any Disputed Claim that may be set forth in Paragraph 4 and the continuing obligations described in Paragraph 6 hereof.

37. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

Claim No.	Description of Claim	Amount of Claim	Date Claim Submitted
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____

[If further space is required, attach additional sheets showing the required information.]

38. Consistent with California Public Contract Code section 7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 hereof, Contractor hereby releases and forever discharges District, all its agents, employees, inspectors, assignees, and transferees from any and all liability, claims, demands, actions, or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.

39. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, including without limitation, the duty to defend, indemnify and hold harmless the District, shall remain in full force and effect as specified in the Contract Documents.

40. Contractor hereby waives the provisions of California Civil Code section 1542 which provides as follows:

> A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

41. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable. If any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal, or other law, ruling, or regulations, then such provision, or part thereof, shall remain in force and effect to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.

42. All rights of District shall survive completion of the Work or termination of Contract, and execution of this Release.

* * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * *

LODI UNIFIED SCHOOL DISTRICT

Signature: _____

Print Name: _____

Title: _____

CONTRACTOR: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 65 36
GUARANTEE FORM

_____ ("Contractor") hereby agrees that the _____ _____ ("Work" of Contractor) which Contractor has installed for the Lodi Unified School District ("District") for the following project:

PROJECT: **Project Name Project No.**

("Project" or "Contract") has been performed in accordance with the requirements of the Contract Documents and that the Work as installed will fulfill the requirements of the Contract Documents.

The undersigned agrees to repair or replace any or all of such Work that may prove to be defective in workmanship or material together with any other adjacent Work that may be displaced in connection with such replacement within a period of TWO (2) years from the date of completion as defined in Public Contract Code section 7107, subdivision (c), ordinary wear and tear and unusual abuse or neglect excepted. The date of completion is _____, 20___.

In the event of the undersigned's failure to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, but not later than seven (7) days after being notified in writing by the District, the undersigned authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned. The undersigned shall pay the costs and charges therefor upon demand.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

Representatives to be contacted for service subject to terms of Contract:

Name: _____

Address: _____

Phone No.: _____

Email: _____

END OF DOCUMENT

DOCUMENT 00 72 13
TABLE OF CONTENTS

Page

1. CONTRACT TERMS AND DEFINITIONS 111
1.1 Definitions 111
1.2 Laws Concerning the Contract; Venue 117
1.3 No Oral Agreements 117
1.4 No Assignment 117
1.5 Notice and Service Thereof 117
1.6 No Waiver 118
1.7 Substitutions for Specified Items 118
1.8 Materials and Work 118
2. [RESERVED] 120
3. ARCHITECT 120
4. CONSTRUCTION MANAGER 121
5. INSPECTOR, INSPECTIONS, AND TESTS 121
5.1 Project Inspector 121
5.2 Tests and Inspections 122
5.3 Costs for After Hours and/or Off Site Inspections 122
6. CONTRACTOR 123
6.1 Status of Contractor 123
6.2 Project Inspection Card(s) 124
6.3 Contractor's Supervision 124
6.4 Duty to Provide Fit Workers 125
6.5 Field Office 125
6.6 Purchase of Materials and Equipment 125
6.7 Documents on Work 126
6.8 Preservation of Records 126
6.9 Integration of Work 127
6.10 Notifications 128
6.11 Obtaining of Permits, Licenses and Registrations 128
6.12 Royalties and Patents 129
6.13 Work to Comply With Applicable Laws and Regulations 129

6.14 Safety/Protection of Persons and Property 130
6.15 Working Evenings and Weekends 133
6.16 Cleaning Up 133
6.17 No Relief from Obligations Based on Review by Other Persons 134
7. SUBCONTRACTORS 134
8. OTHER CONTRACTS/CONTRACTORS 135
9. DRAWINGS AND SPECIFICATIONS 136
10. CONTRACTOR'S SUBMITTALS AND SCHEDULES 137
10.1 Schedule of Work, Schedule of Submittals, and Schedule of Values 138
10.2 Monthly Progress Schedule(s) 140
10.3 Material Safety Data Sheets (MSDS) 141
10.4 Submittals 141
11. SITE ACCESS, CONDITIONS, AND REQUIREMENTS 142
11.1 Site Investigation 142
11.2 Soils Investigation Report 142
11.3 Access to Work 142
11.4 Layout and Field Engineering 143
11.5 Utilities 143
11.6 Sanitary Facilities 143
11.7 Surveys 143
11.8 Regional Notification Center 143
11.9 Existing Utility Lines 144
11.10 Notification 144
11.11 Hazardous Materials 144
11.12 No Signs 145
12. TRENCHES 145
12.1 Trenches Greater Than Five Feet 145
12.2 Excavation Safety 145
12.3 No Tort Liability of District 145
12.4 No Excavation without Permits 145
12.5 Discovery of Hazardous Waste and/or Unusual Conditions 145
13. INSURANCE AND BONDS 146
13.1 Insurance 146

13.2 Contract Security - Bonds 151
14. WARRANTY/GUARANTEE/INDEMNITY 152
14.1 Warranty/Guarantee 152
14.2 Indemnity and Defense 153
15. TIME 155
15.1 Notice to Proceed 155
15.2 Computation of Time / Adverse Weather 155
15.3 Hours of Work 156
15.4 Progress and Completion 156
15.5 Schedule 157
15.6 Expeditious Completion 157
16. EXTENSIONS OF TIME – LIQUIDATED DAMAGES 157
16.1 Liquidated Damages 157
16.2 Excusable Delay 157
16.3 No Additional Compensation for Delays Within Contractor's Control 159
16.4 Force Majeure 160
16.5 Float or Slack in the Schedule 160
17. CHANGES IN THE WORK 161
17.1 No Changes Without Authorization 161
17.2 Architect Authority 162
17.3 Price Request 162
17.4 Change Orders 162
17.5 Proposed Change Order 162
17.7 Change Order Certification 168
17.8 Determination of Change Order Cost 169
17.9 Deductive Change Orders 169
17.10 Addition or Deletion of Alternate Bid Item(s) 169
17.11 Discounts, Rebates, and Refunds 169
17.12 Construction Change Directives 170
17.13 Force Account Directives 170
17.14 Accounting Records 171
17.15 Notice Required 171
17.16 Applicability to Subcontractors 172

17.17 Alteration to Change Order Language 172
17.18 Failure of Contractor to Execute Change Order 172
18. REQUEST FOR INFORMATION 172
19. PAYMENTS 172
19.1 Contract Price 172
19.2 Applications for Progress Payments 173
19.3 Progress Payments 176
19.4 Decisions to Withhold Payment 177
19.5 Subcontractor Payments 180
20. COMPLETION OF THE WORK 180
20.1 Completion 180
20.2 Close-Out/Certification Procedures 181
20.3 Final Inspection 182
20.4 Costs of Multiple Inspections 184
20.5 Partial Occupancy or Use Prior to Completion 184
21. FINAL PAYMENT AND RETENTION 185
21.1 Final Payment 185
21.2 Prerequisites for Final Payment 185
21.3 Retention 186
21.4 Substitution of Securities 186
22. UNCOVERING OF WORK 186
23. NONCONFORMING WORK AND CORRECTION OF WORK 187
23.1 Nonconforming Work 187
23.2 Correction of Work 187
23.3 District's Right to Perform Work 188
24. TERMINATION AND SUSPENSION 188
24.1 District’s Request for Assurances 188
24.2 District's Right to Terminate Contractor for Cause 189
24.3 Termination of Contractor for Convenience 191
24.4 Effect of Termination 192
24.5 Emergency Termination of Public Contracts Act of 1949 192
24.6 Suspension of Work 193
25. CLAIMS PROCESS 193

25.1 Obligation to File Claims for Disputes 193
25.2 Duty to Perform during Claim Process 194
25.3 Definition of Claim 194
25.4 Claims Presentation 194
25.5 Claim Resolution pursuant to Public Contract Code section 9204 195
25.6 Subcontractor Pass-Through Claims 197
25.7 Government Code Claim Act Claim 198
25.8 Claim Resolution pursuant to Public Contract Code section 20104 et seq. 198
25.9 Claim Procedure Compliance 200
25.10 Claim Resolution Non-Applicability 200
25.11 Attorney's Fees 201
26. STATE LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS 201
26.1 Labor Compliance and Enforcement 201
26.2 Wage Rates, Travel, and Subsistence 201
26.3 Hours of Work 202
26.4 Payroll Records 203
26.5 [RESERVED] 204
26.6 Apprentices 204
26.7 Non-Discrimination 206
26.8 Labor First Aid 206
27. [RESERVED] 206
28. MISCELLANEOUS 206
28.1 Assignment of Antitrust Actions 206
28.2 Excise Taxes 207
28.3 Taxes 207
28.4 Shipments 207
28.5 Compliance with Government Reporting Requirements 207

DOCUMENT 00 72 13
GENERAL CONDITIONS

1. CONTRACT TERMS AND DEFINITIONS

1.1 Definitions

Wherever used in the Contract Documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof:

1.1.1 Adverse Weather: Shall be only weather that satisfies all of the following conditions: (1) unusually severe precipitation, sleet, snow, hail, or extreme temperature conditions in excess of the norm for the location and time of year it occurred based on the closest weather station data averaged over the past five years, (2) that is unanticipated and would cause unsafe work conditions and/or is unsuitable for scheduled work that should not be performed during inclement weather (i.e., exterior finishes), and (3) at the Project.

1.1.2 Allowance(s): The Allowance Item(s) identified in the Bid Form and Proposal and included in the Contract Price. Any unused portion of the Allowance will revert to the District documented by a deductive Change Order. Contractor hereby authorizes the District to execute a unilateral deductive Change Order at or near the end of the Project for all or any portion of the Allowance not allocated.

1.1.3 Allowance Expenditure Directive: Written authorization for expenditure of an Allowance, if any. Contractor shall not bill for or be due any portion of an Allowance unless the District has identified specific work, Contractor has submitted a price for that work or the District has proposed a price for that work, the District has accepted the cost for that work, and the District has executed an Allowance Expenditure Directive incorporating that work.

1.1.4 Approval, Approved, and/or Accepted: Written authorization, unless stated otherwise.

1.1.5 Architect (or "Design Professional in General Responsible Charge"): The individual, partnership, corporation, joint venture, or any combination thereof, named as Architect, who will have the rights and authority assigned to the Architect in the Contract Documents. The term Architect means the Design Professional in General Responsible Charge as defined in DSA PR 13-02 on this Project or the Architect's authorized representative.

1.1.6 As-Builts: Reproducible blue line prints of drawings to be prepared on a monthly basis pursuant to the Contract Documents, that reflect changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed since the preceding monthly submittal. See **Record Drawings**.

1.1.7 Bidder: A contractor who intends to provide a proposal to the District to perform the Work of this Contract.

1.1.8 Burdened: The labor rate for Contractor or any Subcontractor inclusive of any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind.

1.1.9 Change Order: A written order to the Contractor authorizing an addition to, deletion from, or revision in the Work, and/or authorizing an adjustment in the Contract Price or Contract Time.

1.1.10 Claim: A Contractor Claim within the meaning of Public Contract Code sections 9204 and/or 20104 et seq.

1.1.11 Construction Change Directive: A written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work.

1.1.12 Construction Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Construction Manager is used on the Project that is the subject of this Contract, then all references to Construction Manager herein shall be read to refer to District.

1.1.13 Construction Schedule: The progress schedule of construction of the Project as provided by Contractor and approved by District.

1.1.14 Contract, Contract Documents: The Contract consists exclusively of the documents evidencing the agreement of the District and Contractor, identified as the Contract Documents. The Contract Documents consist of the following documents:

1.1.14.1 Notice to Bidders
1.1.14.2 Instructions to Bidders
1.1.14.3 Bid Form and Proposal
1.1.14.4 Bid Bond
1.1.14.5 Designated Subcontractors List
1.1.14.6 Site Visit Certification (if a site visit was required)
1.1.14.7 Non-Collusion Declaration
1.1.14.8 Off-Road Diesel-Fueled Fleet Certification (if applicable)
1.1.14.9 Notice of Award
1.1.14.10 Notice to Proceed
1.1.14.11 Agreement
1.1.14.12 Escrow of Bid Documentation
1.1.14.13 Escrow Agreement for Security Deposits in Lieu of Retention (if applicable)
1.1.14.14 Performance Bond
1.1.14.15 Payment Bond (Contractor's Labor & Material Bond)
1.1.14.16 General Conditions
1.1.14.17 Special Conditions (if applicable)
1.1.14.18 Project Labor Agreement (if applicable)

1.1.14.19 Hazardous Materials Procedures and Requirements
1.1.14.20 Workers' Compensation Certification
1.1.14.21 Prevailing Wage Certification
1.1.14.22 Disabled Veteran Business Enterprise Participation Certification (if applicable)
1.1.14.23 Drug-Free Workplace Certification (if applicable)
1.1.14.24 Tobacco-Free Environment Certification (if applicable)
1.1.14.25 Drug and Alcohol-Free Schools Certification (if applicable)
1.1.14.26 Hazardous Materials Certification (if applicable)
1.1.14.27 Lead-Based Materials Certification (if applicable)
1.1.14.28 Imported Materials Certification (if applicable)
1.1.14.29 Criminal Background Investigation/Fingerprinting Certification
1.1.14.30 Roofing Project Certification (if applicable)
1.1.14.31 Registered Subcontractors List
1.1.14.32 Iran Contracting Act Certification (if applicable)
1.1.14.33 Federal Debarment Certification (if applicable)
1.1.14.34 Federal Byrd Anti-Lobbying Certification (if applicable)
1.1.14.35 Post Bid Interview (if used)
1.1.14.36 All Plans, Technical Specifications, and Drawings
1.1.14.37 Any and all addenda to any of the above documents
1.1.14.38 Any and all change orders or written modifications to the above documents if approved in writing by the District

1.1.15 Contract Price: The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

1.1.16 Contract Time: The time period stated in the Agreement for the completion of the Work.

1.1.17 Contractor: The person or persons identified in the Agreement as contracting to perform the Work to be done under this Contract, or the legal representative of such a person or persons.

1.1.18 Daily Job Report(s): Daily Project reports prepared by the Contractor's employee(s) who are present on Site, which shall include the information required herein.

1.1.19 Day(s): Unless otherwise designated, day(s) means calendar day(s).

1.1.20 Department of Industrial Relations (or "DIR"): is responsible, among other things, for labor compliance monitoring and enforcement of California prevailing wage laws and regulations for public works contracts.

1.1.21 Design Professional in General Responsible Charge: See definition of **Architect** above.

1.1.22 Dispute: A separate demand by Contractor for a time extension, or payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly

provided for or Contractor is not otherwise entitled to; or an amount of payment disputed by the District.

1.1.23 District: The public agency or the school district for which the Work is performed. The governing board of the District or its designees will act for the District in all matters pertaining to the Contract. The District may, at any time,

1.1.23.1 Direct the Contractor to communicate with or provide notice to the Construction Manager or the Architect on matters for which the Contract Documents indicate the Contractor will communicate with or provide notice to the District; and/or

1.1.23.2 Direct the Construction Manager or the Architect to communicate with or direct the Contractor on matters for which the Contract Documents indicate the District will communicate with or direct the Contractor.

1.1.24 Drawings (or "Plans"): The graphic and pictorial portions of the Contract Documents showing the design, location, scope and dimensions of the work, generally including plans, elevations, sections, details, schedules, sequence of operation, and diagrams.

1.1.25 DSA: Division of the State Architect.

1.1.26 Force Account Directive: A process that may be used when the District and the Contractor cannot agree on a price for a specific portion of work or before the Contractor prepares a price for a specific portion of work and whereby the Contractor performs the work as indicated herein on a time and materials basis.

1.1.27 Job Cost Reports: Any and all reports or records detailing the costs associated with work performed on or related to the Project that Contractor shall maintain for the Project. Specifically, Job Cost Reports shall contain, but are not limited by or to, the following information: a description of the work performed or to be performed on the Project; quantity, if applicable, of work performed (hours, square feet, cubic yards, pounds, etc.) for the Project; Project budget; costs for the Project to date; estimated costs to complete the Project; and expected costs at completion. The Job Cost Reports shall also reflect all Contract cost codes, change orders, elements of non-conforming work, back charges, and additional services.

1.1.28 Labor Commissioner's Office (or "Labor Commissioner", also known as the Division of Labor Standards Enforcement ("DLSE")): Division of the DIR responsible for adjudicating wage claims, investigating discrimination and public works complaints, and enforcing Labor Code statutes and Industrial Welfare Commission orders.

1.1.29 Municipal Separate Storm Sewer System (or "MS4"): A system of conveyances used to collect and/or convey storm water, including, without limitation, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.

1.1.30 Plans: See **Drawings**.

1.1.31 Premises: The real property owned by the District on which the Site is located.

1.1.32 Product(s): New material, machinery, components, equipment, fixtures and systems forming the Work, including existing materials or components required and approved by the District for reuse.

1.1.33 Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

1.1.34 Project Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. [-------] will be the District's internal Project Manager on the Project that is the subject of this Contract. An external Project Manager may be assigned to this project at a later time at the District's discretion. If no Program Manager is designated for Project that is the subject of this Contract, then all references to Project Manager herein shall be read to refer to District.

1.1.35 Project: The planned undertaking as provided for in the Contract Documents.

1.1.36 Project Inspector (or "Inspector"): The individual(s) retained by the District in accordance with title 24 of the California Code of Regulations to monitor and inspect the Project.

1.1.37 Project Labor Agreement (or "PLA"): a prehire collective bargaining agreement in accordance with Public Contract Code section 2500 et seq. that establishes terms and conditions of employment for a specific construction project or projects and/or is an agreement described in Section 158(f) of Title 29 of the United States Code.

1.1.38 Proposed Change Order (or "PCO"): a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

1.1.39 Provide: Shall include "provide complete in place," that is, "furnish and install," and "provide complete and functioning as intended in place" unless specifically stated otherwise.

1.1.40 Qualified SWPPP Practitioners (or "QSP"): certified personnel that attended a State Water Resources Control Board sponsored or approved training class and passed the qualifying exam.

1.1.41 Record Drawings: Reproducible drawings (or Plans) prepared pursuant to the requirements of the Contract Documents that reflect all changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed upon completion of the Project. See also **As-Builts**.

1.1.42 Request for Information (or "RFI"): A written request prepared by the Contractor requesting that the Architect provide additional information necessary to clarify or amplify an item in the Contract Documents that the Contractor believes is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address problems that have arisen under field conditions.

1.1.43 Request for Substitution for Specified Item: A request by Contractor to substitute an equal or superior material, product, thing, or service for a specific material, product, thing, or service that has been designated in the Contract Documents by a specific brand or trade name.

1.1.44 Safety Orders: Written and/or verbal orders for construction issued by the California Division of Occupational Safety and Health ("CalOSHA") or by the United States Occupational Safety and Health Administration ("OSHA").

1.1.45 Safety Plan: Contractor's safety plan specifically adapted for the Project. Contractor's Safety Plan shall comply with all provisions regarding Project safety, including all applicable provisions in these General Conditions.

1.1.46 Samples: Physical examples that illustrate materials, products, equipment, finishes, colors, or workmanship and that, when approved in accordance with the Contract Documents, establish standards by which portions of the Work will be judged.

1.1.47 Shop Drawings: All drawings, prints, diagrams, illustrations, brochures, schedules, and other data that are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor, that illustrate how specific portions of the Work shall be fabricated or installed.

1.1.48 Site: The Project site as shown on the Drawings.

1.1.49 Specifications: That portion of the Contract Documents, Division 1 through Division 49, and all technical sections, and addenda to all of these, if any, consisting of written descriptions and requirements of a technical nature of materials, equipment, construction methods and systems, standards, and workmanship.

1.1.50 State: The State of California.

1.1.51 Storm Water Pollution Prevention Plan (or "SWPPP"): A document which identifies sources and activities at a particular facility that may contribute pollutants to storm water and contains specific control measures and time frames to prevent or treat such pollutants.

1.1.52 Subcontractor: A contractor and/or supplier who is under contract with the Contractor or with any other subcontractor, regardless of tier, to perform a portion of the Work of the Project.

1.1.53 Submittal Schedule: The schedule of submittals as provided by Contractor and approved by District.

1.1.54 **Surety**: The person, firm, or corporation that executes as surety the Contractor's Performance Bond and Payment Bond, and must be a California admitted surety insurer as defined in the Code of Civil Procedure section 995.120.

1.1.55 **Work**: All labor, materials, equipment, components, appliances, supervision, coordination, and services required by, or reasonably inferred from, the Contract Documents, that are necessary for the construction and completion of the Project.

1.2 Laws Concerning the Contract; Venue

Contract is subject to all provisions of the Constitution and laws of California and the United States governing, controlling, or affecting District, or the property, funds, operations, or powers of District, and such provisions are by this reference made a part hereof. Any provision required by law to be included in this Contract shall be deemed to be inserted.

To the fullest extent permitted by California law, the county in which the District administration office is located shall be the venue for any action or proceeding that may be brought or arise out of, in connection with or by reason of this Contract.

1.3 No Oral Agreements

No oral agreement or conversation with any officer, agent, or employee of District, either before or after execution of Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract.

1.4 No Assignment

Contractor shall not assign this Contract or any part thereof including, without limitation, any Work or money to become due hereunder without the prior written consent of the District. Assignment without District's prior written consent shall be null and void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of work called for under this Contract in favor of all persons, firms, or corporations rendering services or supplying material to the extent that claims are filed pursuant to the Civil Code, Code of Civil Procedure, Government Code, Labor Code, and/or Public Contract Code, and shall also be subject to deductions for liquidated damages or withholding of payments as determined by District in accordance with this Contract. Contractor shall not assign or transfer in any manner to a Subcontractor or supplier the right to prosecute or maintain an action against the District.

1.5 Notice and Service Thereof

1.5.1 Any notice from one party to the other or otherwise under Contract shall be in writing and shall be dated and signed by the party giving notice or by a duly authorized representative of that party. Any notice shall not be effective for any purpose whatsoever unless served in one of the following manners:

1.5.1.1 If notice is given by personal delivery thereof, it shall be considered delivered on the day of delivery.

1.5.1.2 If notice is given by overnight delivery service, it shall be considered delivered one (1) day after date deposited, as indicated by the delivery service.

1.5.1.3 If notice is given by depositing same in United States mail, enclosed in a sealed envelope, it shall be considered delivered three (3) days after date deposited, as indicated by the postmarked date.

1.5.1.4 If notice is given by registered or certified mail with postage prepaid, return receipt requested, it shall be considered delivered on the day the notice is signed for.

1.5.1.5 Electronic mail may be used for convenience but is not a substitute for the notice and service requirements herein.

1.6 No Waiver

The failure of District in any one or more instances to insist upon strict performance of any of the terms of this Contract or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion. No action or failure to act by the District, Architect, or Construction Manager shall constitute a waiver of any right or duty afforded the District under the Contract, nor shall any action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

1.7 Substitutions for Specified Items

Unless the Special Conditions contain different provisions, Contractor shall not substitute different items for any items identified in the Contract Documents without prior written approval of the District.

1.8 Materials and Work

1.8.1 Except as otherwise specifically stated in this Contract, Contractor shall provide and pay for all materials, labor, tools, equipment, transportation, supervision, temporary constructions of every nature, and all other services, management, and facilities of every nature whatsoever necessary to execute and complete this Contract, in a good and workmanlike manner, within the Contract Time.

1.8.2 Unless otherwise specified, all materials shall be new and of the best quality of their respective kinds and grades as noted or specified, workmanship shall be of good quality, and Contractor shall use all diligence to inform itself fully as to the required manufacturer's instructions and to comply therewith.

1.8.3 Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of Work and shall be stored properly and protected from the elements, theft, vandalism, or other loss or damage as required.

1.8.4 For all materials and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary for complete assemblies and complete working systems, functioning as intended. Incidental items not indicated on Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized here in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and specifications.

1.8.5 Contractor shall, after award of Contract by District and after relevant submittals have been reviewed, place orders for materials and/or equipment as specified so that delivery of same may be made without delays to the Work. Contractor shall, upon five (5) days' demand from District, present documentary evidence showing that orders have been placed.

1.8.6 District reserves the right but has no obligation, in response to Contractor's neglect or failure in complying with the above instructions, to place orders for such materials and/or equipment as the District may deem advisable in order that the Work may be completed at the date specified in the Contract, and all expenses incidental to the procuring of said materials and/or equipment shall be paid for by Contractor or deducted from payment(s) to Contractor.

1.8.7 Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver the Site to District, together with all improvements and appurtenances constructed or placed thereon by it, and free from any claims, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by the Contract shall have any right to lien any portion of the Premises or any improvement or appurtenance thereon, except that Contractor may install metering devices or other equipment of utility companies or of political subdivision, title to which is commonly retained by utility company or political subdivision. In the event of installation of any such metering device or equipment, Contractor shall advise District as to owner thereof.

1.8.7.1 If a lien or a claim based on a stop payment notice of any nature should at any time be filed against the Work or any District property, by any entity that has supplied material or services at the request of the Contractor, Contractor and Contractor's Surety shall promptly, on demand by District and at Contractor's and Surety's own expense, take any and all action necessary to cause any such lien or a claim based on a stop payment notice to be released or discharged immediately therefrom.

1.8.7.2 If the Contractor fails to furnish to the District within ten (10) calendar days after demand by the District, satisfactory evidence that a lien or a claim based on a stop payment notice has been so released, discharged, or secured,

the District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any sum payable to Contractor under the Contract.

1.8.8 Nothing contained in this Article, however, shall defeat or impair the rights of persons furnishing materials or labor under any bond given by Contractor for their protection or any rights under any law permitting such protection or any rights under any law permitting such persons to look to funds due Contractor in hands of District (e.g., stop payment notices), and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for work when no formal contract is entered into for such material.

1.8.9 Title to new materials and/or equipment for the Work of this Contract and attendant liability for its protection and safety shall remain with Contractor until incorporated in the Work of this Contract and accepted by District. No part of any materials and/or equipment shall be removed from its place of storage except for immediate installation in the Work of this Contract. Should the District, in its discretion, allow the Contractor to store materials and/or equipment for the Work off-site, Contractor will store said materials and/or equipment at a bonded warehouse and with appropriate insurance coverage at no cost to District. Contractor shall keep an accurate inventory of all materials and/or equipment in a manner satisfactory to District or its authorized representative and shall, at the District's request, forward it to the District.

1.8.10 [RESERVED]

2. [RESERVED]

3. ARCHITECT

3.1 The Architect shall represent the District during the Project and will observe the progress and quality of the Work on behalf of the District. Architect shall have the authority to act on behalf of District to the extent expressly provided in the Contract Documents and to the extent determined by District. Architect shall have authority to reject materials, workmanship, and/or the Work whenever rejection may be necessary, in Architect's reasonable opinion, to ensure the proper execution of the Contract.

3.2 Architect shall, with the District and on behalf of the District, determine the amount, quality, acceptability, and fitness of all parts of the Work, and interpret the Specifications, Drawings, and shall, with the District, interpret all other Contract Documents.

3.3 Architect shall have all authority and responsibility established by law, including title 24 of the California Code of Regulations.

3.4 Contractor shall provide District and the Construction Manager with a copy of all written communication between Contractor and Architect at the same time as that

communication is made to Architect, including, without limitation, all RFIs, correspondence, submittals, claims, and proposed change orders.

4. CONSTRUCTION MANAGER

4.1 If a Construction Manager is used on this Project ("Construction Manager" or "CM"), the Construction Manager will provide administration of the Contract on the District's behalf. After execution of the Contract and Notice to Proceed, all correspondence and/or instructions from Contractor and/or District shall be forwarded through the Construction Manager. The Construction Manager will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences, or procedures or for safety precautions in connection with the Work, which shall all remain the Contractor's responsibility.

4.2 The Construction Manager, however, will have authority to reject materials and/or workmanship not conforming to the Contract Documents, as determined by the District, the Architect, and/or the Project Inspector. The Construction Manager shall also have the authority to require special inspection or testing of any portion of the Work, whether it has been fabricated, installed, or fully completed. Any decision made by the Construction Manager, in good faith, shall not give rise to any duty or responsibility of the Construction Manager to: the Contractor; any Subcontractor; the Contractor or Subcontractor's respective agents, employees; or other persons performing any of the Work. The Construction Manager shall have free access to any or all parts of Work at any time.

4.3 [ ] will be the District's Construction Manager on the Project that is the subject of this Contract. A Construction Manager may be assigned to this project at a later time at the District's discretion. If the District does not use a Construction Manager on this Project, all references within the Contract Documents to Construction Manager or CM shall be read as District.

5. INSPECTOR, INSPECTIONS, AND TESTS

5.1 Project Inspector

5.1.1 One or more Project Inspector(s), including special Project Inspector(s), as required, will be assigned to the Work by District, in accordance with requirements of title 24, part 1, of the California Code of Regulations, to enforce the building code and monitor compliance with Plans and Specifications for the Project previously approved by the DSA. Duties of Project Inspector(s) are specifically defined in section 4-342 of said part 1 of title 24.

5.1.2 No Work shall be carried on except with the knowledge and under the inspection of the Project Inspector(s). The Project Inspector(s) shall have free access to any or all parts of Work at any time. Contractor shall furnish Project Inspector(s) reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector(s) fully informed respecting progress and manner of work and character of materials, including, but not limited to, submission of form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector at least 48 hours in advance of the

commencement and completion of construction of each and every aspect of the Work. Forms are available on the DSA's website at: http://www.dgs.ca.gov/dsa/Forms.aspx. Inspection of Work shall not relieve Contractor from an obligation to fulfill this Contract. Project Inspector(s) and the DSA are authorized to suspend work whenever the Contractor and/or its Subcontractor(s) are not complying with the Contract Documents. Any work stoppage by the Project Inspector(s) and/or DSA shall be without liability to the District. Contractor shall instruct its Subcontractors and employees accordingly.

5.1.3 If Contractor and/or any Subcontractor requests that the Project Inspector(s) perform any inspection off-site, this shall only be done if it is allowable pursuant to applicable regulations and DSA approval, if the Project Inspector(s) agree to do so, and at the expense of the Contractor.

5.2 Tests and Inspections

5.2.1 Tests and Inspections shall comply with title 24, part 1, California Code of Regulations, group 1, article 5, section 4-335, and with the provisions of the Specifications.

5.2.2 The District will select an independent testing laboratory to conduct the tests. Selection of the materials required to be tested shall be by the laboratory or the District's representative and not by the Contractor. The Contractor shall notify the District's representative a sufficient time in advance of its readiness for required observation or inspection.

5.2.3 The Contractor shall notify the District's representative a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents, which must by terms of the Contract Documents be tested, in order that the District may arrange for the testing of same at the source of supply. This notice shall be provided, at a minimum, seventy-two (72) hours prior to the manufacture of the material that needs to be tested.

5.2.4 Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated into and/or onto the Project.

5.2.5 The District will select the testing laboratory and pay for the cost of all tests and inspections, excepting those inspections performed at Contractor's request and expense. Contractor shall reimburse the District for any and all laboratory costs or other testing costs for any materials found to be not in compliance with the Contract Documents. At the District's discretion, District may elect to deduct laboratory or other testing costs for noncompliant materials from the Contract Price, and such deduction shall not constitute a withholding.

5.3 Costs for After Hours and/or Off Site Inspections

If the Contractor performs Work outside the Inspector's regular working hours or requests the Inspector to perform inspections off Site, costs of any inspections required

outside regular working hours or off Site shall be borne by the Contractor and may be invoiced to the Contractor by the District or the District may deduct those expenses from the next Progress Payment.

6. CONTRACTOR

Contractor shall construct and complete, in a good and workmanlike manner, the Work for the Contract Price including any adjustment(s) to the Contract Price pursuant to provisions herein regarding changes to the Contract Price. Except as otherwise noted, Contractor shall provide and pay for all labor, materials, equipment, permits (excluding DSA), fees, licenses, facilities, transportation, taxes, bonds and insurance, and services necessary for the proper execution and completion of the Work, except as indicated herein.

6.1 Status of Contractor

6.1.1 Contractor represents and warrants that Contractor is an independent contractor or business entity that is: (i) free from the control and direction of the District in connection with the performance of the Services, (ii) performing Services that are outside the usual course of the District's business, and (iii) customarily engaged in an independently established trade, occupation, or business of the same nature as that involved in the Services performed, District being interested only in the results obtained. Contractor understands and agrees that it and all of its employees and its Subcontractors shall not be considered officers, employees, agents, partner, or joint venture of the District, and are not entitled to benefits of any kind or nature normally provided employees of the District and/or to which District's employees are normally entitled, including, but not limited to, State Unemployment Compensation or Worker's Compensation. Contractor shall assume full responsibility for payment of all federal, state, and local taxes or contributions, including unemployment insurance, social security, and income taxes with respect to Consultant's employees. Contractor is and shall at all times be wholly responsible for the manner in which it, its agents, and its Subcontractors perform the services required of it by the Contract Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the District, or any of the District's employees or agents, and Contractor or any of Contractor's Subcontractors, agents or employees. District shall be permitted to monitor the Contractor's activities to determine compliance with the terms of this Contract.

6.1.2 As required by law, Contractor and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board, 9821 Business Park Drive, Sacramento, California 95827, http://www.cslb.ca.gov.

6.1.3 As required by law, Contractor and all Subcontractors shall be properly registered as public works contractors by the Department of Industrial Relations at: https://efiling.dir.ca.gov/PWCR/ActionServlet?action=displayPWCRegistrationForm or current URL.

6.1.4 Contractor represents that Contractor and all Subcontractors shall not be presently debarred, suspended, proposed for disbarment, declared ineligible or

excluded pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7.

6.1.5 [RESERVED]

6.1.6 Contractor represents that it has no existing interest and will not acquire any interest, direct or indirect, which could conflict in any manner or degree with the performance of Work required under this Contract and that no person having any such interest shall be employed by Contractor.

6.1.7 [RESERVED]

6.1.8 If Contractor intends to make any change in the name or legal nature of the Contractor's entity, Contractor must first notify the District in writing prior to making any contemplated change. The District shall determine in writing if Contractor's intended change is permissible while performing this Contract.

6.2 Project Inspection Card(s)

Contractor shall verify that forms DSA 152 (or the current version applicable at the time the Work is performed) are issued for the Project prior to the commencement of construction.

6.3 Contractor's Supervision

6.3.1 During progress of the Work, Contractor shall keep on the Premises, and at all other locations where any Work related to the Contract is being performed, an experienced and competent project manager and construction superintendent who are employees of the Contractor, to whom the District does not object and at least one of whom shall be fluent in English, written and verbal.

6.3.2 The project manager and construction superintendent shall both speak fluently the predominant language of the Contractor's employees.

6.3.3 Before commencing the Work herein, Contractor shall give written notice to District of the name of its project manager and construction superintendent. Neither the Contractor's project manager nor construction superintendent shall be changed except with prior written notice to District. If the Contractor's project manager and/or construction superintendent proves to be unsatisfactory to Contractor, or to District, any of the District's employees, agents, the Construction Manager, or the Architect, the unsatisfactory project manager and/or construction superintendent shall be replaced. However, Contractor shall notify District in writing before any change occurs, but no less than two (2) business days prior. Any replacement of the project manager and/or construction superintendent shall be made promptly and must be satisfactory to the District. The Contractor's project manager and construction superintendent shall each represent Contractor, and all directions given to Contractor's project manager and/or construction superintendent shall be as binding as if given to Contractor.

6.3.4 Contractor shall give efficient supervision to Work, using its best skill and attention. Contractor shall carefully study and compare all Contract Documents, Drawings, Specifications, and other instructions and shall at once report to District, Construction Manager, and Architect any error, inconsistency, or omission that Contractor or its employees and Subcontractors may discover, in writing, with a copy to District's Project Inspector(s). The Contractor shall have responsibility for discovery of errors, inconsistencies, or omissions.

6.4 Duty to Provide Fit Workers

6.4.1 Contractor and Subcontractor(s) shall at all times enforce strict discipline and good order among their employees and shall not employ or work any unfit person or anyone not skilled in work assigned to that person. It shall be the responsibility of Contractor to ensure compliance with this requirement. District may require Contractor to permanently remove unfit persons from Project Site.

6.4.2 Any person in the employ of Contractor or Subcontractor(s) whom District may deem incompetent or unfit shall be excluded from working on the Project and shall not again be employed on the Project except with the prior written consent of District.

6.4.3 The Contractor shall furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work.

6.4.4 **Fingerprinting.** Contractor shall comply with the provisions of Education Code section 45125.2 regarding the submission of employee fingerprints to the California Department of Justice and the completion of criminal background investigations of its employees, its subcontractor(s), and its subcontractors' employees. Contractor shall not permit any employee to have any contact with District pupils until such time as Contractor has verified in writing to the governing board of the District, (A) that such employee has not been convicted of a violent or serious felony, as defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). Contractor shall fully complete and perform all tasks required pursuant to the Criminal Background Investigation/ Fingerprinting Certification.

6.5 Field Office

6.5.1 Contractor shall provide a temporary office on the Site for the District's use exclusively, during the term of the Contract.

6.6 Purchase of Materials and Equipment

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays.

6.7 Documents on Work

6.7.1 Contractor shall at all times keep on the Site, or at another location as the District may authorize in writing, one legible copy of all Contract Documents, including Addenda and Change Orders, and Titles 19 and 24 of the California Code of Regulations, the specified edition(s) of the Uniform Building Code, all approved Drawings, Plans, Schedules, and Specifications, and all codes and documents referred to in the Specifications, and made part thereof. These documents shall be kept in good order and available to District, Construction Manager, Architect, Architect's representatives, the Project Inspector(s), and all authorities having jurisdiction. Contractor shall be acquainted with and comply with the provisions of these titles as they relate to this Project. (See particularly the duties of Contractor, Title 24, Part 1, California Code of Regulations, section 4-343.) Contractor shall also be acquainted with and comply with all California Code of Regulations provisions relating to conditions on this Project, particularly Titles 8 and 17. Contractor shall coordinate with Architect and Construction Manager and shall submit its verified report(s) according to the requirements of Title 24.

6.7.2 Daily Job Reports.

6.7.2.1 Contractor shall maintain, at a minimum, at least one (1) set of Daily Job Reports on the Project. These must be prepared by the Contractor's employee(s) who are present on Site, and must include, at a minimum, the following information:

- **6.7.2.1.1** A brief description of all Work performed on that day.
- **6.7.2.1.2** A summary of all other pertinent events and/or occurrences on that day.
- **6.7.2.1.3** The weather conditions on that day.
- **6.7.2.1.4** A list of all Subcontractor(s) working on that day, including DIR registration numbers.
- **6.7.2.1.5** A list of each Contractor employee working on that day and the total hours worked for each employee.
- **6.7.2.1.6** A complete list of all equipment on Site that day, whether in use or not.
- **6.7.2.1.7** A complete list of all materials, supplies, and equipment delivered on that day.
- **6.7.2.1.8** A complete list of all inspections and tests performed on that day.

6.7.2.2 Each day Contractor shall provide a copy of the previous day's Daily Job Report to the District or the Construction Manager.

6.8 Preservation of Records

Contractor shall maintain, and District shall have the right to inspect, Contractor's financial records for the Project, including, without limitation, Job Cost Reports for the Project in compliance with the criteria set forth herein. The District shall have the right to examine and audit all Daily Job Reports or other Project records of Contractor's project manager(s), project superintendent(s), and/or project foreperson(s), all certified

payroll records and/or related documents including, without limitation, Job Cost Reports, payroll, payment, timekeeping and tracking documents; all books, estimates, records, contracts, documents, bid documents, bid cost data, subcontract job cost reports, and other data of the Contractor, any Subcontractor, and/or supplier, including computations and projections related to bidding, negotiating, pricing, or performing the Work or Contract modification, in order to evaluate the accuracy, completeness, and currency of the cost, manpower, coordination, supervision, or pricing data at no additional cost to the District. These documents may be duplicative and/or be in addition to any Bid Documents held in escrow by the District. The Contractor shall make available at its office at all reasonable times the materials described in this paragraph for the examination, audit, or reproduction until three (3) years after final payment under this Contract. Notwithstanding the provisions above, Contractor shall provide any records requested by any governmental agency, if available, after the time set forth above.

6.9 Integration of Work

6.9.1 Contractor shall do all cutting, fitting, patching, and preparation of Work as required to make its several parts come together properly, to fit it to receive or be received by work of other contractors, and to coordinate tolerances to various pieces of work, showing upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and shall conform them as District and/or Architect may direct.

6.9.2 Contractor shall make its own layout of lines and elevations and shall be responsible for the accuracy of both Contractor's and Subcontractors' work resulting therefrom.

6.9.3 Contractor and all Subcontractors shall take all field dimensions required in performance of the Work and shall verify all dimensions and conditions on the Site. All dimensions affecting proper fabrication and installation of all Work must be verified prior to fabrication by taking field measurements of the true conditions. If there are any discrepancies between dimensions in drawings and existing conditions which will affect the Work, Contractor shall bring such discrepancies to the attention of the District and Architect for adjustment before proceeding with the Work. In doing so, it is recognized that Contractor is not acting in the capacity of a licensed design professional, and that Contractor's examination is made in good faith to facilitate construction and does not create an affirmative responsibility of a design professional to detect errors, omissions or inconsistencies in the Contract Documents or to ascertain compliance with applicable laws, building codes or regulations. However, nothing in this provision shall abrogate Contractor's responsibilities for discovering and reporting any error, inconsistency, or omission pursuant to the Contract within the Contractor's standard of care including, without limitation, any applicable laws, ordinance, rules, or regulations. Following receipt of written notice from Contractor, the District and/or Architect shall inform Contractor what action, if any, Contractor shall take with regard to such discrepancies.

6.9.4 All costs caused by noncompliant, defective, or delayed Work shall be borne by Contractor, inclusive of repair work. Schedule delays resulting from unauthorized work shall be Contractor's responsibility.

6.9.5 Contractor shall not endanger any work performed by it or anyone else by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with consent of District.

6.10 Notifications

6.10.1 Contractor shall notify the Architect and Project Inspector, in writing, of the commencement of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector. Forms are available on the DSA's website at: http://www.dgs.ca.gov/dsa/Forms.aspx.

6.10.2 Contractor shall notify the Architect and Project Inspector, in writing, of the completion of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or current version) to the Project Inspector.

6.11 Obtaining of Permits, Licenses and Registrations

6.11.1 Contractor shall secure and pay for all permits (except DSA), licenses, registrations, approvals and certificates necessary for prosecution of Work, including but not limited to those listed in the Special Conditions, if any, before the date of the commencement of the Work or before the permits, licenses, registrations, approvals and certificates are legally required to continue the Work without interruption. The Contractor shall obtain and pay, only when legally required, for all licenses, registrations, approvals, permits, inspections, and inspection certificates required to be obtained from or issued by any authority having jurisdiction over any part of the Work included in the Contract. All final permits, licenses, registrations, approvals and certificates shall be delivered to District before demand is made for final payment.

6.11.2 General Permit For Storm Water Discharges Associated With Construction and Land Disturbance Activities.

6.11.2.1 Contractor acknowledges that all California school districts are obligated to develop and implement the following requirements for the discharge of storm water to surface waters from its construction and land disturbance activities pursuant to the Clean Water Act and Porter Cologne Water Quality Act. District has determined that the construction of this Project requires enrollment in the Construction Storm Water Permit. District has filed certain submittals referred to as Permit Registration Documents ("PRDS") with the Regional Water Control Board ("Storm Water Pollution Prevention Plan" or "SWPPP").

6.11.2.2 Contractor shall comply with any District SWPPP that is approved by the District and applicable to the Project, at no additional cost to the District. Contractor shall pay any fees and any penalties that may imposed by a regulatory agency for its non-compliance with the SWPPP during the course of Work.

6.11.2.3 Contractor shall provide a Qualified Storm Water Practitioner ("QSP") at no additional cost to the District, who shall perform on-site inspections and implement and monitor any and all SWPPP requirements applicable to the Project, including required visual observations, sampling, analysis, reporting and record keeping, including of Total Maximum Daily Loads ("TMDL") of pollutants and construction dewatering and discharge, and Best Management Practices ("BMPs").

6.12 Royalties and Patents

6.12.1 Contractor shall obtain and pay, only when legally required, all royalties and license fees necessary for prosecution of Work before the earlier of the date of the commencement of the Work or the date that the license is legally required to continue the Work without interruption. Contractor shall defend suits or claims of infringement of patent, copyright, or other rights and shall hold the District, the Architect, and the Construction Manager harmless and indemnify them from loss on account thereof except when a particular design, process, or make or model of product is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process, or product is an infringement of a patent or copyright, the Contractor shall indemnify and defend the District, Architect and Construction Manager against any loss or damage unless the Contractor promptly informs the District of its information.

6.12.2 The review by the District or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be only its adequacy for the Work and shall not approve use by the Contractor in violation of any patent or other rights of any person or entity.

6.13 Work to Comply With Applicable Laws and Regulations

6.13.1 Contractor shall give all notices and comply with the following specific laws, ordinances, rules, and regulations and all other applicable laws, ordinances, rules, and regulations bearing on conduct of Work as indicated and specified, including but not limited to the appropriate statutes and administrative code sections. If Contractor observes that Drawings and Specifications are at variance therewith, or should Contractor become aware of the development of conditions not covered by Contract Documents that may result in finished Work being at variance therewith, Contractor shall promptly notify District in writing and any changes deemed necessary by District shall be made as provided in Contract for changes in Work.

6.13.1.1 National Electrical Safety Code, U. S. Department of Commerce

6.13.1.2 National Board of Fire Underwriters' Regulations

6.13.1.3 International Building Code, latest addition, and the California Code of Regulations, title 24, and other amendments

6.13.1.4 Manual of Accident Prevention in Construction, latest edition, published by A.G.C. of America

6.13.1.5 Industrial Accident Commission's Safety Orders, State of California

6.13.1.6 Regulations of the State Fire Marshall (title 19, California Code of Regulations) and Pertinent Local Fire Safety Codes

6.13.1.7 Americans with Disabilities Act

6.13.1.8 Education Code of the State of California

6.13.1.9 Government Code of the State of California

6.13.1.10 Labor Code of the State of California, division 2, part 7, Public Works and Public Agencies

6.13.1.11 Public Contract Code of the State of California

6.13.1.12 California Art Preservation Act

6.13.1.13 U. S. Copyright Act

6.13.1.14 U. S. Visual Artists Rights Act

6.13.2 Contractor shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act (Public Resources Code section 21000 et seq.).

6.13.3 If Contractor performs any Work that it knew, or through exercise of reasonable care should have known, to be contrary to any applicable laws, ordinance, rules, or regulations, Contractor shall bear all costs arising therefrom and arising from the correction of said Work.

6.13.4 Where Specifications or Drawings state that materials, processes, or procedures must be approved by the DSA, State Fire Marshall, or other body or agency, Contractor shall be responsible for satisfying requirements of such bodies or agencies applicable at the time the Work is performed, and as determined by those bodies or agencies.

6.13.5 [RESERVED]

6.14 Safety/Protection of Persons and Property

6.14.1 The Contractor will be solely and completely responsible for conditions of the Site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours.

6.14.2 The wearing of hard hats will be mandatory at all times for all personnel on Site. Contractor shall supply sufficient hard hats to properly equip all employees and visitors.

6.14.3 Any construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the Site.

6.14.4 Implementation and maintenance of safety programs shall be the sole responsibility of the Contractor.

6.14.5 The Contractor shall furnish to the District a copy of the Contractor's safety plan within the time frame indicated in the Contract Documents and specifically adapted for the Project.

6.14.6 Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and completion and final acceptance by District. All Work shall be solely at Contractor's risk with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105.

6.14.7 Contractor shall take, and require Subcontractors to take, all necessary precautions for safety of workers on the Project and shall comply with all applicable federal, state, local, and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. Contractor shall furnish, erect, and properly maintain at all times, all necessary safety devices, safeguards, construction canopies, signs, nets, barriers, lights, and watchmen for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction.

6.14.8 Hazards Control – Contractor shall store volatile wastes in covered metal containers and remove them from the Site daily. Contractor shall prevent accumulation of wastes that create hazardous conditions. Contractor shall provide adequate ventilation during use of volatile or noxious substances.

6.14.9 Contractor shall designate a responsible member of its organization on the Project, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety, and health of workers. Name and position of person so designated shall be reported to District by Contractor.

6.14.10 Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, Contractor shall correct such violation promptly.

6.14.11 Contractor shall comply with any District storm water requirements that are approved by the District and applicable to the Project, at no additional cost to the District.

6.14.12 In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization, shall act, at its discretion, to prevent such threatened loss or injury. Any compensation claimed by Contractor on account of emergency work shall be determined by agreement.

6.14.13 All salvage materials will become the property of the Contractor and shall be removed from the Site unless otherwise called for in the Contract Documents. However, the District reserves the right to designate certain items of value that shall be turned over to the District unless otherwise directed by District.

6.14.14 All connections to public utilities and/or existing on-site services, including, without limitation, internet, phone and data connections, shall be made and maintained in such a manner as to not interfere with the continuing use of same by the District during the entire progress of the Work.

6.14.15 Contractor shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions, such as extreme heat, cold, rain, snow, dry winds, flooding, or dampness.

6.14.16 Contractor shall protect and preserve the Work from all damage or accident, providing any temporary roofs, window and door coverings, boxings, or other construction as required by the Architect. The Contractor shall be responsible for existing structures, walks, roads, trees, landscaping, and/or improvements in working areas; and shall provide adequate protection therefore. If temporary removal is necessary of any of the above items, or damage occurs due to the Work, the Contractor shall replace same at his expense with same kind, quality, and size of Work or item damaged. This shall include any adjoining property of the District and others.

6.14.17 Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property, and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations.

6.14.18 Contractor shall confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits, or directions of Architect, and shall not interfere with the Work or unreasonably encumber Premises or overload any structure with materials. Contractor shall enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking, and require that all workers comply with all regulations while on Project Site.

6.14.19 Contractor, Contractor's employees, Subcontractors, Subcontractors' employees, or any person associated with the Work shall conduct themselves in a manner appropriate for a school site. No verbal or physical contact with neighbors, students, and faculty, profanity, or inappropriate attire and/or logos, or behavior will be permitted. District may require Contractor to temporarily or permanently remove non-complying persons from Project Site.

6.14.20 Contractor shall take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed, Contractor shall have a civil engineer, registered as a professional engineer in California, replace them at no cost to District.

6.14.21 In the event that the Contractor enters into any agreement with owners of any adjacent property to enter upon the adjacent property for the purpose of performing the Work, Contractor shall fully indemnify, defend, and hold harmless each person, entity, firm, or agency that owns or has any interest in adjacent property. The form and content of the agreement of indemnification shall be approved by the District prior to the commencement of any Work on or about the adjacent property. The Contractor shall also indemnify the District as provided in the indemnification provision herein. These provisions shall be in addition to any other requirements of the owners of the adjacent property.

6.15 Working Evenings and Weekends

Contractor may be required to work increased hours, evenings, and/or weekends at no additional cost to the District. Contractor shall give the District seventy-two (72) hours' notice prior to performing any evening and/or weekend work. Contractor shall perform all evening and/or weekend work only upon District's approval and in compliance with all applicable rules, regulations, laws, and local ordinances including, without limitation, all noise and light limitations. Contractor shall reimburse the District for any increased or additional Inspector charges as a result of Contractor's increased hours, or evening and/or weekend work.

6.16 Cleaning Up

6.16.1 The Contractor shall provide all services, labor, materials, and equipment necessary for protecting and securing the Work, all school occupants, furnishings, equipment, and building structure from damage until its completion and final acceptance by District. Dust barriers shall be provided to isolate dust and dirt from construction operations. At completion of the Work and portions thereof, Contractor shall clean to the original state any areas beyond the Work area that become dust laden as a result of the Work. The Contractor must erect the necessary warning signs and barricades to ensure the safety of all school occupants. The Contractor at all times must maintain good housekeeping practices to reduce the risk of fire damage and must make a fire extinguisher, fire blanket, and/or fire watch, as applicable, available at each location where cutting, braising, soldering, and/or welding is being performed or where there is an increased risk of fire.

6.16.2 Contractor at all times shall keep Premises, including property immediately adjacent thereto, free from debris such as waste, rubbish (including personal rubbish of workers, e.g., food wrappers, etc.), and excess materials and equipment caused by the Work. Contractor shall not leave debris under, in, or about the Premises (or surrounding property or neighborhood), but shall promptly remove same from the Premises on a daily basis. If Contractor fails to clean up, District may do so and the cost thereof shall be charged to Contractor. If Contract is for work on an existing facility, Contractor shall also perform specific clean-up on or about the

Premises upon request by the District as it deems necessary for continued operations. Contractor shall comply with all related provisions of the Specifications.

6.16.3 If the Construction Manager, Architect, or District observes the accumulation of trash and debris, the District will give the Contractor a 24-hour written notice to mitigate the condition.

6.16.4 Should the Contractor fail to perform the required clean-up, or should the clean-up be deemed unsatisfactory by the District, the District may, at its sole discretion, then perform the clean-up. All cost associated with the clean-up work (including all travel, payroll burden, and costs for supervision) will be deducted from the Contract Price.

6.17 No Relief from Obligations Based on Review by Other Persons

6.17.1 Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by act or omission of the District, Architect, Construction Manager, Project Inspector, or DSA or other entities having jurisdiction including, but not limited to, administration of the Contract, review of submittals, or by tests, observation, inspection, or permit/interconnection approvals.

7. SUBCONTRACTORS

7.1 Contractor shall provide the District with information for all Subcontracts as indicated in the Contractor's Submittals and Schedules Section herein.

7.2 No contractual relationship exists between the District and any Subcontractor, supplier, or sub-subcontractor by reason of this Contract.

7.3 Contractor agrees to bind every Subcontractor by terms of this Contract as far as those terms that are applicable to Subcontractor's work including, without limitation, all labor, wage & hour, apprentice and related provisions and requirements. If Contractor shall subcontract any part of this Contract, Contractor shall be as fully responsible to District for acts and omissions of any Subcontractor and of persons either directly or indirectly employed by any Subcontractor, including Subcontractor caused Project delays, as it is for acts and omissions of persons directly employed by Contractor. The divisions or sections of the Specifications and/or the arrangement of the drawings are not intended to control the Contractor in dividing the Work among Subcontractors or limit the work performed by any trade.

7.4 District's consent to, or approval of, or failure to object to, any Subcontractor under this Contract shall not in any way relieve Contractor of any obligations under this Contract and no such consent shall be deemed to waive any provisions of this Contract.

7.5 Contractor is directed to familiarize itself with sections 4100 through 4114 of the Public Contract Code of the State of California, as regards subletting and subcontracting, and to comply with all applicable requirements therein. In addition, Contractor is directed to familiarize itself with sections 1720 through 1861 of the Labor Code of the State of California, as regards the payment of prevailing wages and related issues, and to comply with all applicable requirements therein including, without

limitation, section 1775 and the Contractor's and Subcontractors' obligations and liability for violations of prevailing wage law and other applicable laws.

7.6 No Contractor whose Bid is accepted shall, without consent of the awarding authority and in full compliance with section 4100 et seq. of the Public Contract Code, including, without limitation, sections 4107, 4107.5, and 4109 of the Public Contract Code, and section 1771.1 of the Labor Code, either:

7.6.1 Substitute any person as a Subcontractor in place of the Subcontractor designated in the original Bid; or

7.6.2 Permit any Subcontract to be assigned or transferred, or allow any portion of the Work to be performed by anyone other than the original Subcontractor listed in the Bid; or

7.6.3 Sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor's total bid as to which his original bid did not designate a Subcontractor.

7.7 The Contractor shall be responsible for the coordination of the trades, Subcontractors, sub-subcontractors, and material or equipment suppliers working on the Project.

7.7.1 If the Contract is valued at $1 million or more and uses, or plans to use, state bond funds, then Contractor is responsible for ensuring that first tier Subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and/or C-46 licenses are prequalified by the District to work on the Project pursuant to Public Contract Code section 20111.6.

7.7.2 Contractor is responsible for ensuring that all Subcontractors are properly registered as public works contractors by the Department of Industrial Relations.

7.8 Contractor is solely responsible for settling any differences between the Contractor and its Subcontractor(s) or between Subcontractors.

7.9 Contractor must include in all of its subcontracts the assignment provisions as indicated in the Termination section of these General Conditions.

8. OTHER CONTRACTS/CONTRACTORS

8.1 District reserves the right to let other contracts, and/or to perform work with its own forces, in connection with the Project. Contractor shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly coordinate and connect Contractor's Work with the work of other contractors.

8.2 In addition to Contractor's obligation to protect its own Work, Contractor shall protect the work of any other contractor that Contractor encounters while working on the Project.

8.3 If any part of Contractor's Work depends for proper execution or results upon work of District or any other contractor, the Contractor shall inspect and, before proceeding with its Work, promptly report to the District in writing any defects in District's or any other contractor's work that render Contractor's Work unsuitable for proper execution and results. Contractor shall be held accountable for damages to District for District's or any other contractor's work that Contractor failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute Contractor's acceptance of all District's or any other contractor's work as fit and proper for reception of Contractor's Work, except as to defects that may develop in District's or any other contractor's work after execution of Contractor's Work and not caused by execution of Contractor's Work.

8.4 To ensure proper execution of its subsequent work, Contractor shall measure and inspect work already in place and shall at once report to the District in writing any discrepancy between that executed work and the Contract Documents.

8.5 Contractor shall ascertain to its own satisfaction the scope of the Project and nature of District's or any other contracts that have been or may be awarded by District in prosecution of the Project to the end that Contractor may perform this Contract in light of the other contracts, if any.

8.6 Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy of the Site, the Premises, or of the Project. Contractor shall not cause any unnecessary hindrance or delay to the use and/or operation(s) of the Premises and/or to District or any other contractor working on the Project. If simultaneous execution of any contract or Premises operation is likely to cause interference with performance of Contractor's Contract, Contractor shall coordinate with those contractor(s), person(s), and/or entity(s) and shall notify the District of the resolution.

9. DRAWINGS AND SPECIFICATIONS

9.1 A complete list of all Drawings that form a part of the Contract is to be found as an index on the Drawings themselves, and/or may be provided to the Contractor and/or in the Table of Contents.

9.2 Materials or Work described in words that so applied have a well-known technical or trade meaning shall be deemed to refer to recognized standards, unless noted otherwise.

9.3 **Trade Name or Trade Term.** It is not the intention of this Contract to go into detailed descriptions of any materials and/or methods commonly known to the trade under "trade name" or "trade term." The mere mention or notation of "trade name" or "trade term" shall be considered a sufficient notice to Contractor that it will be required to complete the work so named, complete, finished, and operable, with all its appurtenances, according to the best practices of the trade.

9.4 The naming of any material and/or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and/or labor

therefor, as per best practices of the trade(s) involved, unless specifically noted otherwise.

9.5 Contract Documents are complementary, and what is called for by one shall be binding as if called for by all. As such, Drawings and Specifications are intended to be fully cooperative and to agree. However, if Contractor observes that Drawings and Specifications are in conflict with the Contract Documents, Contractor shall promptly notify District and Architect in writing, and any necessary changes shall be made as provided in the Contract Documents.

9.6 In the case of discrepancy or ambiguity in the Contract Documents, the order of precedence in the Agreement shall prevail. However, in the case of discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In case of ambiguity, conflict, or lack of information, District will furnish clarifications with reasonable promptness.

9.7 Drawings and Specifications are intended to comply with all laws, ordinances, rules, and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, the laws, ordinances, rules, and regulations shall be considered as a part of the Contract within the limits specified. Contractor shall bear all expense of correcting work done contrary to said laws, ordinances, rules, and regulations.

9.8 As required by Section 4-317(c), Part 1, Title 24, CCR: "Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA-approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work."

9.9 Ownership of Drawings

All copies of Plans, Drawings, Designs, Specifications, and copies of other incidental architectural and engineering work, or copies of other Contract Documents furnished by District, are the property of District. They are not to be used by Contractor in other work and, with the exception of signed sets of Contract Documents, are to be returned to District on request at completion of Work, or may be used by District as it may require without any additional costs to District. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect. District hereby grants the Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings prepared for the Project in the execution of their Work under the Contract Documents.

10. CONTRACTOR'S SUBMITTALS AND SCHEDULES

Contractor's submittals shall comply with the provisions and requirements of the Specifications including, without limitation Submittals.

10.1 Schedule of Work, Schedule of Submittals, and Schedule of Values

10.1.1 Within **TEN (10)** calendar days after the date of the Notice to Proceed (unless otherwise specified in the Specifications), the Contractor shall prepare and submit to the District for review, in a form supported by sufficient data to substantiate its accuracy as the District may require:

10.1.1.1 Preliminary Schedule. A preliminary schedule of construction indicating the starting and completion dates of the various stages of the Work, including any information and following any form as may be specified in the Specifications. Once approved by District, this shall become the Construction Schedule. This schedule shall include and identify all tasks that are on the Project's critical path with a specific determination of the start and completion of each critical path task as well as all Contract milestones and each milestone's completion date(s) as may be required by the District.

10.1.1.1.1 The District is not required to approve a preliminary schedule of construction with early completion, i.e., one that shows early completion dates for the Work and/or milestones. Contractor shall not be entitled to extra compensation if the District approves a Construction Schedule with an early completion date and Contractor completes the Project beyond the date shown in the schedule but within the Contract Time. A Construction Schedule showing the Work completed in less than the Contract Time, the time between the early completion date and the end of the Contract Time shall be Float.

10.1.1.2 Preliminary Schedule of Values. A preliminary schedule of values for all of the Work, which must include quantities and prices of items aggregating the Contract Price and must subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Unless the Special Conditions contain different limits, this preliminary schedule of values shall include, at a minimum, the following information and the following structure:

10.1.1.2.1 Divided into at least the following categories:

10.1.1.2.1.1 Overhead and profit;
10.1.1.2.1.2 Supervision;
10.1.1.2.1.3 General conditions;
10.1.1.2.1.4 Layout;
10.1.1.2.1.5 Mobilization;
10.1.1.2.1.6 Submittals;
10.1.1.2.1.7 Bonds and insurance;
10.1.1.2.1.8 Close-out/Certification documentation;
10.1.1.2.1.9 Demolition;
10.1.1.2.1.10 Installation;
10.1.1.2.1.11 Rough-in;
10.1.1.2.1.12 Finishes;
10.1.1.2.1.13 Testing;
10.1.1.2.1.14 Punchlist and District acceptance.

10.1.1.2.2 And also divided by each of the following areas:

10.1.1.2.2.1 Site work;
10.1.1.2.2.2 By each building;
10.1.1.2.2.3 By each floor.

10.1.1.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

10.1.1.2.3.1 Mobilization and layout combined to equal not more than 1%;
10.1.1.2.3.2 Submittals, samples and shop drawings combined to equal not more than 3%;
10.1.1.2.3.3 Bonds and insurance combined to equal not more than 2.5%.
10.1.1.2.3.4 Closeout documentation shall have a value in the preliminary schedule of not less than 3%.

10.1.1.2.4 Notwithstanding any provision of the Contract Documents to the contrary, payment of the Contractor's overhead, supervision, general conditions costs, and profit, as reflected in the Cost Breakdown, shall be paid based on percentage complete, with the disbursement of Progress Payments and the Final Payment.

10.1.1.2.5 Contractor shall certify that the preliminary schedule of values as submitted to the District is accurate and reflects the costs as developed in preparing Contractor's bid. For example, without limiting the foregoing, Contractor shall not "front-load" the preliminary schedule of values with dollar amounts greater than the value of activities performed early in the Project.

10.1.1.2.6 The preliminary schedule of values shall be subject to the District's review and approval of the form and content thereof. In the event that the District objects to any portion of the preliminary schedule of values, the District shall notify the Contractor, in writing, of the District's objection(s) to the preliminary schedule of values. Within five (5) calendar days of the date of the District's written objection(s), Contractor shall submit a revised preliminary schedule of values to the District for review and approval. The foregoing procedure for the preparation, review and approval of the preliminary schedule of values shall continue until the District has approved the entirety of the preliminary schedule of values.

10.1.1.2.7 Once the preliminary schedule of values is approved by the District, this shall become the Schedule of Values. The Schedule of Values shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, which may be granted or withheld in the sole discretion of the District.

10.1.1.3 Preliminary Schedule of Submittals. A preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals. Once approved by District, this shall become the Submittal Schedule. All

submittals shall be forwarded to the District by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those submittals shall be forwarded to the District so as not to delay the Construction Schedule. Upon request by the District, Contractor shall provide an electronic copy of all submittals to the District. All submittals shall be submitted no later than 90 days after the Notice to Proceed.

10.1.1.4 Safety Plan. Contractor's Safety Plan specifically adapted for the Project. Contractor's Safety Plan shall comply with the following requirements:

10.1.1.4.1 All applicable requirements of California Division of Occupational Safety and Health ("CalOSHA") and/or of the United States Occupational Safety and Health Administration ("OSHA").

10.1.1.4.2 All provisions regarding Project safety, including all applicable provisions in these General Conditions.

10.1.1.4.3 Contractor's Safety Plan shall be in English and in the language(s) of the Contractor's and its Subcontractors' employees.

10.1.1.5 Update Registered Subcontractors List. The name, address, telephone number, facsimile number, California State Contractors License number, classification, DIR registration number and monetary value of all Subcontracts of any tier for parties furnishing labor, material, or equipment for completion of the Project.

10.1.2 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.1.3 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.1.4 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.1.5 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.2 Monthly Progress Schedule(s)

10.2.1 Contractor shall provide Monthly Progress Schedule(s) to the District. A Monthly Progress Schedule shall update the approved Construction Schedule or the last Monthly Progress Schedule, showing all work completed and to be completed as well as updating the Registered Subcontractors List. The monthly Progress Schedule shall be sent within the timeframe requested by the District and shall be in a format acceptable to the District and contain a written narrative of the progress of work that

month and any changes, delays, or events that may affect the work. The process for District approval of the Monthly Progress Schedule shall be the same as the process for approval of the Construction Schedule.

10.2.2 Contractor shall submit Monthly Progress Schedule(s) with all payment applications.

10.2.3 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.2.4 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.2.5 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.2.6 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.3 Material Safety Data Sheets (MSDS)

Contractor is required to ensure Material Safety Data Sheets are available in a readily accessible place at the Site for any material requiring a Material Safety Data Sheet per the federal "Hazard Communication" standard, or employees' "right to know" law. The Contractor is also required to ensure proper labeling on substances brought onto the job site and that any person working with the material or within the general area of the material is informed of the hazards of the substance and follows proper handling and protection procedures. Two additional copies of the Material Safety Data Sheets shall also be submitted directly to the District.

10.4 Submittals

10.4.1 Architect's favorable review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called Architect's attention to the deviations at the time of submission and the Architect has given specific written response. "Favorable review" shall mean merely that Architect has no objection to Contractor using, upon Contractor's own full responsibility, plan or method of Work proposed, or furnishing materials or equipment proposed.

11. SITE ACCESS, CONDITIONS, AND REQUIREMENTS

11.1 Site Investigation

Before bidding on this Work, Contractor shall make a careful investigation of the Site and thoroughly familiarize itself with the requirements of the Contract. By the act of submitting a bid for the Work included in this Contract, Contractor shall be deemed to have made a complete study and investigation, and to be familiar with and accepted the existing conditions of the Site.

Prior to commencing the Work, Contractor and the District's representative shall survey the Site to document the condition of the Site. Contractor will record the survey in digital videotape format and provide an electronic copy to the District within fourteen (14) days of the survey. This electronic record shall serve as a basis for determining any damages caused by the Contractor during the Project. The Contractor may also document any pre-existing conditions in writing, provided that both the Contractor and the District's representative agree on said conditions and sign a memorandum documenting the same.

11.2 Soils Investigation Report

11.2.1 When a soils investigation report obtained from test holes at Site or for the Project is available, that report may be available to the Contractor but shall not be a part of this Contract and shall not alleviate or excuse the Contractor's obligation to perform its own investigation. Any information obtained from that report or any information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, does not form a part of this Contract, and Contractor may not rely thereon. By submitting its bid, Contractor acknowledges that it has made visual examination of Site and has made whatever tests Contractor deems appropriate to determine underground condition of soil. Although any such report is not a part of this Contract, recommendations from the report may be included in the Drawings, Specifications, or other Contract Documents. It is Contractor's sole responsibility to thoroughly review all Contract Documents, Drawings, and Specifications.

11.2.2 Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages if, during progress of Work, Contractor encounters subsurface or latent conditions at Site materially differing from those shown on Drawings or indicated in Specifications, or for unknown conditions of an unusual nature that differ materially from those ordinarily encountered in the work of the character provided for in Plans and Specifications, except as indicated in the provisions of these General Conditions regarding trenches, trenching, and/or existing utility lines.

11.3 Access to Work

District and its representatives shall at all times have access to Work wherever it is in preparation or progress, including storage and fabrication. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

11.4 Layout and Field Engineering

11.4.1 All field engineering required for layout of this Work and establishing grades for earthwork operations shall be furnished by Contractor at its expense. This Work shall be done by a qualified, California-registered civil engineer approved in writing by District and Architect. Any required Record and/or As-Built Drawings of Site development shall be prepared by the approved civil engineer.

11.4.2 The Contractor shall be responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the Site and for having satisfied itself as to the conditions under which the Work is to be performed. Contractor shall follow best practices, including but not limited to potholing to avoid utilities. District shall not be liable for any claim for allowances because of Contractor's error, failure to follow best practices, or negligence in acquainting itself with the conditions at the Site.

11.4.3 Contractor shall protect and preserve established benchmarks and monuments and shall make no changes in locations without the prior written approval of District. Contractor shall replace any benchmarks or monuments that are lost or destroyed subsequent to proper notification of District and with District's approval.

11.5 Utilities

Utilities shall be provided as indicated in the Specifications.

11.6 Sanitary Facilities

Sanitary facilities shall be provided as indicated in the Specifications.

11.7 Surveys

Contractor shall provide surveys done by a California-licensed civil engineer surveyor to determine locations of construction, grading, and site work as required to perform the Work.

11.8 Regional Notification Center

The Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Contractor unless an inquiry identification number has been assigned to the Contractor or any Subcontractor and the Contractor has given the District the identification number. Any damages arising from Contractor's failure to make appropriate notification shall be at the sole risk and expense of the Contractor. Any delays caused by failure to make appropriate notification shall be at the sole risk of the Contractor and shall not be considered for an extension of the Contract Time.

11.9 Existing Utility Lines

11.9.1 Pursuant to Government Code section 4215, District assumes the responsibility for removal, relocation, and protection of main or trunk utility lines and facilities located on the construction Site at the time of commencement of construction under this Contract with respect to any such utility facilities that are not identified in the Plans and Specifications. Contractor shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of District or the owner of a utility to provide for removal or relocation of such utility facilities.

11.9.2 Locations of existing utilities provided by District shall not be considered exact but approximate within a reasonable margin and shall not relieve Contractor of responsibilities to exercise reasonable care or costs of repair due to Contractor's failure to do so. District shall compensate Contractor for the costs of locating, repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Plans and Specifications with reasonable accuracy, and for equipment necessarily idle during such work.

11.9.3 No provision herein shall be construed to preclude assessment against Contractor for any other delays in completion of the Work. Nothing in this Article shall be deemed to require District to indicate the presence of existing service laterals, appurtenances, or other utility lines, within the exception of main or trunk utility lines or whenever the presence of these utilities on the Site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter junction boxes, on or adjacent to the Site of the construction.

11.9.4 If Contractor, while performing Work under this Contract, discovers utility facilities not identified by District in Contract Plans and Specifications, Contractor shall immediately notify the District and the utility in writing. The cost of repair for damage to above-mentioned discovered facilities without prior written notification to the District shall be borne by the Contractor.

11.10 Notification

Contractor understands, acknowledges and agrees that the purpose for prompt notification to the District pursuant to these provisions is to allow the District to investigate the condition(s) so that the District shall have the opportunity to decide how the District desires to proceed as a result of the condition(s). Accordingly, failure of Contractor to promptly notify the District in writing, pursuant to these provisions, shall constitute Contractor's waiver of any claim for damages or delay incurred as a result of the condition(s).

11.11 Hazardous Materials

Contractor shall comply with all provisions and requirements of the Contract Documents related to hazardous materials including, without limitation, Hazardous Materials Procedures and Requirements.

11.12 No Signs

Neither the Contractor nor any other person or entity shall display any signs not required by law or the Contract Documents at the Site, fences trailers, offices, or elsewhere on the Site without specific prior written approval of the District.

12. TRENCHES

12.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Price exceeds $25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, promptly submit to the District and/or a registered civil or structural engineer employed by the District or Architect, a detailed plan, stamped by a licensed engineer retained by the Contractor, showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

12.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

12.3 No Tort Liability of District

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

12.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CalOSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

12.5 Discovery of Hazardous Waste and/or Unusual Conditions

12.5.1 Pursuant to Public Contract Code section 7104, if the Work involves digging trenches or other excavations that extend deeper than four feet below the Surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:

12.5.1.1 Material that the Contractor believes may be material that is hazardous waste, as defined in section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

12.5.1.2 Subsurface or latent physical conditions at the Site differing from those indicated.

12.5.1.3 Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

12.5.2 The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order under the procedures described herein.

12.5.3 In the event that a dispute arises between District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law that pertain to the resolution of disputes and protests.

13. INSURANCE AND BONDS

13.1 Insurance

Unless different provisions and/or limits are indicated in the Special Conditions, all insurance required of Contractor and/or its Subcontractor(s) shall be at least as broad as the amounts and include the provisions set forth herein.

13.1.1 Commercial General Liability and Automobile Liability Insurance

13.1.1.1 Contractor shall procure and maintain, during the life of this Contract, Commercial General Liability Insurance and Automobile Liability Insurance in a form at least as broad as Insurance Services (ISO) Form CG 00 01 that shall protect Contractor, its agents, representative, employees, or subcontractors, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for products and completed operations, property damage, bodily injury and personal injury, death, advertising injury, and medical payments arising from, or in connection with, the performance of the Work of the Project within the Contract Documents at the required limits, or Contractor shall procure and maintain these coverages separately. Contractor shall procure and maintain Automobile Liability Insurance in a form at least as broad as ISO Form CA 0001 covering Code 1 (any auto) at the required limits, or Contractor shall procure and maintain these coverages separately.

13.1.1.2 Contractor's deductible or self-insured retention for its Commercial General Liability Insurance policy shall not exceed five thousand dollars ($5,000) for deductible or twenty-five thousand dollars ($25,000) for self-insured retention, respectively, unless approved in writing by District.

13.1.1.3 All such policies shall be written on an occurrence form.

13.1.2 Excess Liability Insurance

13.1.2.1 If Contractor's underlying policy limits are less than required, subject to the District's sole discretion, Contractor may procure and maintain, during the life of this Contract, an Excess Liability Insurance Policy to meet the policy limit requirements of the required policies in order to satisfy, in the aggregate with its underlying policy, the insurance requirements herein including, but not limited to, primary and non-contributory, additional insured, Self-Insured Retentions (SIRs), indemnity, and defense requirements. The Excess Liability Insurance Policy shall be provided on a true "following form" or broader coverage basis, with coverage at least as broad as provided on the underlying Commercial General Liability insurance. No insurance policies maintained by the Additional Insureds, whether primary or excess, and which also apply to a loss covered hereunder, shall be called upon to contribute to a loss until Contractor's primary and excess liability policies are exhausted.

13.1.2.2 There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the Excess Liability Insurance Policy. Any Excess Liability Insurance Policy shall be written on a following form and shall protect Contractor, District, State, Construction Manager(s), Project Manager(s), and Architect(s) in amounts and including the provisions as set forth in the Supplementary Conditions (if any) and/or Special Conditions, and that complies with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

13.1.2.3 The District, in its sole discretion, may accept the Excess Liability Insurance Policy that brings Contractor's primary limits to the minimum requirements herein.

13.1.3 Subcontractor(s): Contractor shall require its Subcontractor(s), if any, to procure and maintain Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance (if Subcontractor elects to satisfy, in part the insurance required herein by procuring and maintaining an Excess Liability Insurance Policy) with minimum limits at least equal to the amount required of Contractor except where smaller minimum limits are permitted as set forth below. For Commercial General Liability coverage, subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13.

13.1.4 Workers' Compensation and Employers' Liability Insurance

13.1.4.1 In accordance with provisions of section 3700 of the California Labor Code, the Contractor and every Subcontractor shall be required to secure the payment of compensation to its employees.

13.1.4.2 Contractor shall procure and maintain, during the life of this Contract, Workers' Compensation Insurance and Employers' Liability Insurance for all of its employees engaged in work under this Contract, on/or at the Site of the Project. This coverage shall cover, at a minimum, medical and surgical treatment,

disability benefits, rehabilitation therapy, and survivors' death benefits. Contractor shall require its Subcontractor(s), if any, to procure and maintain Workers' Compensation Insurance and Employers' Liability Insurance for all employees of Subcontractor(s). Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by Contractor's insurance. If any class of employee or employee engaged in Work under this Contract, on or at the Site of the Project, is not protected under the Workers' Compensation Insurance, Contractor shall provide, or shall cause a Subcontractor to provide, adequate insurance coverage for the protection of any employee(s) not otherwise protected before any of those employee(s) commence work.

13.1.4.3 The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of District for all work performed by Contractor, its employees, agents and subcontractors.

13.1.5 Builder's Risk Insurance: Builder's Risk "All Risk" Insurance

Contractor shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction) insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the Project and no coinsurance penalty provisions. The cost value basis shall be consistent with the total replacement cost of all insurable Work of the Project included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, rain, dust, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

13.1.6 Pollution Liability Insurance

13.1.6.1 Contractor shall procure and maintain Pollution Liability Insurance in a form at least as broad as ISO Form CG 2415 that shall protect Contractor, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, including natural resource damage, cleanup costs, removal, storage, disposal, and/or use of the pollutant arising from operations under this Contract, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims, or Contractor shall procure and maintain these coverages separately. Coverage shall apply to sudden and/or gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos.

13.1.6.2 Contractor warrants that any retroactive date applicable to coverage under the policy shall predate the effective date of the Contract and that

continuous coverage will be maintained or an extended reporting or discovery period will be exercised for a period of three (3) years, beginning from the time that the Work under the Contract is completed.

13.1.6.3 If the services involve lead-based paint or asbestos identification/ remediation, Contractor's Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/ remediation, Contractor's Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

13.1.6.4 If Contractor is responsible for removing any pollutants from a site, then Contractor shall ensure that Any Auto, including owned, non-owned, and hired, is included within the above policies and at the required limits, to cover its automobile exposure from transporting the pollutants from the site to an approved disposal site. This coverage shall include the Motor Carrier Act Endorsement, MCS 90.

13.1.7 Proof of Insurance and Other Requirements: Endorsements and Certificates

13.1.7.1 Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract, until Contractor and its Subcontractor(s) have procured all required insurance and Contractor has delivered in duplicate to the District complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the District has approved these documents.

13.1.7.2 Endorsements, certificates, and insurance policies shall include the following:

13.1.7.2.1 A clause stating the following, or other language acceptable to the District:

"This policy shall not be canceled until written notice to District, Architect, and Construction Manager stating date of the cancellation by the insurance carrier. Date of cancellation may not be less than thirty (30) days after date of mailing notice."

13.1.7.2.2 Language stating in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, to whom cancellation and reduction notice will be sent, and length of notice period.

13.1.7.2.3 All endorsements, certificates and insurance policies shall state that District, its trustees, employees and agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s) and Architect(s) are named additional insureds under all policies except Workers' Compensation Insurance and Employers' Liability Insurance. General liability coverage can be provided in the form of an endorsement to the Contractor's

insurance (at least as broad as ISO Form CG 20 10, CG 11 85 or **both** CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 forms if later revisions used).

13.1.7.2.4 All endorsements shall waive any right to subrogation against any of the named additional insureds.

13.1.7.2.5 Contractor's and Subcontractors' insurance coverage at least as broad as ISO CG 20 01 04 13 shall be primary and non-contributory to any insurance or self-insurance maintained by District, its trustees, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Architect(s). This requirement shall also apply to any Excess liability policies.

13.1.7.2.6 Contractor's insurance limit shall apply separately to each insured against whom a claim is made or suit is brought.

13.1.7.3 No policy shall be amended, canceled or modified, and the coverage amounts shall not be reduced, until Contractor or Contractor's broker has provided written notice to District, Architect(s), and Construction Manager(s) stating date of the amendment, modification, cancellation or reduction, and a description of the change. Date of amendment, modification, cancellation or reduction may not be less than thirty (30) days after date of mailing notice.

13.1.7.4 Insurance written on a "claims made" basis shall be retroactive to a date that coincides with or precedes Contractor's commencement of Work, including subsequent policies purchased as renewals or replacements. Said policy is to be renewed by the Contractor and all Subcontractors for a period of five (5) years following completion of the Work or termination of this Agreement. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this Agreement and will cover the Contractor and all Subcontractors for all claims made. If coverage is cancelled or non-renewed, and not replaced with another claims-made policy from with a retroactive date prior to the effective date of this Agreement, or the start of Work date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the District for review.

13.1.7.5 Contractor's and Subcontractors' insurance policy(s) shall be primary and non-contributory to any insurance or self-insurance maintained by District, its Board Members, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Architect(s).

13.1.7.6 Unless otherwise stated in the Special Conditions, all of Contractor's insurance shall be with insurance companies with an A.M. Best rating of no less than **A: VII**.

13.1.7.7 The insurance requirements set forth herein shall in no way limit the Contractor's liability arising out of or relating to the performance of the Work or related activities.

13.1.7.8 Failure of Contractor and/or its Subcontractor(s) to comply with the insurance requirements herein shall be deemed a material breach of the Contract.

[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]

13.1.8 Insurance Policy Limits

13.1.8.1 Unless different limits are indicated in the Special Conditions, the limits of insurance shall not be less than the following amounts:

Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	$2,000,000 per occurrence; $4,000,000 aggregate
Automobile Liability	Any Auto – Combined Single Limit	$1,000,000
Workers' Compensation		Statutory limits pursuant to State law
Employers' Liability		$1,000,000 per accident for bodily injury or disease
Builder's Risk (Course of Construction)		Full replacement value for scope of Work
Pollution Liability		$1,000,000 per claim; $2,000,000 aggregate

13.1.8.2 If Contractor normally carries insurance in an amount greater than the minimum amounts required by District, that greater amount shall become the minimum required amount of insurance for purposes of the Contract. Therefore, Contractor hereby acknowledges and agrees that all insurance carried by it shall be deemed liability coverage for all actions it performs in connection with the Contract.

13.2 Contract Security - Bonds

13.2.1 Contractor shall furnish two surety bonds issued by a California admitted surety insurer as follows:

13.2.1.1 Performance Bond: A bond in an amount at least equal to one hundred percent (100%) of Contract Price as security for faithful performance of this Contract.

13.2.1.2 Payment Bond: A bond in an amount at least equal to one hundred percent (100%) of the Contract Price as security for payment of persons performing labor and/or furnishing materials in connection with this Contract.

13.2.2 Cost of bonds shall be included in the Bid and Contract Price.

13.2.3 All bonds related to this Project shall be in the forms set forth in these Contract Documents and shall comply with all requirements of the Contract Documents, including, without limitation, the bond forms.

14. WARRANTY/GUARANTEE/INDEMNITY

14.1 Warranty/Guarantee

14.1.1 The Contractor shall obtain and preserve for the benefit of the District, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

14.1.2 In addition to guarantees required elsewhere, Contractor shall, and hereby does guarantee and warrant all Work furnished on the job against all defects for a period of **TWO (2)** years after the later of the following dates, unless a longer period is provided for in the Contract Documents:

14.1.2.1 The acceptance by the District's governing board of the Work, subject to these General Conditions, or

14.1.2.2 The date that commissioning for the Project, if any, was completed.

At the District's sole option, Contractor shall repair or replace any and all of that Work, together with any other Work that may be displaced in so doing, that may prove defective in workmanship and/or materials within a **TWO (2)** year period from date of completion as defined above, unless a longer period is provided for in the Contract Documents, without expense whatsoever to District. In the event of failure of Contractor and/or Surety to commence and pursue with diligence said replacements or repairs within ten (10) days after being notified in writing, Contractor and Surety hereby acknowledge and agree that District is authorized to proceed to have defects repaired and made good at expense of Contractor and/or Surety who hereby agree to pay costs and charges therefore immediately on demand.

14.1.3 If, in the opinion of District, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to District or to prevent interruption of District operations, District will attempt to give the notice required above. If Contractor or Surety cannot be contacted or neither complies with District's request for correction within a reasonable time as determined by District, District may, notwithstanding the above provision, proceed to make any and all corrections and/or provide attentions the District believes are necessary. The costs of correction or attention shall be charged against Contractor and Surety of the guarantees provided in this Article or elsewhere in this Contract.

14.1.4 The above provisions do not in any way limit the guarantees on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish to District all appropriate guarantee or warranty certificates as indicated in the Specifications or upon request by District.

14.1.5 Nothing herein shall limit any other rights or remedies available to District.

14.2 Indemnity and Defense

14.2.1 To the furthest extent permitted by California law, the Contractor shall indemnify, keep and hold harmless the District, the Architect(s), and the Construction Manager(s), their respective consultants, separate contractors, board members, officers, representatives, agents, and employees, in both individual and official capacities ("Indemnitees"), against all suits, claims, injury, damages, losses, and expenses ("Claims"), including but not limited to attorney's fees, caused by, arising out of, resulting from, or incidental to the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, the Contractor's indemnification and hold harmless obligation shall be reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent the Claim(s) is/are caused by the active negligence or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. This indemnification and hold harmless obligation of the Contractor shall not be construed to negate, abridge, or otherwise reduce any right or obligation of indemnity that would otherwise exist or arise as to any Indemnitee or other person described herein. This indemnification and hold harmless obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR.

14.2.2 To the furthest extent permitted by California law, Contractor shall also defend Indemnitees, at its own expense, including but not limited to attorneys' fees and costs, against all Claims caused by, arising out of, resulting from, or incidental to the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, without impacting Contractor's obligation to provide an immediate and ongoing defense of Indemnitees, the Contractor's defense obligation shall be retroactively reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent caused by the active negligence or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. The District shall have the right to accept or reject any legal representation that Contractor proposes to defend the Indemnitees. If a conflict-of-interest bars joint representation of Contractor and Indemnitees, District shall have the right to select its own counsel, subject to Contractor's reasonable right of rejection. If any Indemnitee provides its own defense due to failure to timely respond to tender of defense, rejection of tender of defense, or conflict of interest of proposed counsel, Contractor shall reimburse such Indemnitee for any expenditures.

Even if the Contractor assumes the defense of the District with acceptable counsel, the District, at its sole option, may participate in the defense, at its own expense, with counsel of its own choice without relieving the Contractor of any of its obligations hereunder. Contractor's defense obligation shall not be construed to negate, abridge, or otherwise reduce any right or obligation of defense that would otherwise exist as to any Indemnitee or other person described herein. Contractor's defense obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR. The Contractor shall give prompt notice to the District in the event of any Claim(s).

14.2.3 Without limitation of the provisions herein, if the Contractor's obligation to indemnify and hold harmless the Indemnitees or its obligation to defend Indemnitees as provided herein shall be determined to be void or unenforceable, in whole or in part, it is the intention of the parties that these circumstances shall not otherwise affect the validity or enforceability of the Contractor's agreement to indemnify, defend, and hold harmless the rest of the Indemnitees, as provided herein. Further, the Contractor shall be and remain fully liable on its agreements and obligations herein to the fullest extent permitted by law.

14.2.4 Pursuant to Public Contract Code section 9201, the District shall provide timely notification to Contractor of the receipt of any third-party Claim relating to this Contract. The District shall be entitled to recover its reasonable costs incurred in providing said notification.

14.2.5 In any and all Claims against any of the Indemnitees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the Contractor's indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

14.2.6 The District may retain so much of the moneys due the Contractor as shall be considered necessary, until disposition of any such Claims or until the District, Architect(s) and Construction Manager(s) have received written agreement from the Contractor that they will unconditionally defend the District, Architect(s) and Construction Manager(s), their respective officers, agents and employees, and pay any damages due by reason of settlement or judgment.

14.2.7 The Contractor's defense and indemnification obligations hereunder shall survive the completion of Work, the warranty/guarantee period, and the termination of the Contract.

15. TIME

15.1 Notice to Proceed

15.1.1 District may issue a Notice to Proceed within ninety (90) days from the date of the Notice of Award. Once Contractor has received the Notice to Proceed, Contractor shall complete the Work within the period of time indicated in the Contract Documents.

15.1.2 In the event that the District desires to postpone issuing the Notice to Proceed beyond ninety (90) days from the date of the Notice of Award, it is expressly understood that with reasonable notice to the Contractor, the District may postpone issuing the Notice to Proceed. It is further expressly understood by Contractor that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed.

15.1.3 If the Contractor believes that a postponement of issuance of the Notice to Proceed will cause a hardship to Contractor, Contractor may terminate the Contract. Contractor's termination due to a postponement shall be by written notice to District within ten (10) days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement. Should Contractor terminate the Contract as a result of a notice of postponement, District shall have the authority to award the Contract to the next lowest responsive responsible bidder.

15.2 Computation of Time / Adverse Weather

15.2.1 The Contractor will only be allowed a time extension for Adverse Weather conditions if requested by Contractor in compliance with the time extension request procedures and only if all of the following conditions are met:

15.2.1.1 The weather conditions constitute Adverse Weather, as defined herein;

15.2.1.2 Contractor can verify that the Adverse Weather caused delays in excess of five (5) hours of the indicated labor required to complete the scheduled tasks of Work on the day affected by the Adverse Weather;

15.2.1.3 The Contractor's crew is dismissed as a result of the Adverse Weather;

15.2.1.4 Said delay adversely affects the critical path in the Construction Schedule; and

15.2.1.5 Exceeds twelve (12) days of delay per year.

15.2.2 If the aforementioned conditions are met, a non-compensable day-for-day extension will only be allowed for those days in excess of those indicated herein.

15.2.3 The Contractor shall work seven (7) days per week, if necessary, irrespective of inclement weather, to maintain access and the Construction Schedule, and to protect the Work under construction from the effects of Adverse Weather, all at no further cost to the District.

15.2.4 The Contract Time has been determined with consideration given to the average climate weather conditions prevailing in the County in which the Project is located.

15.3 Hours of Work

15.3.1 Sufficient Forces

Contractor and Subcontractors shall continuously furnish sufficient and competent work forces with the required levels of familiarity with the Project and skill, training and experience to ensure the prosecution of the Work in accordance with the Construction Schedule.

15.3.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

15.3.3 No Work during State Testing

Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests. The District or District's Representative will provide Contractor with a schedule of test dates concurrent with the District's issuance of the Notice to Proceed, or as soon as test dates are made available to the District.

15.4 Progress and Completion

15.4.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

15.4.2 No Commencement Without Insurance or Bonds

The Contractor shall not commence operations on the Project or elsewhere prior to the effective date of insurance and bonds. The date of commencement of the Work shall not be changed by the effective date of such insurance or bonds. If Contractor commences Work without insurance and bonds, all Work is performed at Contractor's peril and shall not be compensable until and unless Contractor secures bonds and

insurance pursuant to the terms of the Contract Documents and subject to District claim for damages.

15.5 Schedule

Contractor shall provide to District, Construction Manager, and Architect a schedule in conformance with the Contract Documents and as required in the Notice to Proceed and the Contractor's Submittals and Schedules section of these General Conditions.

15.6 Expeditious Completion

The Contractor shall proceed expeditiously with adequate forces and shall achieve Completion within the Contract Time.

16. EXTENSIONS OF TIME – LIQUIDATED DAMAGES

16.1 Liquidated Damages

Contractor and District hereby agree that the exact amount of damages for failure to complete the Work within the time specified is extremely difficult or impossible to determine. If the Work is not completed within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the Contractor shall pay to District as fixed and liquidated damages, and not as a penalty, the amount set forth in the Agreement for each calendar day of delay in completion. Contractor and its Surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

16.2 Excusable Delay

16.2.1 Contractor shall not be charged for liquidated damages because of any delays in completion of the Work which are not the fault of Contractor or its Subcontractors, including adverse weather delays, strikes, acts of God as defined in Public Contract Code section 7105, acts of enemy, epidemics, and quarantine restrictions. Contractor shall, within five (5) calendar days of beginning of any delay, including a Force Majeure event, notify District in writing of causes of delay including documentation and facts explaining the delay and the direct correlation between the cause and effect ("Notice of Delay"). District shall review the facts and extent of any delay and shall grant extension(s) of time for completing Work when, in its judgment, the findings of fact justify an extension. Extension(s) of time shall apply only to that portion of Work affected by delay and shall not apply to other portions of Work not so affected. An extension of time may only be granted if Contractor has timely submitted the Construction Schedule as required herein.

16.2.2 Contractor's Notice of Delay and request for a time extension pursuant to subparagraph 16.2 is a condition precedent to Contractor's submittal of and/or entitlement to a claim pursuant to Article 25 of these Construction Provisions. Contractor shall notify the District pursuant to the Claims Process provisions in these General Conditions of any anticipated delay and its cause. Following submission of a claim, the District may determine whether the delay is to be considered avoidable or

unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

16.2.3 In the event the Contractor requests an extension of Contract Time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work. When requesting time, requests must be submitted with full justification and documentation. If the Contractor fails to submit justification, it waives its right to a time extension at a later date. Such justification must be based on the official Construction Schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the Scope of Work. Any claim for delay must include the following information as support, without limitation:

16.2.3.1 The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform the activities within the stated duration.

16.2.3.2 Specific logical ties to the Contract Schedule for the proposed changes and/or delay showing the activity/activities in the Construction Schedule that are affected by the change and/or delay. In particular, Contractor must show an actual impact to the schedule, after making a good faith effort to mitigate the delay by rescheduling the work, by providing an analysis of the schedule ("Time Impact Analysis"). Such Time Impact Analysis shall describe in detail the cause and effect of the delay and the impact on the critical dates in the Project schedule and main sequence of schedule activities to enable District to evaluate the impact of changed Work to the scheduled critical path. (This information must be provided for any portion of any delay of seven (7) days or more.) The Contractor shall be responsible for all costs associated with the preparation of Time Impact Analyses.

16.2.4 A recovery schedule must be submitted within twenty (20) calendar days of written notification to the District of causes of delay to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District. At District's discretion, the Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.

16.2.5 Contractor must comply with requirements in subsection 16.2 for a Notice of Delay and supporting justification notwithstanding if Contractor contends the specific delay period is unknown and continuing. When submitting a Notice of Delay and supporting justification, Contractor must provide an estimated delay duration to critical path activities at the time the Notice of Delay and supporting justification is required to be submitted. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of a Notice of Delay. If Contractor contends the delaying event(s) are continuing, Contractor must update monthly the estimated delay period with supporting justification.

16.2.6 Contractor's failure to timely submit a written Notice of Delay and/or provide the justification required in subparagraph 16.2 shall constitute Contractor's waiver of any right to later submit a Proposed Change Order or pursue a Claim on the circumstances giving rise to the request, or to later pursue any additional money or time extensions in any manner related to that issue, regardless of the merits because the Contractor will not have satisfied a condition precedent or exhausted administrative remedies required to show entitlement to a Contract Time adjustment. Contractor acknowledges that these written notices and justification requirements are critically important to District's Work, Project management, and evaluating potential options and alternatives to implement mitigation efforts to reduce or eliminate additional Project costs and delays.

16.3 No Additional Compensation for Delays Within Contractor's Control

16.3.1 Contractor is aware that governmental agencies, including, without limitation, the Division of the State Architect, the Department of General Services, gas companies, electrical utility companies, water districts, and other agencies may have to approve Contractor-prepared drawings or approve a proposed installation. Accordingly, Contractor shall include in its bid, time for possible review of its drawings and for reasonable delays and damages that may be caused by such agencies. Thus, Contractor is not entitled to make a claim for damages or delays arising from the review of Contractor's drawings.

16.3.2 Contractor shall only be entitled to compensation for delay when all of the following conditions are met:

16.3.2.1 The District is responsible for the delay;

16.3.2.2 The delay is unreasonable under the circumstances involved;

16.3.2.3 The delay was not within the contemplation of the District and Contractor;

16.3.2.4 The delay could not have been avoided or mitigated by Contractor's reasonable diligence; and

16.3.2.5 Contractor timely complies with the claims procedure of the Contract Documents.

16.3.3 Where an event for which District is responsible impacts the projected Completion Date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment, and material the Contractor would expend to mitigate District-caused time impact. The Contractor shall submit its mitigation plan to District within fourteen (14) calendar days from the date of discovery of the impact. The Contractor is responsible for the cost to prepare the mitigation plan.

16.3.4 Where a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct costs, provided that Contractor can demonstrate such additional costs are:

16.3.4.1 Actually incurred performing the Work;

16.3.4.2 Not compensated by the Markup allowed; and

16.3.4.3 Directly result from the extended Contract Time.

16.3.5 Contractor shall comply with all required procedures, documentation and time requirements in the Contract Documents. Contractor may not seek or recover such costs using formulas (e.g. Eichleay, labor factors). No time will be granted under this Contract for cumulative effect of changes.

16.4 Force Majeure

"Force Majeure" means any event or circumstance unknown at the time of contracting that is beyond the parties' control and makes performance of the contract impractical or impossible. The Party seeking to have its performance obligation(s) excused must demonstrate that there was such an insuperable interference occurring without the party's intervention as could not have been prevented by the exercise of prudence, diligence, and care, by providing prompt notice to the other Party, including full particulars of such event, of its inability to perform its obligations due to such event, following commencement of the claiming Party's inability to so perform its obligations. To the extent satisfying these conditions, Force Majeure events include the following: acts of God, war, civil unrest, epidemic, fire, smoke, volcanic eruption, earthquake, strike, unusually severe weather, flood, or shortage of transportation facilities, lock out, or commandeering of materials, product, plant, or facilities by the government. Force Majeure shall not be based on a Party's financial inability to perform under this Agreement unless there exists extreme and unreasonable difficulty, expense, injury, or loss involved. A Force Majeure event does not include an act of negligence or intentional wrongdoing by a Party. Any Party claiming a Force Majeure event shall use reasonable diligence to remove the condition that prevents performance and shall not be entitled to suspend performance of its obligations in any greater scope or for any longer duration than is required by the Force Majeure event. Each Party shall use its best efforts to mitigate the effects of such Force Majeure event, remedy its inability to perform, and resume full performance of its obligations hereunder. No obligation that arose before the Force Majeure event that could and should have been fully performed before such Force Majeure event is excused as a result of such Force Majeure event.

16.5 Float or Slack in the Schedule

Float or slack is the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule. Float or slack is not for the exclusive use of or benefit of either the District or the Contractor, but its use shall be determined solely by the District.

17. CHANGES IN THE WORK

17.1 No Changes Without Authorization

17.1.1 There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order or a written Construction Change Directive authorized by the District as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's governing board has authorized the same and the cost thereof has been approved in writing by Change Order or Construction Change Directive in advance of the changed Work being performed. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted and approved in writing in the Change Order or Construction Change Directive. Contractor shall be responsible for any costs incurred by the District for professional services and DSA fees and/or delay to the Project Schedule, if any, for DSA to review any request for changes to the DSA approved plans and specifications for the convenience of the Contractor and/or to accommodate the Contractor's means and methods. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

17.1.2 Contractor shall perform immediately all work that has been authorized by a fully executed Change Order or Construction Change Directive. Contractor shall be fully responsible for any and all delays and/or expenses caused by Contractor's failure to expeditiously perform this Work.

17.1.3 Should any Change Order result in an increase in the Contract Price or extend the Contract Time, the cost of or length of extension in that Change Order shall be agreed to, in writing, by the District in advance of the Work by Contractor and shall be subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that Contractor proceeds with any change in Work without a Change Order executed by the District or Construction Change Directive, Contractor waives any claim of additional compensation or time for that additional work. Under no circumstances shall Contractor be entitled to any claim of additional compensation or time not expressly requested by Contractor in a Proposed Change Order or approved by District in an executed Change Order.

17.1.4 A Change Order or Construction Change Directive will become effective when approved by the Board, notwithstanding that Contractor has not signed it. A Change Order or Construction Change Directive will become effective without Contractor's signature provided District indicates it as a "Unilateral Change Order". Any dispute as to the adjustment in the Contract Price or Contract Time, if any, of the Unilateral Change Order shall be resolved pursuant to the Payments and Claims Process provisions herein.

17.1.5 Contractor understands, acknowledges, and agrees that the reason for District authorization is so that District may have an opportunity to analyze the Work and decide whether the District shall proceed with the Change Order or alter the Project so that a change in Work becomes unnecessary.

17.2 Architect Authority

The Architect will have authority to order minor changes in the Work not involving any adjustment in the Contract Price, or an extension of the Contract Time, or a change that is inconsistent with the intent of the Contract Documents. These changes shall be effected by written Change Order, Construction Change Directive, by Architect's response(s) to RFI(s), or by Architect's Supplemental Instructions ("ASI").

17.3 Price Request

17.3.1 Definition of Price Request

A Price Request is a written request prepared by the Architect requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change in the Work on the Contract Price and the Contract Time.

17.3.2 Scope of Price Request

A Price Request shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required herein. The Contractor shall not be entitled to any additional compensation for preparing a response to a Price Request, whether ultimately accepted or not.

17.4 Change Orders

17.4.1 A Change Order is a written instrument prepared and issued by the District and/or the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, the Architect, and approved by the Project Inspector (if necessary) and DSA (if necessary), stating their agreement regarding all of the following:

17.4.1.1 A description of a change in the Work;

17.4.1.2 The amount of the adjustment in the Contract Price, if any; and

17.4.1.3 The extent of the adjustment in the Contract Time, if any.

17.5 Proposed Change Order

17.5.1 Definition of Proposed Change Order

A Proposed Change Order ("PCO") is a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

17.5.2 Changes in Contract Price

A PCO shall include breakdowns and backup documentation pursuant to the revisions herein and sufficient, in the District's judgment, to validate any change in Contract

Price. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional compensation for Change Order Work.

17.5.3 Changes in Time

A PCO shall also include any changes in time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change but must be based upon the impact to the Construction Schedule as defined in the Contract Documents. The Contractor shall justify the proposed change in time by submittal of a schedule analysis that accurately shows the impact of the change on the critical path of the Construction Schedule ("Time Impact Analysis"). If Contractor fails to request a time extension in a PCO, including the Time Impact Analysis, then the Contractor is thereafter precluded from requesting, and waives any right to request, additional time and/or claim a delay. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional time for Change Order Work. A PCO that leaves the amount of time requested blank, or states that such time requested is "to be determined", is not permitted and shall also constitute a waiver of any right to request additional time and/or claim a delay.

17.5.4 Allowances

If there is an Allowance, then Contractor shall not bill for or be due any portion of an Allowance unless the District has identified specific work, Contractor has submitted a price for that work or the District has proposed a price for that work, the District has accepted the cost for that work, and the District has executed an Allowance Expenditure Directive incorporating that work. Allowance Expenditure Directives shall be based on Contractor's costs, without overhead and profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from the Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive.

Any unused portion of the Allowance will revert to the District documented by a deductive Change Order. Contractor authorizes the District to execute a unilateral deductive Change Order at or near the end of the Project for all or any portion of the Allowance not allocated.

17.5.5 Unknown and/or Unforeseen Conditions

Separate from what is provided in the Allowance, if Contractor requests an increase in Contract Price and/or Contract Time that is based at least partially on Contractor's assertion that Contractor has encountered unknown and/or unforeseen condition(s) on the Project, then Contractor shall base the PCO on provable information that, beyond a reasonable doubt and to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were actually unknown and/or unforeseen and that the condition(s) were reasonably unknown and/or unforeseen. If not, the District shall deny the PCO as unsubstantiated, and the Contractor shall complete the Project without any increase in Contract Price and/or Contract Time based on that PCO.

17.5.6 Time to Submit Proposed Change Order

Contractor shall submit its PCO, using Document 00 63 57 (Proposed Change Order Form), within five (5) working days of the date Contractor discovers, or reasonably should have discovered, the circumstances giving rise to the PCO, unless additional time to submit a PCO is granted in writing by the District. Time is of the essence in Contractor's submission of PCOs so that the District can promptly investigate the basis for the PCO. Accordingly, if Contractor fails to submit its PCO within this timeframe, Contractor waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time based on circumstances giving rise to the PCO.

17.5.7 Proposed Change Order Certification

In submitting a PCO, Contractor certifies and affirms that the cost and/or time request is submitted in good faith, that the cost and/or time request is accurate and in accordance with the provisions of the Contract Documents, and the Contractor submits the cost and/or request for extension of time recognizing the significant civil penalties and treble damages which follow from making a false claim or presenting a false claim under Government Code section 12650 et seq.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

[THE REMAINDER OF THIS PAGE LEFT BLANK INTENTIONALLY]

17.6 Format for Proposed Change Order

17.6.1 The following format shall be used as applicable by the District and the Contractor (e.g. Change Orders, PCO's) to communicate proposed additions and deductions to the Contract, supported by attached documentation. Any spaces left blank will be deemed no change to cost or time.

	WORK PERFORMED OTHER THAN BY CONTRACTOR	**ADD**	**DEDUCT**
(a)	**Material** (attach suppliers' invoice or itemized quantity and unit cost plus sales tax)		
(b)	**Add Labor** (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(c)	**Add Equipment** (attach suppliers' invoice)		
(d)	**Subtotal**		
(e)	**Add Overhead and Profit for any and all Tiers of Subcontractor**, the total not to exceed ten percent (10%) of Item (d)		
(f)	**Subtotal**		
(g)	**Add General Conditions Cost** (if Time is Compensable) (attach supporting documentation)		
(h)	**Subtotal**		
(i)	**Add Overhead and Profit for Contractor**, not to exceed five percent (5%) of Item (h)		
(j)	**Subtotal**		
(k)	**Add Bond and Insurance**, not to exceed two and one-half percent (2.5%) of Item (j)		
(l)	**TOTAL**		
(m)	**Time** (zero unless indicated; "TBD" not permitted)	**_____ Calendar Days**	

[REMAINDER OF THIS PAGE LEFT BLANK INTENTIONALLY]

	WORK PERFORMED BY CONTRACTOR	**ADD**	**DEDUCT**
(n)	**Material** (attach itemized quantity and unit cost plus sales tax)		
(o)	**Add Labor** (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(p)	**Add Equipment** (attach suppliers' invoice)		
(q)	**Add General Conditions Cost** (if Time is Compensable) (attach supporting documentation)		
(r)	**Subtotal**		
(s)	**Add Overhead and Profit for Contractor**, not to exceed fifteen percent (15%) of Item (e)		
(t)	**Subtotal**		
(u)	**Add Bond and Insurance**, not to exceed two and one-half percent (2.5%) of Item (g)		
(v)	**TOTAL**		
(w)	**Time** (zero unless indicated; "TBD" not permitted)	**_____ Calendar Days**	

17.6.2 Mandatory Use of Forms. Contractor shall only submit PCOs by completing Document 00 63 57 (Proposed Change Order Form). Contractor acknowledges and agrees that use of this specific and consistent format is essential to District's evaluation of PCOs. Accordingly, Contractor waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time for any purported PCO that does not comply with Document 00 63 57 (Proposed Change Order Form).

17.6.3 Labor. Contractor shall be compensated for the costs of labor actually and directly utilized in the performance of the Work. Such labor costs shall be the actual cost, use of any formulas (e.g. labor factors) is not allowed, not to exceed prevailing wage rates established by the bid advertisement date or when the Contract was awarded, whichever is applicable, in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Work, fully Burdened. Labor costs shall exclude costs incurred by the Contractor in preparing estimate(s) of the costs of the change in the Work, in the maintenance of records relating to the costs of the change in the Work, coordination and assembly of materials and information relating to the change in the Work or performance thereof, or the supervision and other overhead and general conditions costs associated with the change in the Work or performance thereof, including but not limited to the cost for the job superintendent. If applicable, District will pay Contractor the reasonable costs for room and board, supported with appropriate backup documentation, without markup for profit or overhead as provided by U.S. General Services

Administration per diem rates for California lodging, meals and incidentals, https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup.

17.6.4 Materials. Contractor shall be compensated for the costs of materials necessarily and actually used or consumed in connection with the performance of the change in the Work. Costs of materials may include reasonable costs of transportation from a source closest to the Site of the Work and delivery to the Site. If discounts by material suppliers are available for materials necessarily used in the performance of the change in the Work, they shall be credited to the District. If materials necessarily used in the performance of the change in the Work are obtained from a supplier or source owned in whole or in part by the Contractor, compensation therefor shall not exceed the current wholesale price for such materials. If, in the reasonable opinion of the District, the costs asserted by the Contractor for materials in connection with any change in the Work are excessive, or if the Contractor fails to provide satisfactory evidence of the actual costs of such materials from its supplier or vendor of the same, the costs of such materials and the District's obligation to pay for the same shall be limited to the then lowest wholesale price at which similar materials are available in the quantities required to perform the change in the Work. The District may elect to furnish materials for the change in the Work, in which event the Contractor shall not be compensated for the costs of furnishing such materials or any mark-up thereon.

17.6.5 Equipment. As a precondition to the District's duty to pay for Equipment rental or loading and transportation, Contractor shall provide satisfactory evidence of the actual costs of Equipment from the supplier, vendor or rental agency of same. Contractor shall be compensated for the actual cost of the necessary and direct use of Equipment in the performance of the change in the Work. Use of such Equipment in the performance of the change in the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Equipment moved by its own power shall include time required to move such Equipment to the site of the Work from the nearest available rental source of the same. If Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Equipment is used for performance of any portion of the Work other than the change in the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, the Project Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. Contractor shall not be entitled to an allowance or any other compensation for Equipment or tools used in the performance of change in the Work where such Equipment or tools have a replacement value of $500.00 or less. Equipment costs claimed by the Contractor in connection with the performance of any Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the Project Inspector and the District, the allowable rate for the use of Equipment in connection with the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance,

labor (exclusive of labor costs of the Equipment operator), and any and all other costs incurred by the Contractor incidental to the use of such Equipment.

17.6.6 General Conditions Cost. The phrase "General Conditions Cost" shall mean, other than expressly limited or excluded herein, the costs of Contractor during the construction phase, including but not limited to: payroll costs for project manager for Work conducted at the Site, payroll costs for the superintendent and full-time general foremen, workers not included as direct labor costs engaged in support functions (e.g., loading/unloading, clean-up), costs of offices and temporary facilities including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities and telephone services at the Site, costs of consultants not in the direct employ of Contractor or Subcontractors, and fees for permits and licenses.

17.6.7 Overhead and Profit. The phrase "Overhead and Profit" shall include field and office supervisors and assistants, watchperson, use of small tools, consumable, insurance other than construction bonds and insurance required herein, general conditions costs and home office expenses.

17.7 Change Order Certification

17.7.1 All Change Orders and PCOs include the following certification by the Contractor, either in the form specifically or incorporated by this reference:

17.7.1.1 The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. It is understood that the changes herein to the Contract shall only be effective when approved by the governing board of the District.

17.7.1.2 It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

17.7.2 Accord and Satisfaction: Contractor's execution of any Change Order shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim.

17.7.3 Mandatory Use of Forms. Contractor shall only submit Change Orders by completing Document 00 63 63 (Change Order Form). Contractor acknowledges and agrees that use of this specific and consistent format is essential to District's processing of Change Orders. Accordingly, Contractor waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time for any change that does not comply with Document 00 63 63 (Change Order Form).

17.8 Determination of Change Order Cost

17.8.1 The amount of the increase or decrease in the Contract Price from a Change Order, if any, shall be determined in one or more of the following ways as applicable to a specific situation and at the District's discretion:

17.8.1.1 District acceptance of a PCO;

17.8.1.2 By unit prices contained in Contractor's original bid;

17.8.1.3 By agreement between District and Contractor.

17.9 Deductive Change Orders

All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the Contract, the reasonable value of the deducted work less the value of work performed shall be considered the appropriate deduction. The value submitted on the Schedule of Values shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. Unit Prices, if any, may be used in District's discretion in calculating reasonable value. If Contractor offers a proposed amount for a deductive Change Order(s), Contractor shall include a minimum of five percent (5%) total profit and overhead to be deducted with the amount of the work of the Change Order(s). If Subcontractor work is involved, Subcontractors shall also include a minimum of five percent (5%) profit and overhead to be deducted with the amount of its deducted work. Any deviation from this provision shall not be allowed.

17.10 Addition or Deletion of Alternate Bid Item(s)

If the Bid Form and Proposal includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect to add or delete any such Alternate Bid Item(s) if not included in the Contract at the time of award. If the District elects to add or delete Alternate Bid Item(s) after Contract award, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Bid Form and Proposal unless the parties agree to a different price and the Contract Time shall be adjusted by the number of days allocated in the Contract Documents. If days are not allocated in the Contract Documents, the Contract Time shall be equitably adjusted.

17.11 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of

surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omission in the Work as provided herein.

17.12 Construction Change Directives

17.12.1 A Construction Change Directive is a written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work. The District may, as provided by law, by Construction Change Directive and without invalidating the Contract, order changes in the Work consisting of additions, deletions, or other revisions. The adjustment to the Contract Price or Time, if any, is subject to the provisions of this section regarding Changes in the Work. If all or a portion of the Project is being funded by funds requiring approval by the State Allocation Board ("SAB"), these revisions may be subject to compensation once approval of same is received and funded by the SAB, and funds are released by the Office of Public School Construction ("OPSC"). Any dispute as to the adjustment in the Contract Price, if any, of the Construction Change Directive or timing of payment shall be resolved pursuant to the Payments and Claims Process provisions herein.

17.12.2 The District may issue a Construction Change Directive in the absence of agreement on the terms of a Change Order.

17.13 Force Account Directives

17.13.1 When work, for which a definite price has not been agreed upon in advance, is to be paid for on a force account basis, all direct costs necessarily incurred and paid by the Contractor for labor, material, and equipment used in the performance of that Work, shall be subject to the approval of the District and compensation will be determined as set forth herein.

17.13.2 The District will issue a Force Account Directive to proceed with the Work on a force account basis, and a not-to-exceed budget will be established by the District.

17.13.3 All requirements regarding direct cost for labor, labor burden, material, equipment, and markups on direct costs for overhead and profit described in this section shall apply to Force Account Directives. However, the District will only pay for actual costs verified in the field by the District or its authorized representative(s) on a daily basis.

17.13.4 The Contractor shall be responsible for all cost related to the administration of Force Account Directive. The markup for overhead and profit for Contractor modifications shall be full compensation to the Contractor to administer Force Account Directive, and Contractor shall not be entitled to separately recover additional amounts for overhead and/or profit.

17.13.5 The Contractor shall notify the District or its authorized representative(s) at least twenty-four (24) hours prior to proceeding with any of the force account work. Furthermore, the Contractor shall notify the District when it has consumed eighty percent (80%) of the budget, and shall not exceed the budget unless specifically authorized in writing by the District. The Contractor will not be compensated for force account work in the event that the Contractor fails to timely notify the District regarding the commencement of force account work, or exceeding the force account budget.

17.13.6 The Contractor shall diligently proceed with the work, and on a daily basis, submit a daily force account report using Document 00 63 47, "Daily Force Account Report," no later than 5:00 p.m. each day. The report shall contain a detailed itemization of the daily labor, material, and equipment used on the force account work only. The names of the individuals performing the force account work shall be included on the daily force account reports. The type and model of equipment shall be identified and listed. The District will review the information contained in the reports, and sign the reports no later than the next work day, and return a copy of the report to the Contractor for their records. The District will not sign, nor will the Contractor receive compensation for work the District cannot verify. The Contractor will provide a weekly force account summary indicating the status of each Force Account Directive in terms of percent complete of the not-to-exceed budget and the estimated percent complete of the work.

17.13.7 In the event the Contractor and the District reach a written agreement on a set cost for the work while the work is proceeding based on a Force Account Directive, the Contractor's signed daily force account reports shall be discontinued, and all previously signed reports shall be invalid.

17.14 Accounting Records

With respect to portions of the Work performed by Change Orders and Construction Change Directives, the Contractor shall keep and maintain cost-accounting records satisfactory to the District, including, without limitation, Job Cost Reports as provided in these General Conditions, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents. Such records shall include without limitation hourly records for Labor and Equipment and itemized records of materials and Equipment used that day in connection with the performance of any Work. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect or the Project Inspector upon request. In the event that the Contractor fails or refuses, for any reason, to maintain or make available for inspection, review and/or reproduction such records, the District's reasonable good faith determination of the extent of adjustment to the Contract Price shall be final, conclusive, dispositive and binding upon Contractor.

17.15 Notice Required

If the Contractor desires to make a claim for an increase in the Contract Price, or any extension in the Contract Time for completion, it shall notify the District pursuant to the provisions herein including, without limitation, Article 25 Claims Process provisions. No claim shall be considered unless made in accordance with this subparagraph. Contractor

shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such claim shall be authorized by a Change Order.

17.16 Applicability to Subcontractors

Any requirements under this Article shall be equally applicable to Change Orders or Construction Change Directives issued to Subcontractors by the Contractor to the extent as required by the Contract Documents.

17.17 Alteration to Change Order Language

Contractor shall not alter Change Orders or reserve time in Change Orders. Change Orders altered in violation of this provision, if in conflict with the terms set forth herein, shall be construed in accordance with the terms set forth herein. Contractor shall execute finalized Change Orders and proceed under the provisions herein with proper notice.

17.18 Failure of Contractor to Execute Change Order

Contractor shall be in default of the Contract if Contractor fails to execute a Change Order when the Contractor agrees with the addition and/or deletion of the Work in that Change Order.

18. REQUEST FOR INFORMATION

18.1 Any Request for Information shall reference all applicable Contract Document(s), including Specification section(s), detail(s), page number(s), drawing number(s), and sheet number(s), etc. The Contractor shall make suggestions and interpretations of the issue raised by each Request for Information. A Request for Information cannot modify the Contract Price, Contract Time, or the Contract Documents. Upon request by the District, Contractor shall provide an electronic copy of the Request for Information in addition to the hard copy.

18.2 The Contractor shall be responsible for any costs incurred for professional services that District may deduct from any amounts owing to the Contractor, if a Request for Information requests an interpretation or decision of a matter where the information sought is equally available to the party making the request. District, at its sole discretion, shall deduct from and/or invoice Contractor for all the professional services arising herein.

19. PAYMENTS

19.1 Contract Price

The Contract Price is stated in the Agreement and, including authorized adjustments, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents.

19.2 Applications for Progress Payments

19.2.1 Procedure for Applications for Progress Payments

19.2.1.1 Application for Progress Payment

19.2.1.1.1 Not before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the District and the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be notarized, if required, and supported by the following or each portion thereof unless waived by the District in writing:

19.2.1.1.1.1 The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;

19.2.1.1.1.2 The amount being requested under the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;

19.2.1.1.1.3 The balance that will be due to each of such entities after said payment is made;

19.2.1.1.1.4 A certification that the As-Built Drawings and annotated Specifications are current;

19.2.1.1.1.5 Itemized breakdown of work done for the purpose of requesting partial payment;

19.2.1.1.1.6 An updated and acceptable construction schedule in conformance with the provisions herein;

19.2.1.1.1.7 The additions to and subtractions from the Contract Price and Contract Time;

19.2.1.1.1.8 A total of the retentions held;

19.2.1.1.1.9 Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;

19.2.1.1.1.10 The percentage of completion of the Contractor's Work by line item;

19.2.1.1.1.11 Schedule of Values updated from the preceding Application for Payment;

19.2.1.1.1.12 A duly completed and executed conditional waiver and release upon progress payment compliant with Civil Code section 8132 from the Contractor and each subcontractor of any tier and supplier to be paid from the current progress payment;

19.2.1.1.1.13 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134 from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payment(s); and

19.2.1.1.1.14 A certification by the Contractor of the following:

The Contractor warrants title to all Work performed as of the date of this payment application has been completed in accordance with the Contract Documents for the Project. The Contractor further warrants that all amounts have been paid for work which previous Certificates for Payment were issued and payments received and all Work performed as of the date of this payment application is free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, workers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work, except those of which the District has been informed. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.

19.2.1.1.1.15 The Contractor shall be subject to the False Claims Act set forth in Government Code section 12650 et seq. for information provided with any Application for Progress Payment.

19.2.1.1.1.16 All remaining certified payroll records ("CPR(s)") for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work for the period of the Application for Payment. As indicated herein, the District shall not make any payment to Contractor until:

19.2.1.1.1.16.1 Contractor and/or its Subcontractor(s) provide electronic CPRs directly to the DIR on no less than every 30 days while Work is being performed and within 30 days after the final day of Work performed on the Project for any journeyman, apprentice, worker or other employee was employed in connection with the Work, or within ten (10) days of any request by the District or the DIR to the requesting entity, and

19.2.1.1.1.16.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs in a timely manner may directly delay the Contractor's payment.

19.2.1.1.2 Applications received after June 20th will not be paid until the second week of July and applications received after December 12th will not be paid until the first week of January.

19.2.2 Prerequisites for Progress Payments

19.2.2.1 First Payment Request: The following items, if applicable, must be completed before the District will accept and/or process the Contractor's first payment request:

19.2.2.1.1 Installation of the Project sign;

19.2.2.1.2 Installation of field office;

19.2.2.1.3 Installation of temporary facilities and fencing;

19.2.2.1.4 Schedule of Values;

19.2.2.1.5 Contractor's Construction Schedule;

19.2.2.1.6 Schedule of unit prices, if applicable;

19.2.2.1.7 Submittal Schedule;

19.2.2.1.8 Receipt by Architect of all submittals due as of the date of the payment application;

19.2.2.1.9 Copies of necessary permits;

19.2.2.1.10 Copies of authorizations and licenses from governing authorities;

19.2.2.1.11 Initial progress report;

19.2.2.1.12 Surveyor qualifications;

19.2.2.1.13 Written acceptance of District's survey of rough grading, if applicable;

19.2.2.1.14 List of all Subcontractors, with names, license numbers, telephone numbers, and Scope of Work;

19.2.2.1.15 All bonds and insurance endorsements; and

19.2.2.1.16 Resumes of Contractor's project manager, and if applicable, job site secretary, record documents recorder, and job site superintendent.

19.2.2.2 Second Payment Request: The District will not process the second payment request until and unless all submittals and Shop Drawings have been accepted for review by the Architect.

19.2.2.3 No Waiver of Criteria: Any payments made to Contractor where criteria set forth herein have not been met shall not constitute a waiver of said criteria by District. Instead, such payment shall be construed as a good faith effort by District to resolve differences so Contractor may pay its Subcontractors and suppliers. Contractor agrees that failure to submit such items may constitute a breach of contract by Contractor and may subject Contractor to termination.

19.3 Progress Payments

19.3.1 District's Approval of Application for Payment

19.3.1.1 Upon receipt of an Application for Payment, The District shall act in accordance with both of the following:

19.3.1.1.1 Each Application for Payment shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the Application for Payment is a proper Application for Payment.

19.3.1.1.2 Any Application for Payment determined not to be a proper Application for Payment suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) days, after receipt. An Application for Payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the Application for Payment is not proper. The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds this seven-day return requirement.

19.3.1.1.3 An Application for Payment shall be considered properly executed if funds are available for payment of the Application for Payment, and payment is not delayed due to an audit inquiry by the financial officer of the District.

19.3.1.2 The District's review of the Contractor's Application for Payment will be based on the District's and the Architect's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the District's and the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to:

19.3.1.2.1 Observation of the Work for general conformance with the Contract Documents,

19.3.1.2.2 Results of subsequent tests and inspections,

19.3.1.2.3 Minor deviations from the Contract Documents correctable prior to completion, and

19.3.1.2.4 Specific qualifications expressed by the Architect.

19.3.1.3 District's approval of the certified Application for Payment shall be based on Contractor complying with all requirements for a fully complete and valid certified Application for Payment.

19.3.2 Payments to Contractor

19.3.2.1 Within thirty (30) days after approval of the Application for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as verified by Architect and Inspector and certified by Contractor) up to the last day of the previous month, less the aggregate of previous payments and amount to be withheld. The value of the Work completed shall be Contractor's best estimate. No inaccuracy or error in said estimate shall operate to release the Contractor, or any Surety upon any bond, from damages arising from such Work, or from the District's right to enforce each and every provision of this Contract, and the District shall have the right subsequently to correct any error made in any estimate for payment.

19.3.2.2 The Contractor shall not be entitled to have any payment requests processed or be entitled to have any payment made for Work performed, so long as any lawful or proper direction given by the District concerning the Work, or any portion thereof, remains incomplete.

19.3.2.3 If the District fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted Application for Payment from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

19.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Notwithstanding any payment, the District may enforce each and every provision of this Contract. The District may correct or require correction of any error subsequent to any payment.

19.4 Decisions to Withhold Payment

19.4.1 Reasons to Withhold Payment

The District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required herein cannot be made. The District may withhold payment, in whole, or in part, to such extent as may be necessary to protect the District from loss because of, but not limited to any of the following:

19.4.1.1 Defective Work not remedied within **FORTY-EIGHT (48)** hours of written notice to Contractor.

19.4.1.2 Stop Payment Notices or other liens served upon the District as a result of the Contract. Contractor agrees that the District may withhold up to

125% of the amount claimed in the Stop Payment Notice to answer the claim and to provide for the District's reasonable cost of any litigation pursuant to the stop payment notice.

19.4.1.3 Written notice to withhold payment from Contractor by payment and/or performance bond surety(ies).

19.4.1.4 Liquidated damages assessed against the Contractor.

19.4.1.5 The cost of completion of the Contract if there exists a reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price or by the completion date.

19.4.1.6 Damage to the District or other contractor(s).

19.4.1.7 Unsatisfactory prosecution of the Work by the Contractor.

19.4.1.8 Failure to store and properly secure materials.

19.4.1.9 Failure of the Contractor to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, a Construction Schedule, Schedule of Submittals, Schedule of Values, Monthly Progress Schedules, Shop Drawings, Product Data and samples, Proposed product lists, executed Change Orders, and/or verified reports.

19.4.1.10 Failure of the Contractor to maintain As-Built Drawings.

19.4.1.11 Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment.

19.4.1.12 Unauthorized deviations from the Contract Documents.

19.4.1.13 Failure of the Contractor to prosecute the Work in a timely manner in compliance with the Construction Schedule, established progress schedules, and/or completion dates.

19.4.1.14 Failure to provide acceptable electronic certified payroll records, as required by the Labor Code, by these Contract Documents, or by written request; for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or by each Subcontractor in connection with the Work for the period of the Application for Payment or if payroll records are delinquent or inadequate.

19.4.1.15 Failure to properly pay prevailing wages as required in Labor Code section 1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with labor compliance monitoring and enforcement by the DIR.

19.4.1.16 Allowing an unregistered subcontractor, as described in Labor Code section 1725.5, to engage in the performance of any work under this Contract.

19.4.1.17 Failure to comply with any applicable federal statutes and regulations regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon Act and related requirements, Contract Work Hours and Safety Standards Act requirements, if applicable.

19.4.1.18 Failure to properly maintain or clean up the Site.

19.4.1.19 Failure to timely indemnify, defend, or hold harmless the District.

19.4.1.20 Any payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits.

19.4.1.21 Failure to pay Subcontractor(s) or supplier(s) as required by law and by the Contract Documents.

19.4.1.22 Failure to pay any royalty, license or similar fees.

19.4.1.23 Contractor is otherwise in breach, default, or in substantial violation of any provision of this Contract.

19.4.1.24 Failure to perform any implementation and/or monitoring required by any SWPPP for the Project and/or the imposition of any penalties or fines therefore whether imposed on the District or Contractor.

19.4.2 Reallocation of Withheld Amounts

19.4.2.1 District may, in its discretion, apply any withheld amount to pay outstanding claims or obligations as defined herein. In so doing, District shall make such payments on behalf of Contractor. If any payment is so made by District, then that amount shall be considered a payment made under Contract by District to Contractor and District shall not be liable to Contractor for any payment made in good faith. These payments may be made without prior judicial determination of claim or obligation. District will render Contractor an accounting of funds disbursed on behalf of Contractor.

19.4.2.2 If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after **FORTY-EIGHT (48)** hours' written notice to the Contractor and, without prejudice to any other remedy, make good such deficiencies. The District shall adjust the total Contract Price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work that is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least one hundred fifty percent (150%) of the estimated reasonable value of the nonconforming Work) shall be made therefor.

19.4.3 Payment After Cure

When Contractor removes the grounds for declining approval, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

19.5 Subcontractor Payments

19.5.1 Payments to Subcontractors

No later than seven (7) days after receipt, or pursuant to Business and Professions Code section 7108.5 and Public Contract Code section 7107, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to its Sub-subcontractors in a similar manner.

19.5.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

19.5.3 Joint Checks

District shall have the right in its sole discretion, if necessary for the protection of the District, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, or a material or equipment supplier, any obligation from the District to such Subcontractor or a material or equipment supplier, or rights in such Subcontractor or a material or equipment supplier against the District.

20. COMPLETION OF THE WORK

20.1 Completion

20.1.1 District will accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District.

20.1.2 The Work may only be accepted as complete by action of the governing board of the District.

20.1.3 District, at its sole option, may accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District, except for minor corrective items, as distinguished

from incomplete items. If Contractor fails to complete all minor corrective items within fifteen (15) days after the date of the District's acceptance of completion, District shall withhold from the final payment one hundred fifty percent (150%) of an estimate of the amount sufficient to complete the corrective items, as determined by District, until the item(s) are completed.

20.1.4 At the end of the 15-day period, if there are any items remaining to be corrected, District may elect to proceed as provided herein related to adjustments to Contract Price, and/or District's right to perform the Work of the Contractor.

20.2 Close-Out/Certification Procedures

20.2.1 Punch List

The Contractor shall notify the Architect when Contractor considers the Work complete. Upon notification, Architect will prepare a list of minor items to be completed or corrected ("Punch List"). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

20.2.2 Close-Out/Certification Requirements

20.2.2.1 Utility Connections

Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected.

20.2.2.2 Record Drawings and Record Specifications

20.2.2.2.1 Contractor shall provide exact Record Drawings of the Work ("As-Builts") and Record Specifications upon completion of the Project and as a condition precedent to approval of final payment.

20.2.2.2.2 Contractor shall obtain the Inspector's approval of the corrected prints and employ a competent draftsman to transfer the Record Drawings information to the most current version of AutoCAD that is, at that time, currently utilized for plan check submission by either the District, the Architect, OPSC, and/or DSA, and print a complete set of transparent sepias. When completed, Contractor shall deliver to the District corrected sepias and data storage device acceptable to District with AutoCAD file.

20.2.2.2.3 Contractor is liable and responsible for any and all inaccuracies in the Record Drawings and Record Specifications, even if inaccuracies become evident at a future date.

20.2.2.3 Construction Storm Water Permit, if applicable

Contractor shall submit to District all electronic or hard copy records required by the Construction Storm Water Permit, if applicable, within seven (7) days of Completion of the Project.

20.2.2.4 Spare Parts and Maintenance Manuals:

20.2.2.4.1 Contractor shall provide products, spare parts, maintenance, and extra materials in quantities specified in the Specifications and in Manufacturer's recommendations.

20.2.2.4.2 Contractor shall prepare all operation and maintenance manuals and date as indicated in the Specifications.

20.2.2.5 Instruction of District Personnel:

20.2.2.5.1 Before final inspection, at agreed upon times, Contractor shall instruct District's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems.

20.2.2.5.2 For equipment requiring seasonal operation, Contractor shall perform instructions for other seasons within six months or by the change of season.

20.2.2.5.3 Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

20.2.2.5.4 Contractor shall prepare and insert additional data in Operation and Maintenance Manual when the need for such data becomes apparent during instruction.

20.2.2.5.5 Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

20.2.2.6 Source Programming: Contractor shall provide all source programming for all items in the Project.

20.2.2.7 Verified Reports: Contractor shall completely and accurately fill out and file forms DSA 6-C or DSA 152 (or current form), as appropriate. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

20.3 Final Inspection

20.3.1 Contractor shall comply with Punch List procedures as provided herein and maintain the presence of a Project Superintendent and Project Manager until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List without District's prior written approval. Upon receipt of Contractor's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and District acceptance, Architect and Project

Inspector will inspect the Work and shall submit to Contractor and District a final inspection report noting the Work, if any, required in order to complete in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.

20.3.2 Upon Contractor's completion of all items on the Punch List and any other uncompleted portions of the Work, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect finds the Work complete and acceptable under the Contract Documents, the Architect will notify Contractor, who shall then jointly submit to the Architect and the District its final Application for Payment.

20.3.3 Final Inspection Requirements

20.3.3.1 Before calling for final inspection, Contractor shall determine that the following have been performed:

20.3.3.1.1 The Work has been completed.

20.3.3.1.2 All life safety items are completed and in working order.

20.3.3.1.3 Mechanical and electrical Work including, without limitation, security system, data, and fire alarm, are complete and tested, fixtures are in place, connected, and ready for tryout.

20.3.3.1.4 Electrical circuits scheduled in panels and disconnect switches labeled.

20.3.3.1.5 Replace filters of operating equipment.

20.3.3.1.6 Painting and special finishes complete.

20.3.3.1.7 Doors complete with hardware, cleaned of protective film, relieved of sticking or binding, and in working order.

20.3.3.1.8 Tops and bottoms of doors sealed.

20.3.3.1.9 Floors waxed and polished as specified.

20.3.3.1.10 Carpeted and soft surfaces vacuumed.

20.3.3.1.11 Broken glass replaced and interior and exterior glass and all surfaces exposed to view cleaned.

20.3.3.1.12 Equipment and fixtures cleaned to a sanitary condition.

20.3.3.1.13 Grounds cleared of Contractor's equipment, raked clean of debris, and remove waste and surplus materials, rubbish, and construction facilities from the Site and surrounding areas.

20.3.3.1.14 Site cleaned, paved areas swept, and clean landscaped surfaces raked.

20.3.3.1.15 Roofs, gutters, down spouts, and drainage systems cleaned of debris.

20.3.3.1.16 Work cleaned, free of stains, scratches, and other foreign matter, and damaged and broken material replaced.

20.3.3.1.17 Temporary labels, tape, stains, and foreign substances removed, transparent and glossy surfaces polished,

20.3.3.1.18 Finished and decorative work shall have marks, dirt, and superfluous labels removed.

20.3.3.1.19 Final cleanup, as provided herein.

20.4 Costs of Multiple Inspections

More than two (2) requests of the District to make a final inspection shall be considered an additional service of District, Architect, Construction Manager, and/or Project Inspector, and all subsequent costs will be invoiced to Contractor and if funds are available, withheld from remaining payments.

20.5 Partial Occupancy or Use Prior to Completion

20.5.1 District's Rights to Occupancy

The District may occupy or use any completed or partially completed portion of the Work at any stage, and such occupancy shall not constitute the District's Final Acceptance of any part of the Work. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein. In the event that the District occupies or uses any completed or partially completed portion of the Work, the Contractor shall remain responsible for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents unless the Contractor requests in writing, and the District agrees, to otherwise divide those responsibilities. Any dispute as to responsibilities shall be resolved pursuant to the Claims Process provisions herein, with the added provision that during the dispute process, the District shall have the right to occupy or use any portion of the Work that it needs or desires to use.

20.5.2 Inspection Prior to Occupancy or Use

Immediately prior to partial occupancy or use, the District, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

20.5.3 No Waiver

Unless otherwise agreed upon, partial or entire occupancy or use of a portion or portions of the Work shall not constitute beneficial occupancy or District's acceptance of the Work not complying with the requirements of the Contract Documents.

21. FINAL PAYMENT AND RETENTION

21.1 Final Payment

Upon receipt and approval of a valid and final Application for Payment, the Architect will issue a final Certificate of Payment. The District shall thereupon jointly inspect the Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon District's acceptance of the Work of the Contractor as fully complete by the Governing Board of the District (that, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of final payment from the District, pay the amount due Subcontractors.

21.2 Prerequisites for Final Payment

The following conditions must be fulfilled prior to Final Payment:

21.2.1 A full release of all Stop Payment Notices served in connection with the Work shall be submitted by Contractor.

21.2.2 A duly completed and executed conditional waiver and release upon final payment compliant with Civil Code section 8136, from the Contractor and each subcontractor of any tier and supplier to be paid from the final payment.

21.2.3 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134, from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payments.

21.2.4 A duly completed and executed Document 00 65 19.26, "AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS" from the Contractor.

21.2.5 The Contractor shall have made all corrections to the Work that are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

21.2.6 Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.

21.2.7 Contractor must have completed all requirements set forth under "Close-Out/Certification Procedures," including, without limitation, submission of an approved set of complete Record Drawings.

21.2.8 Architect shall have issued its written approval that final payment can be made.

21.2.9 The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents, which must be approved by the District.

21.2.10 The Contractor shall have completed final clean-up as provided herein.

21.3 Retention

21.3.1 The retention, less any amounts disputed by the District or that the District has the right to withhold pursuant to provisions herein, shall be paid:

21.3.1.1 After approval by the Architect of the Application and Certificate of Payment,

21.3.1.2 After the satisfaction of the conditions set forth herein, and

21.3.1.3 After forty-five (45) days after the recording of the Notice of Completion by District.

21.3.2 No interest shall be paid on any retention, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement between the District and the Contractor pursuant to Public Contract Code section 22300.

21.4 Substitution of Securities

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300.

22. UNCOVERING OF WORK

If a portion of the Work is covered without Inspector or Architect approval or not in compliance with the Contract Documents, it must, if required in writing by the District, the Project Inspector, or the Architect, be uncovered for the Project Inspector's or the Architect's observation and be corrected, replaced, and/or recovered at the Contractor's expense without change in the Contract Price or Contract Time.

23. NONCONFORMING WORK AND CORRECTION OF WORK

23.1 Nonconforming Work

23.1.1 Contractor shall promptly remove from Premises all Work identified by District as failing to conform to the Contract Documents whether incorporated or not. Contractor shall promptly replace and re-execute its own Work to comply with the Contract Documents without additional expense to the District and shall bear the expense of making good all work of other contractors destroyed or damaged by any removal or replacement pursuant hereto and/or any delays to the District or other Contractors caused thereby.

23.1.2 If Contractor does not remove Work that District has identified as failing to conform to the Contract Documents within a reasonable time, not to exceed **FORTY-EIGHT (48)** hours, District may remove it and may store any material at Contractor's expense. If Contractor does not pay expense(s) of that removal within ten (10) days' time thereafter, District may, upon ten (10) days' written notice, sell any material at auction or at private sale and shall deduct all costs and expenses incurred by the District and/or District may withhold those amounts from payment(s) to Contractor.

23.2 Correction of Work

23.2.1 Correction of Rejected Work

Pursuant to the notice provisions herein, the Contractor shall immediately correct the Work rejected by the District, the Architect, or the Project Inspector as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby.

23.2.2 Two-Year Warranty Corrections

If, within two (2) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established hereunder, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so. This period of two (2) years shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation hereunder shall survive District's acceptance of the Work

under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

23.3 District's Right to Perform Work

23.3.1 If the Contractor should neglect to prosecute the Work properly or fail to perform any provisions of this contract, the District, after **FORTY-EIGHT (48)** hours' written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

23.3.2 If it is found at any time, before or after completion of the Work, that Contractor has varied from the Drawings and/or Specifications, including, but not limited to, variation in material, quality, form, or finish, or in the amount or value of the materials and labor used, District may require at its option:

23.3.2.1 That all such improper Work be removed, remade or replaced, and all work disturbed by these changes be made good by Contractor at no additional cost to the District;

23.3.2.2 That the District deduct from any amount due Contractor the sum of money equivalent to the difference in value between the work performed and that called for by the Drawings and Specifications; or

23.3.2.3 That the District exercise any other remedy it may have at law or under the Contract Documents, including but not limited to the District hiring its own forces or another contractor to replace the Contractor's nonconforming Work, in which case the District shall either issue a deductive Change Order, a Construction Change Directive, or invoice the Contractor for the cost of that work. Contractor shall pay any invoices within thirty (30) days of receipt of same or District may withhold those amounts from payment(s) to Contractor.

24. TERMINATION AND SUSPENSION

24.1 District's Request for Assurances

If District at any time reasonably believes Contractor is or may be in default under this Contract, District may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of Work and a written plan from Contractor to remedy any potential default under the terms this Contract that the District may advise Contractor of in writing. Contractor shall, within ten (10) calendar days of District's request, deliver a written cure plan that meets the District's requirements in its request for assurances. Contractor's failure to provide such written assurances of performance and the required written plan, within ten (10) calendar days of request, will constitute a material breach of this Contract sufficient to justify termination for cause.

24.2 District's Right to Terminate Contractor for Cause

24.2.1 Grounds for Termination: The District, in its sole discretion, may terminate the Contract and/or terminate the Contractor's right to perform the work of the Contract based upon any of the following:

24.2.1.1 Contractor refuses or fails to execute the Work or any separable part thereof with sufficient diligence as will ensure its completion within the time specified or any extension thereof, or

24.2.1.2 Contractor fails to complete said Work within the time specified or any extension thereof, or

24.2.1.3 Contractor persistently fails or refuses to perform Work or provide material of sufficient quality as to be in compliance with Contract Documents; or

24.2.1.4 Contractor persistently refuses, or repeatedly fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the Work in the time specified; or

24.2.1.5 Contractor fails to make prompt payment to Subcontractors, or for material, or for labor; or

24.2.1.6 Contractor persistently disregards laws, or ordinances, or instructions of District; or

24.2.1.7 Contractor fails to supply labor, including that of Subcontractors, that is sufficient to prosecute the Work or that can work in harmony with all other elements of labor employed or to be employed on the Work; or

24.2.1.8 Contractor or its Subcontractor(s) is/are otherwise in breach, default, or in substantial violation of any provision of this Contract, including but not limited to a lapse in licensing or registration.

24.2.2 Notification of Termination

24.2.2.1 Upon the occurrence at District's sole determination of any of the above conditions, District may, without prejudice to any other right or remedy, serve written notice upon Contractor and its Surety of District's termination of this Contract and/or the Contractor's right to perform the work of the Contract. This notice will contain the reasons for termination. Unless, within three (3) days after the service of the notice, any and all condition(s) shall cease, and any and all violation(s) shall cease, or arrangement satisfactory to District for the correction of the condition(s) and/or violation(s) be made, this Contract and/or the Contractor's right to perform the Work of the Contract shall cease and terminate. Upon termination, Contractor shall not be entitled to receive any further payment until the entire Work is finished.

24.2.2.2 Upon termination, District may immediately serve written notice of tender upon Surety whereby Surety shall have the right to take over and perform this Contract only if Surety:

24.2.2.2.1 Within three (3) days after service upon it of the notice of tender, gives District written notice of Surety's intention to take over and perform this Contract; and

24.2.2.2.2 Commences performance of this Contract within three (3) days from date of serving of its notice to District.

24.2.2.3 Surety shall not utilize Contractor in completing the Project if the District notifies Surety of the District's objection to Contractor's further participation in the completion of the Project. Surety expressly agrees that any contractor which Surety proposes to fulfill Surety's obligations is subject to District's approval. District's approval shall not be unreasonably withheld, conditioned or delayed.

24.2.2.4 If Surety fails to notify District or begin performance as indicated herein, District may take over the Work and execute the Work to completion by any method it may deem advisable at the expense of Contractor and/or its Surety. Contractor and/or its Surety shall be liable to District for any excess cost or other damages the District incurs thereby. Time is of the essence in this Contract. If the District takes over the Work as herein provided, District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plan, and other property belonging to Contractor as may be on the Site of the Work, in bonded storage, or previously paid for.

24.2.2.5 In the alternative, the District shall have the right (but shall have no obligation) to assume and/or assign to a general contractor or construction manager or other third party who is qualified and has sufficient resources to complete the Work, the rights of the Contractor under its subcontracts with any or all Subcontractors. In the event of an assumption or assignment by the District, no Subcontractor shall have any claim against the District or third party for Work performed by Subcontractor or other matters arising prior to

termination of the Contract and/or the Contractor's right to perform the work of the Contract. The District or any third party, as the case may be, shall be liable only for obligations to the Subcontractor arising after assumption or assignment. Should the District so elect, the Contractor shall execute and deliver all documents and take all steps, including the legal assignment of its contractual rights, as the District may require, for the purpose of fully vesting in the District the rights and benefits of its Subcontractor under Subcontracts or other obligations or commitments. All payments due the Contractor hereunder shall be subject to a right of offset by the District for expenses and damages suffered by the District as a result of any default, acts, or omissions of the Contractor. Contractor must include this assignment provision in all of its contracts with its Subcontractors.

24.2.3 In the event of a termination for cause, if the expense to the District to finish the Work exceeds the unpaid Contract Price, Contractor and Surety shall pay difference to District within twenty-one (21) days of District's request.

24.2.4 In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, effective as of the same date as the purported termination for cause, and the Contractor shall have no greater rights than it would have had following a termination for convenience. Any Contractor claim arising out of a termination for cause shall be made in accord with Article 12 herein. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

24.3 Termination of Contractor for Convenience

24.3.1 District in its sole discretion may terminate the Contract in whole or in part upon three (3) days' written notice to the Contractor.

24.3.2 Upon notice, Contractor shall:

24.3.2.1 Cease operations as directed by the District in the notice;

24.3.2.2 Take necessary actions for the protection and preservation of the Work as soon as possible; and

24.3.2.3 Terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

24.3.3 Within 30 days of the notice, Contractor submit to the District a payment application for the actual cost for labor, materials, and services performed, including all Contractor's and Subcontractor(s)' mobilization and/or demobilization costs, that is unpaid. Contractor shall have no claims against the District except for the actual cost for labor, materials, and services performed that adequately documented through timesheets, invoices, receipts, or otherwise. District shall pay all undisputed invoice(s) for work performed until the notice of termination.

24.3.4 If Contractor objects to the termination for convenience, including disagreement on the actual cost due Contractor, the District retains the right to all the options available to the District under a termination for cause.

24.4 Effect of Termination

24.4.1 Contractor shall, only if ordered to do so by the District, immediately remove from the Site all or any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The District retains the right, but not the obligation, to keep and use any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The Contractor and its Surety shall be liable upon the Performance Bond for all damages caused to the District by reason of the Contractor's failure to complete the Contract.

24.4.2 In the event that the District shall perform any portion of, or the whole of the Work, pursuant to the provisions of the General Conditions, the District shall not be liable nor account to the Contractor in any way for the time within which, or the manner in which, the Work is performed by the District or for any changes the District may make in the Work or for the money expended by the District in satisfying claims and/or suits and/or other obligations in connection with the Work.

24.4.3 In the event that the Contract is terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the Contractor or any impact or impairment of Contractor's bonding capacity.

24.4.4 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to District.

24.5 Emergency Termination of Public Contracts Act of 1949

24.5.1 This Contract is subject to termination as provided by sections 4410 and 4411 of the Government Code of the State of California, being a portion of the Emergency Termination of Public Contracts Act of 1949.

24.5.1.1 Section 4410 of the Government Code states:

In the event a national emergency occurs, and public work, being performed by contract, is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the public agency and the contractor may, by written agreement, terminate said contract.

24.5.1.2 Section 4411 of the Government Code states:

Such an agreement shall include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any,

which either party shall pay to the other or any other person, under the facts and circumstances in the case.

24.5.2 Compensation to the Contractor shall be determined at the sole discretion of District on the basis of the reasonable value of the Work done, including preparatory work. As an exception to the foregoing and at the District's discretion, in the case of any fully completed separate item or portion of the Work for which there is a separate previously submitted unit price or item on the accepted schedule of values, that price shall control. The District, at its sole discretion, may adopt the Contract Price as the reasonable value of the work done or any portion thereof.

24.6 Suspension of Work

24.6.1 District in its sole discretion may suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine upon three (3) days written notice to the Contractor.

24.6.1.1 An adjustment may be made for changes in the cost of performance of the Work caused by any such suspension, delay or interruption. No adjustment shall be made to the extent:

24.6.1.1.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or

24.6.1.1.2 That an equitable adjustment is made or denied under another provision of the Contract; or

24.6.1.1.3 That the suspension of Work was the direct or indirect result of Contractor's failure to perform any of its obligations hereunder.

24.6.1.2 Any adjustments in cost of performance may have a fixed or percentage fee as provided in the section on Format for Proposed Change Order herein. This amount shall be full compensation for all Contractor's and its Subcontractor(s)' changes in the cost of performance of the Contract caused by any such suspension, delay or interruption.

25. CLAIMS PROCESS

25.1 Obligation to File Claims for Disputes

25.1.1 Should Contractor otherwise seek extra time or compensation for any reason whatsoever, then Contractor shall first follow procedures set forth in the Contract Documents including, without limitation, Articles 15, 16 and 17, all of which are conditions precedent to submitting a Claim pursuant to Article 25. A Notice of Delay or Proposed Change Order are less formal procedures that proceed the formal claim and do not constitute a Claim. A Claim also does not include correspondence, RFIs, vouchers, invoices, progress payment applications, or other routine or authorized form of requests for progress payments in compliance with the Contract.

If a dispute remains, then Contractor shall give written notice to District that expressly invokes this Article 25 within the time limits set forth herein.

25.1.2 Contractor's sole and exclusive remedy for a Dispute is to file a written claim setting forth Contractor's position as required herein within the time limits set forth herein.

25.2 Duty to Perform during Claim Process

Contractor and its subcontractors shall continue to perform its Work under the Contract including the disputed work and shall not cause a delay of the Work during any dispute, claim, negotiation, mediation, or arbitration proceeding, except by written agreement by the District.

25.3 Definition of Claim

25.3.1 Pursuant to Public Contract Code section 9204, the term "Claim" means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

25.3.1.1 A time extension, including without limitation, for relief of damages or penalties for delay assessed by the District under the Contract;

25.3.1.2 Payment by the District of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or to which Contractor is not otherwise entitled to; or

25.3.1.3 An amount of payment disputed by the District.

25.4 Claims Presentation

25.4.1 Form and Contents of Claim

25.4.1.1 If Contractor intends to submit a Claim for an increase in the Contract Price and/or Contract Time for any reason including, without limitation, the acts of District or its agents, Contractor shall, within thirty (30) days after the event giving rise to the Claim, give notice of the Claim ("Notice of Potential Claim") in writing specifically identifying Contractor is invoking this Article 25 Claims Presentation. The Notice of Potential Claim shall provide Contractor's preliminary request for an adjustment to the Contract Price and/or Contract Time, with a description of the grounds therefore.

25.4.1.2 Within thirty (30) days after serving the written Notice of Potential Claim, Contractor shall provide a Claim including an itemized statement of the details and amounts of its Claim for any increase in the Contract Price of Contract Time as provided below, including a Time Impact Analysis and any and all other documentation substantiating Contractor's claimed damages:

25.4.1.2.1 The issues, events, conditions, circumstances and/or causes giving rise to the dispute, and shall show, in detail, the cause and effect of same;

25.4.1.2.2 Citation to provisions in the Contract Documents, statute sections, and/or case law entitling Contractor to an increase in the Contract Price or Contract Time;

25.4.1.2.3 The pertinent dates and/or durations and actual and/or anticipated effects on the Contract Price, Contract Schedule milestones and/or Contract Time adjustments;

25.4.1.2.4 The Time Impact Analysis of all time delays that shows actual time impact on the critical path; and

25.4.1.2.5 The line-item costs for labor, material, and/or equipment, if applicable, for all cost impacts priced like a change order according to Article 17 and must be updated monthly as to cost and entitlement if a continuing claim.

25.4.1.3 The Claim shall include the following certification by the Contractor:

25.4.1.3.1 The undersigned Contractor certifies under penalty of perjury that the attached dispute is made in good faith; that the supporting data is accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the adjustment for which Contractor believes the District is liable; and that I am duly authorized to certify the dispute on behalf of the Contractor.

25.4.1.3.2 Furthermore, Contractor understands that the value of the attached dispute expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from the Work performed on the Project, additional time required on the Project and/or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor may not separately recover for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

25.4.2 Contractor shall bear all costs incurred in the preparation and submission of a Claim.

25.4.3 Failure to timely submit a Claim and the requisite supporting documentation shall constitute a waiver of Contractor's claim(s) against the District and Contractor's Claim(s) for compensation or an extension of time shall be deemed waived, released, and discharged as to any entitlement for adjustment to Contract Price and/or Contract Time.

25.5 Claim Resolution pursuant to Public Contract Code section 9204

Contractor may request to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding

arbitration. If Contractor chooses to proceed, Contractor shall comply with the following steps:

25.5.1 STEP 1:

25.5.1.1 Upon receipt of a Claim by registered or certified mail, return receipt requested, including the documents necessary to substantiate it, the District shall conduct a reasonable review of the Claim and, within a period not to exceed forty-five (45) days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period to provide a written statement. If the District needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the forty-five (45) days or within the mutually agreed to extension of time following receipt of Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion.

25.5.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the District issues its written statement. Amounts not paid in a timely manner as required by this section shall bear interest at seven percent (7%) per annum.

25.5.1.2 Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. In this instance, District and Contractor must comply with the sections below regarding Public Contract Code section 20104, et seq. and Government Code Claim Act Claims.

25.5.1.3 If the District fails to issue a written statement, or to otherwise meet the time requirements of this section, this shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of Contractor.

25.5.2 STEP 2:

25.5.2.1 If Contractor disputes the District's written response, or if the District fails to respond to a Claim within the time prescribed, Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute. Within ten (10) business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the

Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed.

25.5.2.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the District issues its written statement. Amounts not paid in a timely manner as required by this section shall bear interest at seven percent (7%) per annum.

25.5.3 STEP 3:

25.5.3.1 Any disputed portion of the Claim, as identified by Contractor in writing, shall be submitted to nonbinding mediation, with the District and Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

25.5.3.1.1 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

25.5.3.2 Unless otherwise agreed to by the District and Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code section 20104.4 to mediate after litigation has been commenced.

25.5.4 STEP 4:

25.5.4.1 If mediation under this section does not resolve the parties' dispute, the District may, but does not require arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program.

25.6 <u>Subcontractor Pass-Through Claims</u>

25.6.1 If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a District because privity of contract does not exist, the contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be

presented to the District shall furnish reasonable documentation to support the Claim.

25.6.2 Within forty-five (45) days of receipt of this written request from a subcontractor, Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

25.6.3 The Contractor shall bind all its Subcontractors to the provisions of this section and will hold the District harmless against Claims by Subcontractors.

25.7 Government Code Claim Act Claim

25.7.1 If a claim, or any portion thereof, remains in dispute upon satisfaction of all applicable Claim Resolution requirements the Contractor shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the Contractor's right to bring a civil action against the District.

25.7.2 Contractor shall bear all costs incurred in the preparation, submission and administration of a Claim. Any claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein of the claims asserted.

25.7.3 For purposes of those provisions, the running of the time within which a claim pursuant to Public Contract Code section 20104.2 only must be presented to the District shall be tolled from the time the claimant submits his or her written claim until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

25.8 Claim Resolution pursuant to Public Contract Code section 20104 et seq.

25.8.1 In the event of a disagreement between the parties as to performance of the Work, the interpretation of this Contract, or payment or nonpayment for Work performed or not performed, the parties shall attempt to resolve all claims of three hundred seventy-five thousand dollars ($375,000) or less which arise between Contractor and District by those procedures set forth in Public Contract Code section 20104, et seq., to the extent applicable.

25.8.1.1 Contractor shall file with the District any written Claim, including the documents necessary to substantiate it, upon the application for final payment.

25.8.1.2 For claims of less than fifty thousand dollars ($50,000), the District shall respond in writing within forty-five (45) days of receipt of the Claim or may request in writing within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.2.1 If additional information is required, it shall be requested and provided by mutual agreement of the parties.

25.8.1.2.2 District's written response to the documented Claim shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor to produce the additional information, whichever is greater.

25.8.1.3 For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the District shall respond in writing to all written Claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.3.1 If additional information is required, it shall be requested and provided upon mutual agreement of the District and the Contractor.

25.8.1.3.2 The District's written response to the Claim, as further documented, shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor to produce the additional information or requested documentation, whichever is greater.

25.8.1.4 If Contractor disputes the District's written response, or the District fails to respond within the time prescribed, Contractor may so notify the District, in writing, either within fifteen (15) days of receipt of the District's response or within fifteen (15) days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the District shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

25.8.1.5 Following the meet and confer conference, if the Claim or any portion of it remains in dispute, the Contractor may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions the running of the time within which a claim must be filed shall be tolled from the time the Contractor submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet and confer process.

25.8.1.6 For any civil action filed to resolve claims filed pursuant to this section, within sixty (60) days, but no earlier than thirty (30) days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a

good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

25.8.1.7 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of the Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986, (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

25.8.1.8 The District shall not fail to pay money as to any portion of a Claim which is undisputed except as otherwise provided in the Contract Documents. In any suit filed pursuant to this section, the District shall pay interest due at the legal rate on any arbitration award or judgment. Interest shall begin to accrue on the date the suit is filed in a court of law.

25.8.2 Contractor shall bind its Subcontractors to the provisions of this Article and will hold the District harmless against disputes by Subcontractors.

25.9 Claim Procedure Compliance

25.9.1 Failure to submit and administer claims as required in Article 25 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) not raised in a timely protest and timely claim submitted under this Article 25 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.

25.9.2 District shall not be deemed to waive any provision under this Article 25, if at District's sole discretion, a claim is administered in a manner not in accord with this Article 25. Waivers or modifications of this Article 25 may only be made by a signed change order approved as to form by legal counsel for both District and Contractor; oral or implied modifications shall be ineffective.

25.10 Claim Resolution Non-Applicability

25.10.1 The procedures for dispute and claim resolutions set forth in this Article shall not apply to the following:

25.10.1.1 Personal injury, wrongful death or property damage claims;

25.10.1.2 Latent defect or breach of warranty or guarantee to repair;

25.10.1.3 Stop payment notices;

25.10.1.4 District's rights set forth in the Article on Suspension and Termination;

25.10.1.5 Disputes arising out of labor compliance enforcement by the Department of Industrial Relations; or

25.10.1.6 District rights and obligations as a public entity set forth in applicable statutes; provided, however, that penalties imposed against a public entity by statutes, including, but not limited to, Public Contract Code sections 20104.50 and 7107, shall be subject to the Claim Resolution requirements provided in this Article.

25.11 Attorney's Fees

25.11.1 Should litigation be necessary to enforce any terms or provisions of this Agreement, then each party shall bear its own litigation and collection expenses, witness fees, court costs, and attorney's fees.

26. STATE LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS

26.1 Labor Compliance and Enforcement

Since this Project is subject to labor compliance and enforcement by the Department of Industrial Relations ("DIR"), Contractor specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the Contractor and all Subcontractors shall timely furnish complete and accurate electronic certified payroll records directly to the DIR. The District may not issue payment if this requirement is not met.

26.2 Wage Rates, Travel, and Subsistence

26.2.1 Pursuant to the provisions of Article 2 (commencing at section 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed to execute this Contract are on file at the District's principal office and copies will be made available to any interested party on request or available online at http://www.dir.ca.gov/. Contractor shall obtain and post a copy of these wage rates at the job site.

26.2.2 Holiday and overtime work, when permitted by law, shall be paid for at the general prevailing rate of per diem wages for holiday and overtime work on file with the Director of the Department of Industrial Relations, unless otherwise specified. The holidays upon which those rates shall be paid need not be specified by the District but shall be all holidays recognized in the applicable collective bargaining agreement. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code.

26.2.3 Contractor shall pay and shall cause to be paid each worker engaged in Work on the Project the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations, regardless of any contractual relationship which may be alleged to exist between Contractor or any Subcontractor and such workers.

26.2.4 If during the period this bid is required to remain open, the Director of the Department of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which the Work under the Contract is to be performed, such change shall not alter the wage rates in the Notice to Bidders or the Contract subsequently awarded.

26.2.5 Pursuant to Labor Code section 1775, Contractor shall, as a penalty to District, forfeit the statutory amount up to two hundred dollars ($200) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates, determined by the District and/or the Director, for the work or craft in which that worker is employed for any public work done under Contract by Contractor or by any Subcontractor under it. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Contractor.

26.2.6 Any worker employed to perform Work on the Project, which Work is not covered by any classification listed in the general prevailing wage rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to Work to be performed by him, and such minimum wage rate shall be retroactive to time of initial employment of such person in such classification.

26.2.7 Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, subsistence pay, and apprenticeship or other training programs authorized by Labor Code section 3093, and similar purposes.

26.2.8 Contractor shall post at appropriate conspicuous points on the Site of Project, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned. In addition, Contractor shall post a sign-in log for all workers and visitors to the Site, a list of all subcontractors of any tier on the Site, and the required Equal Employment Opportunity poster(s).

26.3 Hours of Work

26.3.1 As provided in article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by Contractor or by any Subcontractor on any subcontract under this Contract upon the Work or upon any part of the Work contemplated by this Contract shall be limited and restricted by Contractor to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, Work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

26.3.2 Contractor shall keep and shall cause each Subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day

and each calendar week by each worker employed by Contractor in connection with the Work or any part of the Work contemplated by this Contract. The record shall be kept open at all reasonable hours to the inspection of District and to the Division of Labor Standards Enforcement of the DIR.

26.3.3 Pursuant to Labor Code section 1813, Contractor shall as a penalty to the District forfeit the statutory amount (believed by the District to be currently twenty-five dollars ($25)) for each worker employed in the execution of this Contract by Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code.

26.3.4 Any Work necessary to be performed after regular working hours, or on Sundays or other holidays shall be performed without additional expense to the District.

26.4 Payroll Records

26.4.1 Contractor shall upload, and shall cause each Subcontractor performing any portion of the Work under this Contract to upload, an accurate and complete certified payroll record ("CPR") electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online on no less than every thirty (30) days while Work is being performed and within thirty (30) days after the final day of Work performed on the Project and within ten (10) days of any request by the District or Labor Commissioner at http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html or current application and URL, showing the name, address, social security number, work classification, straight-time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work.

26.4.1.1 The CPRs enumerated hereunder shall be filed directly with the DIR on a weekly basis or to the requesting party, whether the District or DIR, within ten (10) days after receipt of each written request. The CPRs from the Contractor and each Subcontractor for each week shall be provided on or before Wednesday of the week following the week covered by the CPRs. District may not make any payment to Contractor until:

26.4.1.1.1 Contractor and/or its Subcontractor(s) provide CPRs acceptable to the DIR; and

26.4.1.1.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs to the DIR in a timely manner may directly delay Contractor's payment.

26.4.2 All CPRs shall be available for inspection at all reasonable hours at the principal office of Contractor on the following basis:

26.4.2.1 A certified copy of an employee's CPR shall be made available for inspection or furnished to the employee or his/her authorized representative on request.

26.4.2.2 CPRs shall be made available for inspection or furnished upon request to a representative of District, Division of Labor Standards Enforcement, Division of Apprenticeship Standards, and/or the DIR.

26.4.2.3 CPRs shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested CPRs have not been provided pursuant to the provisions herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by Contractor, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of Contractor.

26.4.3 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by District, Division of Apprenticeship Standards, or Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of Contractor awarded Contract or performing Contract shall not be marked or obliterated.

26.4.4 Contractor shall inform District of the location of the records enumerated hereunder, including the street address, city, and county, and shall, within five (5) working days, provide a notice of change of location and address.

26.4.5 In the event of noncompliance with the requirements of this section, Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects Contractor must comply with this section. Should noncompliance still be evident after the ten (10) day period, Contractor shall, as a penalty to District, forfeit up to one hundred dollars ($100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Labor Commissioner, these penalties shall be withheld from progress payments then due.

26.4.6 [RESERVED]

26.5 [RESERVED]

26.6 Apprentices

26.6.1 Contractor acknowledges and agrees that, if this Contract involves a dollar amount greater than, or a number of working days greater than that specified in Labor Code section 1777.5, then this Contract is governed by the provisions of Labor Code Section 1777.5. It shall be the responsibility of Contractor to ensure compliance with this Article and with Labor Code section 1777.5 for all apprenticeship occupations.

26.6.2 Apprentices of any crafts or trades may be employed and, when required by Labor Code section 1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the Labor Code.

26.6.3 Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she/they is employed, and shall be employed only at the work of the craft or trade to which he/she/they is registered.

26.6.4 Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprentice agreements under chapter 4 (commencing at section 3070), division 3, of the Labor Code, are eligible to be employed. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she/they is training.

26.6.5 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractors employing workers in any apprenticeable craft or trade in performing any Work under this Contract shall apply to the applicable joint apprenticeship committee for a certificate approving the Contractor or Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

26.6.6 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractor may be required to make contributions to the apprenticeship program.

26.6.7 If Contractor or Subcontractor willfully fails to comply with Labor Code section 1777.5, then, upon a determination of noncompliance by the Administrator of Apprenticeship, it shall:

26.6.7.1 Be denied the right to bid on any subsequent project for one (1) year from the date of such determination;

26.6.7.2 Forfeit as a penalty to District the full amount as stated in Labor Code section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council and under the authority of the Chief of the Division of Apprenticeship Standards.

26.6.8 Contractor and all Subcontractors shall comply with Labor Code section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

26.6.9 Contractor shall become fully acquainted with the law regarding apprentices prior to commencement of the Work. Special attention is directed to sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and title 8, California Code of Regulations, section 200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 9th floor, San Francisco, California 94102.

26.7 Non-Discrimination

26.7.1 Contractor herein agrees to comply with the provisions of the California Fair Employment and Housing Act as set forth in part 2.8 of division 3 of the California Government Code, commencing at section 12900; the Federal Civil Rights Act of 1964, as set forth in Public Law 88-352, and all amendments thereto; Executive Order 11246; and all administrative rules and regulations found to be applicable to Contractor and Subcontractor.

26.7.2 Special requirements for Federally Assisted Construction Contracts: During the performance of this Contract, Contractor agrees to incorporate in all subcontracts the provisions set forth in Chapter 60-1.4(b) of Title 41 published in Volume 33 No. 104 of the Federal Register dated May 28, 1968.

26.8 Labor First Aid

Contractor shall maintain emergency first aid treatment for Contractor's workers on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.) and the California Occupational Safety and Health Act of 1973 (Lab. Code, § 6300 et seq.; 8 Cal. Code of Regs., § 330 et seq.).

27. [RESERVED]

28. MISCELLANEOUS

28.1 Assignment of Antitrust Actions

28.1.1 Section 7103.5(b) of the Public Contract Code states:

In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commending with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, which assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

28.1.2 Section 4552 of the Government Code states:

In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

28.1.3 Section 4553 of the Government Code states:

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

28.1.4 Section 4554 of the Government Code states:

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

28.1.5 Under this Article, "public purchasing body" is District and "bidder" is Contractor.

28.2 Excise Taxes

If, under Federal Excise Tax Law, any transaction hereunder constitutes a sale on which a Federal Excise Tax is imposed and the sale is exempt from such Federal Excise Tax because it is a sale to a State or Local Government for its exclusive use, District, upon request, will execute documents necessary to show (1) that District is a political subdivision of the State for the purposes of such exemption, and (2) that the sale is for the exclusive use of District. No Federal Excise Tax for such materials shall be included in any Contract Price.

28.3 Taxes

Contract Price is to include any and all applicable sales taxes or other taxes that may be due in accordance with section 7051 et seq. of the Revenue and Taxation Code, Regulation 1521 of the State Board of Equalization or any other tax code that may be applicable.

28.4 Shipments

Contractor is responsible for any or all damage or loss to shipments until delivered and accepted on Site, as indicated in the Contract Documents. There must be no charge for containers, packing, unpacking, drayage, or insurance. The total Contract Price shall be all inclusive (including sales tax) and no additional costs of any type will be considered.

28.5 Compliance with Government Reporting Requirements

If this Contract is subject to federal or other governmental reporting requirements because of federal or other governmental financing in whole or in part for the Project of which it is part, or for any other reason, Contactor shall comply with those reporting requirements at the request of the District at no additional cost.

END OF DOCUMENT

DOCUMENT 00 73 13
SPECIAL CONDITIONS

THIS DOCUMENT MUST BE ADAPTED FOR EACH PROJECT – Delete any provision that is not applicable or if no change from the provision in the General Conditions.

***** THIS LIST OF SPECIAL CONDITION PROVISIONS IS FOR REFERENCE ONLY. REMOVE THIS PAGE BEFORE USING THIS DOCUMENT. *****

1. Preparation of Solicitation for Subsequent Contracts
2. Mitigation Measures
3. Modernization Projects
4. Badge Policy for Contractors
5. Substitution for Specified Items
6. Weather Days
7. Owner-Controlled or Wrap-Up Insurance Program
8. Insurance Policy Limits
9. Permits, Certificates, Licenses, Fees, Approval
10. Project Labor Agreement/Payroll Records
11. As-Builts and Record Drawings
12. Disabled Veteran Business Enterprises
13. Construction Manager
14. Program Manager
15. Federal Funds - Wages
16. Federal Funds – Debarment
17. Federal Funds – Byrd Anti-Lobbying
18. Federal Funds – Procurement of recovered materials
19. Federal Funds - Domestic preferences for procurements
20. Preliminary Schedule of Values

DOCUMENT 00 73 13
SPECIAL CONDITIONS

1. Preparation of Solicitation of Subsequent Contracts

Insert Section 6.1.9 in the General Conditions:

6.1.9 Contractor's duties and services under this Contract shall not include preparing or assisting the District with any portion of the District's preparation of a request for proposals, request for qualifications, or any other solicitation regarding a subsequent or additional contract with the District. The District shall at all times retain responsibility for public contracting, including with respect to any subsequent phase of this Project. Contractor's participation in the planning, discussions, or drawing of project plans or specifications shall be limited to conceptual, preliminary, or initial plans or specifications. Contractor shall cooperate with the District to ensure that all bidders for a subsequent contract on any subsequent phase of this Project have access to the same information, including all conceptual, preliminary, or initial plans or specifications prepared by Contractor pursuant to this Contract.

2. Mitigation Measures

The Contractor shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.).

3. Modernization Projects

3.1 Access. Access to the school buildings and entry to buildings, classrooms, restrooms, mechanical rooms, electrical rooms, or other rooms, for construction purposes, must be coordinated with District and onsite District personnel before Work is to start. Unless agreed to otherwise in writing, only a school custodian will be allowed to unlock and lock doors in existing building(s). The custodian will be available only while school is in session. If a custodian is required to arrive before 7:00 a.m. or leave after 3:30 p.m. to accommodate Contractor's Work, the overtime wages for the custodian will be paid by the Contractor, unless at the discretion of the District, other arrangements are made in advance.

3.2 Keys. Upon request, the District may, at its own discretion, provide keys to the school site for the convenience of the Contractor. The Contractor agrees to pay all expenses to re-key the entire school site and all other affected District buildings if the keys are lost or stolen, or if any unauthorized party obtains a copy of the key or access to the school.

3.3 Maintaining Services. The Contractor is advised that Work is to be performed in spaces regularly scheduled for instruction. Interruption and/or periods of shutdown of public access, electrical service, water service, lighting, or other utilities shall be only as arranged in advance with the District. Contractor shall provide temporary services to all facilities interrupted by Contractor's Work.

3.4 Maintaining Utilities. The Contractor shall maintain in operation during duration of Contract, drainage lines, storm drains, sewers, water, gas, electrical, steam, and other utility service lines within working area.

3.5 Confidentiality. Contractor shall maintain the confidentiality of all information, documents, programs, procedures and all other items that Contractor encounters while performing the Work. This requirement shall be ongoing and shall survive the expiration or termination of this Contract and specifically includes, without limitation, all student, parent, and employee disciplinary information and health information.

3.6 Work during Instructional Time. By submitting its bid, Contractor affirms that Work may be performed during ongoing instruction in existing facilities. If so, Contractor agrees to cooperate to the best of its ability to minimize any disruption to school operations and any use of school facilities by the public up to, and including, rescheduling specific work activities, at no additional cost to District.

3.7 No Work during Student Testing. Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests.

4. Badge Policy for Contractors

All Contractors doing work for the District will provide their workers with identification badges. These badges will be worn by all members of the Contractor's staff who are working in a District facility.

4.1 Badges must be filled out in full and contain the following information:

4.1.1 Name of Contractor

4.1.2 Name of Employee

4.1.3 Contractor's address and phone number

4.2 Badges are to be worn when the Contractor or his/her employees are on site and must be visible at all times. Contractors must inform their employees that they are required to allow District employees, the Architect, the Construction Manager, the Program Manager, or the Project Inspector to review the information on the badges upon request.

4.3 Continued failure to display identification badges as required by this policy may result in the individual being removed from the Project or assessment of fines against the Contractor.

5. Substitutions for Specified Items

Replace Section 1.7 in the General Conditions with the following provisions:

1.7.1 Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified.

1.7.1.1 If the material, process, or article offered by Contractor is not, in the opinion of the District, substantially equal or better in every respect to that specified, then Contractor shall furnish the material, process, or article specified in the Specifications without any additional compensation or change order.

1.7.1.2 This provision shall not be applicable with respect to any material, product, thing or service for which District made findings and gave notice in accordance with Public Contract Code section 3400(c); therefore, Contractor shall not be entitled to request a substitution with respect to those materials, products or services.

1.7.2 A request for a substitution shall be submitted as follows:

1.7.2.1 Contractor shall notify the District in writing of any request for a substitution at least ten (10) days prior to bid opening as indicated in the Instructions to Bidders.

1.7.2.2 Requests for Substitutions after award of the Contract shall be submitted within thirty-five (35) days of the date of the Notice of Award.

1.7.3 Within 35 days after the date of the Notice of Award, Contractor shall provide data substantiating a request for substitution of "an equal" item, including but not limited to the following:

1.7.3.1 All variations of the proposed substitute from the material specified including, but not limited to, principles of operation, materials, or construction finish, thickness or gauge of materials, dimensions, weight, and tolerances;

1.7.3.2 Available maintenance, repair or replacement services;

1.7.3.3 Increases or decreases in operating, maintenance, repair, replacement, and spare parts costs;

1.7.3.4 Whether or not acceptance of the substitute will require other changes in the Work (or in work performed by the District or others under Contract with the District); and

1.7.3.5 The time impact on any part of the Work resulting directly or indirectly from acceptance of the proposed substitute.

1.7.4 No substitutions shall be made until approved, in writing, by the District. The burden of proof as to equality of any material, process, or article shall rest with Contractor. The Contractor warrants that if substitutes are approved:

1.7.4.1 The proposed substitute is equal or superior in all respects to that specified, and that such proposed substitute is suitable and fit for the intended purpose and will perform adequately the function and achieve the results called for by the general design and the Contract Documents;

1.7.4.2 The Contractor provides the same warranties and guarantees for the substitute that would be provided for that specified;

1.7.4.3 The Contractor shall be fully responsible for the installation of the substitute and any changes in the Work required, either directly or indirectly, because of the acceptance of such substitute, with no increase in Contract Price or Contract Time. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time;

1.7.4.4 The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute; and

1.7.4.5 The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit.

1.7.5 In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.

1.7.6 In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

1.7.7 Contractor shall be responsible for any costs the District incurs for professional services, DSA fees, or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods. District may deduct those costs from any amounts owing to the Contractor for the review of the request for substitution, even if the request for substitution is not approved. District, at its sole discretion, shall deduct from the payments due to and/or invoice Contractor for all the professional services and/or DSA fees or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods arising herein.

6. Weather Days

Replace Section 15.2.1.5 in the General Conditions with the following:

15.2.1.5 The number of days of Adverse Weather exceeds the following parameters:

January		July	
February		August	
March		September	
April		October	
May		November	
June		December	

7. Owner-Controlled or Wrap-Up Insurance Program

If the District opts to implement an owner-controlled or wrap-up insurance program ("OCIP"), Contractor and all Subcontractors under the Contractor shall participate in and comply with the OCIP as required by the District, OCIP Administrator, insurers, or designees, prior to the commencement of construction activities at the Project. In addition, Contractor shall procure and maintain, at its own expense, until completion and final acceptance of the Work at least the following insurance from insurance companies with an A.M. Best rating of no less than _____, except for those coverages provided by the OCIP as described in the OCIP Manual:

[Commercial General Liability]	Personal Injury Liability, Broad Form Property Damage including completed operations, and Explosion, Collapse and Underground Hazards	**[E.G. $5,000,000]**
[Automobile Liability – Any Auto]	Bodily Injury and Property Damage	**[E.G. $5,000,000]**
[Workers Compensation]		Statutory limits pursuant to State law
[Employers' Liability]		**[E.G. $1,000,000]**

[THE REMAINDER OF THIS PAGE LEFT BLANK INTENTIONALLY]

8. Insurance Policy Limits

All of Contractor's insurance shall be with insurance companies with an A.M. Best rating of no less than _____. The limits of insurance shall not be less than:

Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	**[E.G. CHOOSE ONE OF THREE OPTIONS:** Option 1 - Low Risk Option: $1,000,000 per occurrence; $2,000,000 aggregate
		Option 2 - Intermediate Risk Option: $2,000,000 per occurrence; $4,000,000 aggregate
		Option 3 - High Risk Option: $5,000,000 per occurrence; $10,000,000 aggregate**]**
Automobile Liability – Any Auto	Combined Single Limit	**[E.G. CHOOSE ONE OF TWO OPTIONS:** Option 1 - Personal vehicles: $500,000 Commercial vehicles: $1,000,000
		Option 2 - Personal vehicles: $100,000 per person/ $300,000 per accident**]**
Workers' Compensation		Statutory limits pursuant to State law
Employer's Liability		**[E.G. $0]**
Builder's Risk (Course of Construction)		**[E.G. $0]**
Pollution Liability		**[E.G. $0]**

9. Permits, Certificates, Licenses, Fees, Approvals

9.1 Payment for Permits, Certificates, Licenses, Fees, and Approvals. As required in the General Conditions, the Contractor shall secure and pay for all permits, licenses,

approvals, and certificates necessary for the prosecution of the Work with the exception of the following:

[_____]

With respect to the above-listed items, Contractor shall be responsible for securing such items; however, District will be responsible for payment of these charges or fees. Contractor shall notify the District of the amount due with respect to such items and to whom the amount is payable. Contractor shall provide the District with an invoice and receipt with respect to such charges or fees.

9.2 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities

General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities does not apply to this Project.

10. Project Labor Agreement/Payroll Records

The District reserves the right to enter into a Project Labor Agreement ("PLA") related to this Project.

Accordingly, the following provision may be added as Section 26.4.6 :

26.4.6 As Contractor and its subcontractors have agreed to be bound by the terms of the PLA entered into by the District [on or about / dated] _____, Contractor and its subcontractors may be excused from uploading CPRs electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online at http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html , or by using a more current application and URL. However, within ten (10) days of any request by the District or Labor Commissioner, Contractor and its subcontractors shall provide CPRs showing the name, address, social security number, work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each subcontractor in connection with the Work.

11. As-Builts and Record Drawings

11.1 When called for by Division 1, Contractor shall submit As-Built Drawings pursuant to the Contract Documents consisting of one set of computer-aided design and drafting ("CADD") files in the following format _____, plus one set of As-Built Drawings on vellum or mylar.

11.2 Contractor shall submit Record Drawings pursuant to the Contract Documents consisting of one set of computer-aided design and drafting ("CADD") files in the following format _____, plus one set of Record Drawings on vellum or mylar.

12. Disabled Veteran Business Enterprises

This Project may use or plan to use funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings. Therefore, Section 17076.11 of the Education Code requires the District to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%), per year, of the overall dollar amount expended each year by the District on projects that receive state funding. The Contractor must submit the Disabled Veteran Business Enterprise Participation Certification to the District with its executed Agreement, identifying the steps Contractor took to solicit DVBE participation in conjunction with this Contract.

In instances where this Project does not utilize funds allocated by the State of California School Facility Program for the construction and/or modernization of school buildings, the above-stated DVBE participation goals and certification requirements shall not apply.

13. Construction Manager

The District will use a Construction Manager on the Project that is the subject of this Contract. _____ is the Construction Manager for this Project.

14. Program Manager

_____ is the Program Manager designated for the Project that is the subject of this Contract.

15. Federal Funds - Wages

As this Project is funded in whole or in part by federal funds, Contractor and all Subcontractors are subject to civil or criminal prosecution for any violation of the federal False Claims Act set forth under section 1001 of title 18 and section 231 of title 31 of the United States Code.

If federal funding is utilized, in whole or in part, then the following provisions are added as Section 27 of the General Conditions:

27. FEDERAL LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS

27.1 Minimum Wages

The Davis-Bacon Act and 29 CFR parts 1 through 7 shall apply if the Project is financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution.

27.1.1 All laborers and mechanics employed or working upon the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the Project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3) , the full amount of wages and bona fide fringe benefits,

or cash equivalents thereof, due at time of payment computed at rates not less than those contained in the applicable wage determination of the Secretary of Labor regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of this section, including but not limited to paragraph 27.1.7; also, regular contributions made or costs incurred for more than a weekly period, but not less often than quarterly, under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of Work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing Work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which Work is performed. The wage determination including any additional classification and wage rates conformed under this section, including but not limited to paragraph 27.1.6 and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its Subcontractors at the Site of the Work in a prominent and accessible place where it can be easily seen by the workers.

27.1.2 Any class of laborers or mechanics, including helpers, and which is to be employed under the Contract which is not listed in the wage determination shall be classified in conformance with the wage determination. An additional classification and wage rate and fringe benefits will not be approved unless when the following criteria have been met:

27.1.2.1 The Work to be performed by the classification requested is not performed by a classification in the wage determination; and

27.1.2.2 The classification is utilized in the area by the construction industry; and

27.1.2.3 The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

27.1.3 If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the District agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Contractor to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210.

27.1.4 In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the District do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contractor shall provide the questions, including the views of all interested parties and the recommendation of the District, to the District for the District's review and referral to the Administrator for determination.

27.1.5 The wage rate (including fringe benefits where appropriate) determined pursuant to this section, shall be paid to all workers performing Work in the classification under this Contract from the first day on which Work is performed in the classification.

27.1.6 Whenever the minimum wage rate prescribed in any applicable wage determination for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

27.1.7 If the Contractor does not make payments to a trustee or other third person, the Contractor may consider, as part of the wages of any laborer or mechanic, the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. If the Secretary of Labor so requires, the Contractor shall set aside in a separate account sufficient assets to meet obligations under the plan or program.

27.2 Withholding. District may, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract. In the event of Contractor's or any Subcontractors' failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the Contract, the District may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as it deems necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

27.3 Payrolls and basic records.

27.3.1 Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the Site of the

Work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

27.3.2 The Contractor shall submit weekly for each week in which any Contract Work is performed a copy of all payrolls to the District. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information shall be submitted on a form acceptable to the District. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at https://www.dol.gov/whd/programs/dbra/wh347.htm or its successor site. Contractor is responsible for the submission of copies of payrolls by all Subcontractors. Contractor and Subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the District, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. Contractor may require a Subcontractor to provide addresses and social security numbers to the Contractor for its own records, without weekly submission to the District or other government agency

27.3.3 Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or Subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

27.3.3.1 That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5,

27.3.3.2 That the appropriate information is being maintained under 29 CFR 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and

27.3.3.3 That such information is correct and complete;

27.3.3.4 That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and

27.3.3.5 That no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

27.3.3.6 That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of Work performed, as specified in the applicable wage determination incorporated into or applicable to the Contract.

27.3.3.7 The weekly submission of a properly executed certification in the form set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 27.3.3 of this section.

27.3.3.8 The falsification of any of the above certifications may subject the Contractor or one or more Subcontractors to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

27.3.3.9 The Contractor or Subcontractor shall make the records required under this section available for inspection, copying, or transcription by authorized representatives of the District or the federal Department of Labor, and shall permit representatives to interview employees during working hours on the job. If the Contractor or Subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

27.4 Apprentices and trainees

27.4.1 Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the Work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if

a person is employed in his or her first ninety (90) days of probationary employment as an apprentice in an eligible apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job Site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of Work actually performed. In addition, any apprentice performing Work on the job Site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the Work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or Subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the Work performed until an acceptable program is approved.

27.4.2 Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to Work at less than the predetermined rate for the Work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job Site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the

wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of Work actually performed. In addition, any trainee performing Work on the job Site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the Work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the Work performed until an acceptable program is approved.

27.4.3 Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

27.5 Compliance with Copeland Act requirements. Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Contract.

27.6 Subcontracts. The Contractor or Subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal agency may by appropriate instructions require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for the compliance by any Subcontractor or lower tier Subcontractor with all the Contract clauses in 29 CFR 5.5.

27.7 Contract termination: debarment. A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a Subcontractor as provided in 29 CFR 5.12.

27.8 Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Contract.

27.9 Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its Subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

27.10 Certification of eligibility.

27.10.1 By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's

firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

27.10.2 No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

27.10.3 Contractor shall be subject to the penalty for making false statements prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

27.11 Clauses Mandated by Contract Work Hours and Safety Standards Act.

As used in the following paragraphs, the terms laborers and mechanics include watchmen and guards.

27.11.1 Overtime requirements. No Contractor or Subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such Work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

27.11.2 Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in the foregoing paragraph the Contractor and any Subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the foregoing paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to Work in excess of the standard workweek of forty hours without payment of the overtime wages required by the foregoing paragraph.

27.11.3 Withholding for unpaid wages and liquidated damages. The District may upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of Work performed by the Contractor or Subcontractor under the Contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the forgoing paragraph.

27.11.4 Subcontracts. The Contractor or Subcontractor shall insert in any subcontracts the foregoing paragraphs concerning "Overtime requirements" and "Violation; liability for unpaid wages; liquidated damages" and also a clause requiring each Subcontractor to include these clauses in any lower tier subcontracts. Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with the clauses set forth in paragraphs 27.11.1 through 27.11.4 of this section.

16. Federal Funds – Debarment

If the Project is funded in whole or in part by federal funds, then the following provision is added as Section 6.1.5 of the General Conditions:

This Project uses or may plan to use federal funds. Consequently, Contractor is required to provide a signed "Federal Debarment" certification with its bid. This certification is required by the regulation implementing Executive Order 12549, Debarment and Suspension, 29 CFR Part 89, Section 98.510, Participants; responsibilities. The regulations were published as Part of VII of the May 26, 1988 Federal Register (pages 19160-19211).

17. Federal Funds – Byrd Anti-Lobbying

If the Project is funded in whole or in part by federal funds, then the following provision is added as Section 6.1.7 of the General Conditions:

If the contract exceeds $100,000, Contractor is required to provide a signed "Byrd Anti-Lobbying" certification with its bid ((31 U.S.C. 1352) (Appendix II to 2 CFR, Part 200)).

18. Federal Funds – Procurement of recovered materials

If the Project is funded in whole or in part by federal funds, then the following provision is added as Section 6.13.5 of the General Conditions:

Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds $10,000 or the value of the quantity acquired during the preceding fiscal year exceeded $10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

19. Federal Funds - Domestic preferences for procurements

If the Project is funded in whole or in part by a federal grant made after November 12, 2020, then the following provision is added as Section 1.8.10 of the General Conditions:

1.8.10 As appropriate and to the extent consistent with law, Contractor should, to the greatest extent practicable for the Project, provide a preference for the purchase,

acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subcontracts and purchase orders for work or products for the Project.

1.8.10.1 "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

1.8.10.2 "Manufactured products" means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

20. Preliminary Schedule of Values

The preliminary schedule of values shall include, at a minimum, the following information and the following structure:

Replace Section 10.1.1.2.3 in the General Conditions with the following provisions:

10.1.1.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

10.1.1.2.3.1 Mobilization and layout combined to equal not more than [2]%;

10.1.1.2.3.2 Submittals, samples and shop drawings combined to equal not more than [4]%;

10.1.1.2.3.3 Bonds and insurance combined to equal not more than [2.75]%.

10.1.1.2.3.4 Closeout documentation shall have a value in the preliminary schedule of not less than [5]%.

SECTION 00 01 05
CERTIFICATIONS PAGE

OWNER:

Lodi Unified School District
130 E Vine Street
Lodi, CA 95240

209-331-7000

Contact:
Amberly Kidder
Planning Analyst - Facility & Planning

ARCHITECT:

LPA, INC.
431 I Street, Suite 107, Sacramento, CA 95814
(916) 287-2400

Contact:
Julian Watt
Architect of Record

CIVIL ENGINEER:

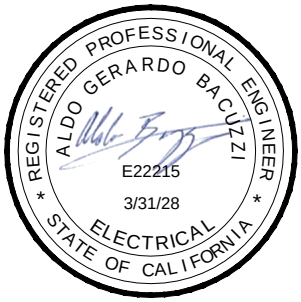
LPA, INC.
5301 California Avenue, Suite 100, Irvine, CA 92617
(949) 261-1001

Contact:
Kathereen Shinkai
Civil Engineer of Record

ELECTRICAL ENGINEER:

LPA, INC.
5301 California Avenue, Suite 100, Irvine, CA 92617
(949) 261-1001

Contact:
Aldo Bacuzzi
Electrical Engineer of Record:



LANDSCAPE ARCHITECT:

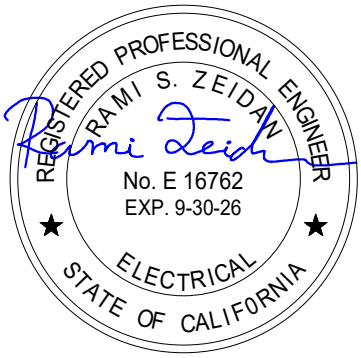
LPA, INC.
60 S. Market Street, Suite 1250, San Jose, CA 95113
(408) 780-7200

Contact:
Naomi Nishimoto
Landscape Architect of Record

TECHNOLOGY:

LP Egineers
1209 Pleasant Grove Blvd., Roseville, CA 95678

Contact:
Rami Zeida
Technology Engineer of Record



END OF SECTION

SECTION 00 01 10
TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01 - Project Title Page

00 01 05 - Certifications Page

00 01 10 - Table of Contents

SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

01 30 00 - Administrative Requirements

01 41 13.11 - Regulatory Requirements - Global Warming Potential (GWP)

01 56 39 - Temporary Tree and Plant Protection

01 57 13 - Temporary Erosion and Sediment Control

01 61 16 - Volatile Organic Compound (VOC) Restrictions

DIVISION 02 -- EXISTING CONDITIONS

02 41 00 - Demolition

DIVISION 03 -- CONCRETE

03 20 00 - Concrete Reinforcing

03 30 00 - Cast-in-Place Concrete

DIVISION 04 -- MASONRY (NOT USED)

DIVISION 05 -- METALS

05 05 13 - Shop-Applied Coatings for Metal

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

06 10 00 - Rough Carpentry

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

07 05 13 - Selective Roof Modifications

07 21 00 - Thermal Insulation

07 92 00 - Joint Sealants

DIVISION 08 -- OPENINGS

08 11 13 - Hollow Metal Doors and Frames
08 14 16 - Flush Wood Doors
08 31 00 - Access Doors and Panels
08 71 00 - Door Hardware
08 80 00 - Glazing

DIVISION 09 -- FINISHES

09 21 16 - Gypsum Board Assemblies
09 51 00 - Acoustical Ceilings
09 51 53 - Direct-Applied Acoustical Ceilings
09 65 00 - Resilient Flooring
09 67 00 - Fluid-Applied Flooring
09 68 13 - Tile Carpeting
09 81 00 - Acoustic Insulation
09 91 13 - Exterior Painting
09 91 23 - Interior Painting
09 96 20 - Permanent Non-Sacrificial Anti-Graffiti Coating

DIVISION 10 -- SPECIALTIES

10 14 23 - Panel Signage
10 21 13.19 - Plastic Toilet Compartments
10 28 00 - Toilet, Bath, and Laundry Accessories

DIVISION 11 -- EQUIPMENT

11 68 13 - Playground Equipment

DIVISION 12 -- FURNISHINGS

12 24 00 - Window Shades
12 36 00 - Countertops

DIVISION 13 -- SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 -- CONVEYING EQUIPMENT (NOT USED)

DIVISION 21 -- FIRE SUPPRESSION (NOT USED)

DIVISION 22 -- PLUMBING

22 01 30 - Common Work Results for Plumbing
22 05 16 - Expansion Fittings and Loops for Plumbing Piping
22 05 17 - Sleeves and Sleeve Seals for Plumbing Piping
22 05 19 - Meters and Gauges for Plumbing Piping

22 05 23 - General-Duty Valves for Plumbing Piping
22 05 29 - Hangers and Supports for Plumbing Piping and Equipment
22 05 53 - Identification for Plumbing Piping and Equipment
22 07 19 - Plumbing Piping Insulation
22 10 05 - Plumbing Piping
22 10 06 - Plumbing Piping Specialties
22 30 00 - Plumbing Equipment
22 40 00 - Plumbing Fixtures

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 00 - Common Work Results for HVAC
23 05 17 - Sleeves and Sleeve Seals for HVAC Piping
23 05 29 - Hangers and Supports for HVAC Piping and Equipment
23 05 48 - Vibration and Seismic Controls for HVAC
23 05 53 - Identification for HVAC Piping and Equipment
23 05 93 - Testing, Adjusting, and Balancing for HVAC
23 07 13 - Duct Insulation
23 07 19 - HVAC Piping Insulation
23 09 01 - Cloud-Based Energy and Control System
23 23 00 - Refrigerant Piping
23 31 00 - HVAC Ducts and Casings
23 33 00 - Air Duct Accessories
23 34 23 - HVAC Power Ventilators
23 37 00 - Air Outlets and Inlets
23 40 00 - HVAC Air Cleaning Devices
23 81 26 - Split-System Air Conditioners

DIVISION 25 -- INTEGRATED AUTOMATION (NOT USED)

DIVISION 26 -- ELECTRICAL

26 05 05 - Selective Demolition for Electrical
26 05 19 - Low-Voltage Electrical Power Conductors and Cables
26 05 26 - Grounding and Bonding for Electrical Systems
26 05 29 - Hangers and Supports for Electrical Systems
26 05 33.13 - Conduit for Electrical Systems
26 05 33.16 - Boxes for Electrical Systems
26 05 48 - Vibration and Seismic Controls for Electrical Systems
26 05 53 - Identification for Electrical Systems
26 05 73 - Power System Studies
26 05 83 - Wiring Connections
26 09 23 - Lighting Control Devices

26 21 00 - Low-Voltage Electrical Service Entrance
26 24 13 - Switchboards
26 27 13 - Electricity Metering
26 28 13 - Fuses
26 28 16.16 - Enclosed Switches
26 43 00 - Surge Protective Devices
26 56 00 - Exterior Lighting

DIVISION 27 -- COMMUNICATIONS

27 00 00 - Communications Administration
27 05 00 - Common Work Results for Communications
27 11 00 - Equipment Rooms and Enclosures
27 11 23 - Communication Cable Management and Ladder Rack
27 13 00 - Communications Backbone Cabling
27 15 00 - Communications Horizontal Cabling
27 16 00 - Connecting Cords
27 41 00 - Audio-Visual Systems
27 51 23 - Intercommunication Program Systems
27 51 26 - Assistive Listening Systems
27 53 13 - Clock Systems

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

28 10 00 - Access Control
28 20 00 - Video Surveillance
28 31 00 - Intrusion Detection
28 46 00 - Fire Detection and Alarm

DIVISION 31 -- EARTHWORK

31 10 00 - Site Clearing
31 22 00 - Grading
31 23 16 - Excavation
31 23 16.13 - Trenching
31 23 23 - Fill

DIVISION 32 -- EXTERIOR IMPROVEMENTS

32 01 90 - Landscape Maintenance
32 11 20 - Subbase and Aggregate Base Courses
32 12 16 - Asphalt Paving
32 13 13 - Concrete Paving
32 13 73 - Pavement Joint Sealers
32 17 40 - Streetbond SB150 (Flat Surface)

32 18 14.30 - Permeable Base System - Northern CA
32 18 15 - Synthetic Turf Surfacing (Non-Athletic)
32 33 00 - Site Furnishings
32 33 53 - Architectural Site Concrete
32 84 00 - Irrigation System
32 91 19 - Landscape Grading
32 93 00 - Landscape Work

DIVISION 33 -- UTILITIES

33 14 16 - Site Water Utility Distribution Piping
33 42 11 - Stormwater Gravity Piping

DIVISION 34 -- TRANSPORTATION (NOT USED)

DIVISION 35 -- WATERWAY AND MARINE CONSTRUCTION (NOT USED)

DIVISION 40 -- PROCESS INTEGRATION (NOT USED)

DIVISION 42 -- PROCESS HEATING, COOLING, AND DRYING EQUIPMENT (NOT USED)

DIVISION 44 -- POLLUTION CONTROL EQUIPMENT (NOT USED)

DIVISION 46 -- WATER AND WASTEWATER EQUIPMENT (NOT USED)

END OF SECTION

DOCUMENT 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Site Access Conditions and Requirements;

B. Special Conditions.

1.02 SUMMARY OF WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Contract consists of the following:

Selective demolition and construction necessary for the Modernization to existing school buildings, including associated civil, architectural, structural, plumbing, mechanical and/or electrical work as indicated in the Drawings and Specifications. Generally, these categories of work involve new finishes, adaptive re-use and modification of certain selected areas, new cabinetry, handicap accessibility retrofits, re-roofing, and adding HVAC to instructional areas, library and administrative areas and pertain to changing and expanding selected infrastructure utilities, and extensive modifications. The Project will involve the "phasing" and barricading of work areas as indicated on the Plans and enumerated in these Specifications.

1.03 CONTRACTS

A. Perform the Work under a single, fixed-price Contract.

1.04 WORK BY OTHERS

A. Work on the Project that will be performed and completed prior to the start of the Work of this Contract:

[FILL IN OR MODIFY AS APPROPRIATE]

(1) Asbestos removal/abatement.

(2) Lead paint removal/abatement.

B. Work on the Project that will be performed by others concurrent with the Work of this Contract:

(1) _____

(2) _____

1.05 CODES, REGULATIONS, AND STANDARDS

A. The codes, regulations, and standards adopted by the state and federal agencies having jurisdiction shall govern minimum requirements for this Project. Where codes, regulations, and standards conflict with the Contract Documents, these conflicts shall be brought to the immediate attention of the District and the Architect.

B. Codes, regulations, and standards shall be as published effective as of date of bid opening, unless otherwise specified or indicated.

1.06 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain on Site one set of the following record documents; Contractor shall record actual revisions to the Work:

(1) Contract Drawings.

(2) Specifications.

(3) Addenda.

(4) Change Orders and other modifications to the Contract.

(5) Reviewed shop drawings, product data, and samples.

(6) Field test records.

(7) Inspection certificates.

(8) Manufacturer's certificates.

B. Contractor shall store Record Documents separate from documents used for construction. Provide files, racks, and secure storage for Record Documents and samples.

C. Contractor shall record information concurrent with construction progress.

D. Specifications: Contractor shall legibly mark and record at each product section of the Specifications the description of the actual product(s) installed, including the following:

(1) Manufacturer's name and product model and number.

(2) Product substitutions or alternates utilized.

(3) Changes made by Addenda and Change Orders and written directives.

1.07 EXAMINATION OF EXISTING CONDITIONS

A. Contractor shall be held to have examined the Project Site and acquainted itself with the conditions of the Site and of the streets or roads approaching the Site.

B. Prior to commencement of Work, Contractor shall survey the Site and existing buildings and improvements to observe existing damage and defects such as cracks, sags, broken, missing or damaged glazing, other building elements and Site improvements, and other damage.

C. Should Contractor observe cracks, sags, and other damage to and defects of the Site and adjacent buildings, paving, and other items not indicated in the Contract Documents, Contractor shall immediately report same to the District and the Architect.

1.08 CONTRACTOR'S USE OF PREMISES

A. If unoccupied and only with District's prior written approval, Contractor may use the building(s) at the Project Site without limitation for its operations, storage, and office facilities for the performance of the Work. If the District chooses to beneficially occupy any building(s), Contractor must obtain the District's written approval for Contractor's use of spaces and types of operations to be performed within the building(s) while so occupied. Contractor's access to the building(s) shall be limited to the areas indicated.

B. If the space at the Project Site is not sufficient for Contractor's operations, storage, office facilities and/or parking, Contractor shall arrange and pay for any additional facilities needed by Contractor.

C. Contractor shall not interfere with use of or access to occupied portions of the building(s) or adjacent property.

D. Contractor shall maintain corridors, stairs, halls, and other exit-ways of building clear and free of debris and obstructions at all times.

E. No one other than those directly involved in the demolition and construction, or specifically designated by the District or the Architect shall be permitted in the areas of work during demolition and construction activities.

F. The Contractor shall install the construction fence and maintain that it will be locked when not in use. Keys to this fencing will be provided to the District.

1.09 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The Drawings show above-grade and below-grade structures, utility lines, and other installations that are known or believed to exist in the area of the Work. Contractor shall locate these existing installations before proceeding with excavation and other operations that could damage same; maintain them in service, where appropriate; and repair damage to them caused by the performance of the Work. Should damage occur to these existing

installations, the costs of repair shall be at the Contractor's expense and made to the District's satisfaction.

B. Contractor shall be alert to the possibility of the existence of additional structures and utilities. If Contractor encounters additional structures and utilities, Contractor will immediately report to the District for disposition of same as indicated in the General Conditions.

1.10 UTILITY SHUTDOWNS AND INTERRUPTIONS

A. Contractor shall give the District a minimum of three (3) days written notice in advance of any need to shut off existing utility services or to effect equipment interruptions. The District will set exact time and duration for shutdown, and will assist Contractor with shutdown. Work required to re-establish utility services shall be performed by the Contractor.

B. Contractor shall obtain District's written approval as indicated in the General Conditions in advance of deliveries of material or equipment or other activities that may conflict with District's use of the building(s) or adjacent facilities.

1.11 STRUCTURAL INTEGRITY

A. Contractor shall be responsible for and supervise each operation and work that could affect structural integrity of various building elements, both permanent and temporary.

B. Contractor shall include structural connections and fastenings as indicated or required for complete performance of the Work.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 21 00
ALLOWANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-specified work.

1.2 RELATED SECTIONS

A. Document 01 10 00 (Summary of Work)

B. Document 01 29 00 (Payments and Completion)

C. Document 01 32 19 (Submittal Procedures)

1.3 ALLOWANCES

A. Included in the Contract, a 10 percent District controlled allowance for Unforeseen Conditions within the limits set forth in the Contract Documents. **This Allowance shall not be utilized without written approval by the District**.

B. Contractor's costs, without overhead and profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from this Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive.

C. Funds will be drawn from Allowance only with District approval evidenced by an Allowance Expenditure Directive.

D. At Contract closeout, funds remaining in Allowance will be credited to District by Change Order.

E. Whenever costs are more than the Allowance, the amount covered by the Allowance will be approved at cost. The Contract Price shall be adjusted by Change Order for amounts in excess of the Allowance.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF DOCUMENT

DOCUMENT 01 22 00
ALTERNATES AND UNIT PRICING

PART 4 – ALTERNATES

4.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions;

C. Bid Form and Proposal;

D. Instruction to Bidders.

4.02 DESCRIPTION

The items of work indicated below propose modifications to, substitutions for, additions to and/or deletions from the various parts of the Work specified in other Sections of the Specifications. The acceptance or rejection of any of the alternates is strictly at the option of the District subject to District's acceptance of Contractor's stated prices contained in this Proposal.

4.03 GENERAL

Where an item is omitted, or scope of Work is decreased, all Work pertaining to the item whether specifically stated or not, shall be omitted and where an item is added or modified or where scope of Work is increased, all Work pertaining to that required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

4.04 BASE BID

The Base Bid includes all work required to construct the Project completely and in accordance with the Contract Documents.

4.05 ALTERNATES

A. _____

B. _____

The above Alternate descriptions are general in nature and for reference purposes only. The Contract Documents, including, without limitation, the Drawings and Specifications, must be referred to for the complete scope of Work.

PART 5 - UNIT PRICING

5.01 GENERAL

Contractor shall completely state all required figures based on Unit Prices listed below. Where scope of Work is decreased, all Work pertaining to the item, whether specifically stated or not, shall be omitted and where scope of Work is increased, all work pertaining to that item required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

5.02 UNIT PRICES

Furnish unit prices for each of the named items on a square foot, lineal foot, or per each basis, as applies. Unit prices shall include all labor, materials, services, profit, overhead, insurance, bonds, taxes, and all other incidental costs of Contractor, subcontractors, and supplier(s).

A. _____

B. _____

END OF DOCUMENT

DOCUMENT 01 25 13
PRODUCT OPTIONS AND SUBSTITUTIONS

PART 6 - GENERAL

6.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. Instructions to Bidders;

B. General Conditions, including, without limitation, Substitutions For Specified Items; and

C. Special Conditions.

6.02 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

A. Catalog numbers and specific brands or trade names followed by the designation "or equal" are used in conjunction with material and equipment required by the Specifications to establish the standards of quality, utility, and appearance required. Substitutions which are equal in quality, utility, and appearance to those specified may be reviewed subject to the provisions of the General Conditions.

B. Wherever more than one manufacturer's product is specified, the first-named product is the basis for the design used in the work and the use of alternative-named manufacturers' products or substitutes may require modifications in that design. If such alternatives are proposed by Contractor and are approved by the District and/or the Architect, Contractor shall assume all costs required to make necessary revisions and modifications of the design resulting from the substitutions requested by the Contractor.

C. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name and "or approved equal," supporting data for the second product, if proposed by Contractor, shall be submitted in accordance with the requirements for substitutions. The District's Board has found and determined that certain item(s) shall be used on this Project based on the purpose(s) indicated pursuant to Public Contract Code section 3400(c). These findings, as well as the products and brand or trade names, have been identified in the Notice to Bidders.

D. The Contractor will not be allowed to substitute specified items unless the request for substitution is submitted as follows:

(1) District must receive any notice of request for substitution of a specified item a minimum of ten (10) calendar days prior to bid opening.

(2) Within 35 days after the date of the Notice of Award, the Contractor shall submit data substantiating the request(s) for all substitution(s)

containing sufficient information to assess acceptability of product or system and impact on Project, including, without limitation, the requirements specified in the Special Conditions and the technical Specifications. Insufficient information shall be grounds for rejection of substitution.

E. If the District and/or Architect, in reviewing proposed substitute materials and equipment, require revisions or corrections to be made to previously accepted Shop Drawings and supplemental supporting data to be resubmitted, Contractor shall promptly do so. If any proposed substitution is judged by the District and/or Architect to be unacceptable, the specified material or equipment shall be provided.

F. Samples may be required. Tests required by the District and/or Architect for the determination of quality and utility shall be made at the expense of Contractor, with acceptance of the test procedure first given by the District.

G. In reviewing the supporting data submitted for substitutions, the District and/or Architect will use for purposes of comparison all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Contract Documents. If more than two (2) submissions of supporting data are required, the cost of reviewing the additional supporting data shall be borne by Contractor, and the District will deduct the costs from the Contract Price. The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute.

H. The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit. In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.

I. In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

PART 7 – PRODUCTS Not Used.

PART 8 – EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 26 00
CHANGES IN WORK

CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE PROVISIONS IN THE AGREEMENT, GENERAL CONDITIONS, AND SPECIAL CONDITIONS, IF USED, RELATED TO CHANGES AND/OR REQUESTS FOR CHANGES.

END OF DOCUMENT

DOCUMENT 01 29 00

APPLICATION FOR PAYMENT AND CONDITIONAL AND UNCONDITIONAL WAIVER AND RELEASE FORMS

CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS IN THE GENERAL CONDITIONS RELATED TO APPLICATIONS FOR PAYMENT AND/OR PAYMENTS.

CONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(Civil Code Section 8132)

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: _____

Amount of Check: $_____

Check Payable to: _____

Exceptions

This document does not affect any of the following:

(1) Retentions.

(2) Extras for which the claimant has not received payment.

(3) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release: _____

Amount(s) of unpaid progress payment(s): $_____

(4) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

UNCONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(Civil Code Section 8134)

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: $_____

Exceptions

This document does not affect any of the following:

1. Retentions.

(5) Extras for which the claimant has not received payment.

(6) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

CONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(Civil Code Section 8136)

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check:

Amount of Check: $_____

Check Payable to: _____

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: $_____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

UNCONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(Civil Code Section 8138)

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: $_____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

DOCUMENT 01 31 19
PROJECT MEETINGS

PART 9 – GENERAL

9.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions; and

B. Special Conditions.

9.02 PROGRESS MEETINGS:

A. Contractor shall schedule and hold regular weekly progress meetings after a minimum of one week's prior written notice of the meeting date and time to all Invitees as indicated below.

B. Location: Contractor's field office.

C. The Contractor shall notify and invite the following entities ("Invitees"):

(1) District Representative.

(2) Contractor.

(3) Contractor's Project Manager.

(4) Contractor's Superintendent.

(5) Subcontractors, as appropriate to the agenda of the meeting.

(6) Suppliers, as appropriate to the agenda of the meeting.

(7) Construction Manager, if any.

(8) Architect

(9) Engineer(s), if any and as appropriate to the agenda of the meeting.

(10) Others, as appropriate to the agenda of the meeting.

D. The District's and/or the Architect's Consultants will attend at their discretion, in response to the agenda.

E. The District representative, the Construction Manager, and/or another District Agent shall take and distribute meeting notes to attendees and other concerned parties. If exceptions are taken to anything in the meeting notes, those exceptions shall be stated in writing to the District within five (5) working days following District's distribution of the meeting notes.

9.03 PRE-INSTALLATION/PERFORMANCE MEETING:

A. Contractor shall schedule a meeting prior to the start of each of the following portions of the Work: cutting and patching of plaster and roofing, and other weather-exposed and moisture-resistant products. Contractor shall invite all Invitees to this meeting, and others whose work may affect or be affected by the quality of the cutting and patching work.

B. Contractor shall review in detail prior to this meeting, the manufacturer's requirements and specifications, applicable portions of the Contract Documents, Shop Drawings, and other submittals, and other related work. At this meeting, invitees shall review and resolve conflicts, incompatibilities, or inadequacies discovered or anticipated.

C. Contractor shall review in detail Project conditions, schedule, requirements for performance, application, installation, and quality of completed Work, and protection of adjacent Work and property.

D. Contractor shall review in detail means of protecting the completed Work during the remainder of the construction period.

PART 10 - PRODUCTS Not Used.

PART 11 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 32 13
SCHEDULING OF WORK

PART 12 – GENERAL

12.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions;

C. Summary of Work; and

D. Submittals.

12.02 SECTION INCLUDES

A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.

(1) Development of schedule, cost and resource loading of the schedule, monthly payment requests, and project status reporting requirements of the Contract shall employ computerized Critical Path Method ("CPM") scheduling ("CPM Schedule").

(2) CPM Schedule shall be cost loaded based on Schedule of Values as approved by District.

(3) Submit schedules and reports as specified in the General Conditions.

B. Upon Award of Contract, Contractor shall immediately commence development of Initial and Original CPM Schedules to ensure compliance with CPM Schedule submittal requirements.

12.03 CONSTRUCTION SCHEDULE

A. Within ten (10) days of issuance of the Notice to Proceed and before request for first progress payment, the Contractor shall prepare and submit to the Project Manager a construction progress schedule conforming to the Milestone Schedule below.

B. The Construction Schedule shall be continuously updated, and an updated schedule shall be submitted with each application for progress payment. Each revised schedule shall indicate the work actually accomplished during the previous period and the schedule for completion of the remaining work.

C. Milestone Schedule:

ACTIVITY DESCRIPTION	REQUIRED COMPLETION

CONSTRUCTION STARTS **[DATE]**
FINAL PROJECT COMPLETION **[DATE]**

12.04 QUALIFICATIONS

A. Contractor shall employ experienced scheduling personnel qualified to use the latest version of [i.e., Primavera Project Planner]. Experience level required is set forth below. Contractor may employ such personnel directly or may employ a consultant for this purpose.

(1) The written statement shall identify the individual who will perform CPM scheduling.

(2) Capability and experience shall be verified by description of construction projects on which individual has successfully applied computerized CPM.

(3) Required level of experience shall include at least two (2) projects of similar nature and scope with value not less than three-fourths (¾) of the Total Bid Price of this Project. The written statement shall provide contact persons for referenced projects with current telephone and address information.

B. District reserves the right to approve or reject Contractor's scheduler or consultant at any time. District reserves the right to refuse replacing of Contractor's scheduler or consultant, if District believes replacement will negatively affect the scheduling of Work under this Contract.

12.05 GENERAL

A. Progress Schedule shall be based on and incorporate milestone and completion dates specified in Contract Documents.

B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in the Contract, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by District. Any such agreement shall be formalized by a Change Order.

(1) District is not required to accept an early completion schedule, i.e., one that shows an earlier completion date than the Contract Time.

(2) Contractor shall not be entitled to extra compensation in event agreement is reached on an earlier completion schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in its early completion schedule but within the Contract Time.

(3) A schedule showing the work completed in less than the Contract Time, and that has been accepted by District, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and the Completion Date. Project Float is a resource available to both District and the Contractor.

C. Ownership Project Float: Neither the District nor Contractor owns Project Float. The Project owns the Project Float. As such, liability for delay of the Completion Date rests with the party whose actions, last in time, actually cause delay to the Completion Date.

(1) For example, if Party A uses some, but not all of the Project Float and Party B later uses remainder of the Project Float as well as additional time beyond the Project Float, Party B shall be liable for the time that represents a delay to the Completion Date.

(2) Party A would not be responsible for the time since it did not consume the entire Project Float and additional Project Float remained; therefore, the Completion Date was unaffected by Party A.

D. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract CPM Schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

E. Failure of Progress Schedule to include any element of the Work, or any inaccuracy in Progress Schedule, will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. District's acceptance of schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests and shall not, in any manner, impose a duty of care upon District, or act to relieve Contractor of its responsibility for means and methods of construction.

F. Software: Use **[i.e., District Project Planner for Windows, latest version]**. Such software shall be compatible with Windows operating system. Contractor shall transmit contract file to District on compact disk at times requested by District.

G. Transmit each item under the form approved by District.

(1) Identify Project with District Contract number and name of Contractor.

(2) Provide space for Contractor's approval stamp and District's review stamps.

(3) Submittals received from sources other than Contractor will be returned to the Contractor without District's review.

12.06 INITIAL CPM SCHEDULE

A. Initial CPM Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to ninety (90) calendar days after the Notice to Proceed.

B. Indicate detailed plan for the Work to be completed in first ninety (90) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; procurement of materials and equipment. Show Work beyond ninety (90) calendar days in summary form.

C. Initial CPM Schedule shall be time scaled.

D. Initial CPM Schedule shall be cost and resource loaded. Accepted cost and resource loaded schedule will be used as basis for monthly progress payments until acceptance of the Original CPM Schedule. Use of Initial CPM Schedule for progress payments shall not exceed ninety (90) calendar days.

E. District and Contractor shall meet to review and discuss the Initial CPM Schedule within seven (7) calendar days after it has been submitted to District.

(1) District's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).

(2) Contractor shall make corrections to schedule necessary to comply with Contract requirements and shall adjust schedule to incorporate any missing information requested by District. Contractor shall resubmit Initial CPM Schedule if requested by District.

F. If, during the first ninety (90) days after Notice to Proceed, the Contractor is of the opinion that any of the Work included on its Initial CPM Schedule has been impacted, the Contractor shall submit to District a written Time Impact Evaluation ("TIE") in accordance with Article 1.12 of this Section. The TIE shall be based on the most current update of the Initial CPM Schedule.

12.07 ORIGINAL CPM SCHEDULE

A. Submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work in conformance with requirements as specified herein.

B. Progress Schedule shall include or comply with following requirements:

(1) Time scaled, cost and resource (labor and major equipment) loaded CPM schedule.

(2) No activity on schedule shall have duration longer than fifteen (15) Work days, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by District.

(a) Activity durations shall be total number of actual Work days required to perform that activity.

(3) The start and completion dates of all items of Work, their major components, and milestone completion dates, if any.

(4) District furnished materials and equipment, if any, identified as separate activities.

(5) Activities for maintaining Project Record Documents.

(6) Dependencies (or relationships) between activities.

(7) Processing/approval of submittals and shop drawings for all material and equipment required per the Contract. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.

(a) Include time for submittals, re-submittals and reviews by District. Coordinate with accepted schedule for submission of Shop Drawings, samples, and other submittals.

(b) Contractor shall be responsible for all impacts resulting from re-submittal of Shop Drawings and submittals.

(8) Procurement of major equipment, through receipt and inspection at jobsite, identified as separate activity.

(a) Include time for fabrication and delivery of manufactured products for the Work.

(b) Show dependencies between procurement and construction.

(9) Activity description: what Work is to be accomplished and where.

(10) The total cost of performing each activity shall be total of labor, material, and equipment, excluding overhead and profit of Contractor. Overhead and profit of the General Contractor shall be shown as a separate activity in the schedule. Sum of cost for all activities shall equal total Contract value.

(11) Resources required (labor and major equipment) to perform each activity.

(12) Responsibility code for each activity corresponding to Contractor or Subcontractor responsible for performing the Work.

(13) Identify the activities which constitute the controlling operations or critical path. No more than twenty-five percent (25%) of the activities shall be critical or near critical. Near critical is defined as float in the range of one (1) to ten (10) days.

(14) Twenty (20) workdays for developing punch list(s), completion of punch list items, and final clean-up for the Work or any designated portion thereof. No other activities shall be scheduled during this period.

(15) Interface with the work of other contractors, District, and agencies such as, but not limited to, utility companies.

(16) Show detailed Subcontractor Work activities. In addition, furnish copies of Subcontractor schedules upon which CPM was built.

(a) Also furnish for each Subcontractor, as determined by District, submitted on Subcontractor letterhead, a statement certifying that Subcontractor concurs with Contractor's Original CPM Schedule and that Subcontractor's related schedules have been incorporated, including activity duration, cost and resource loading.

(b) Subcontractor schedules shall be independently derived and not a copy of Contractor's schedule.

(c) In addition to Contractor's schedule and resource loading, obtain from electrical, mechanical, and plumbing Subcontractors, and other Subcontractors as required by District, productivity calculations common to their trades, such as units per person day, feet of pipe per day per person, feet of wiring per day per person, and similar information.

(d) Furnish schedule for Contractor/Subcontractor CPM schedule meetings which shall be held prior to submission of Original CPM schedule to District. District shall be permitted to attend scheduled meetings as an observer.

(17) Activity durations shall be in Work days.

(18) Submit with the schedule a list of anticipated non-Work days, such as weekends and holidays. The Progress Schedule shall exclude in its Work day calendar all non-Work days on which Contractor anticipates critical Work will not be performed.

C. Original CPM Schedule Review Meeting: Contractor shall, within sixty (60) days from the Notice to Proceed date, meet with District to review the Original CPM Schedule submittal.

(1) Contractor shall have its Project Manager, Project Superintendent, Project Scheduler, and key Subcontractor representatives, as required by District, in attendance. The meeting will take place over a continuous one (1) day period.

(2) District's review will be limited to submittal's conformance to Contract requirements including, but not limited to, coordination requirements. However, review may also include:

(a) Clarifications of Contract Requirements.

(b) Directions to include activities and information missing from submittal.

(c) Requests to Contractor to clarify its schedule.

(3) Within five (5) days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by District at the Meeting.

12.08 ADJUSTMENTS TO CPM SCHEDULE

A. Adjustments to Original CPM Schedule: Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments from original CPM Schedule review meeting and resubmit network diagrams and reports for District's review.

(1) District, within ten (10) days from date that Contractor submitted the revised schedule, will either:

(a) Accept schedule and cost and resource loaded activities as submitted, or

(b) Advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for District to monitor Project's progress, resources, and status or evaluate monthly payment request by Contractor.

(2) District may accept schedule with conditions that the first monthly CPM Schedule update be revised to correct deficiencies identified.

(3) When schedule is accepted, it shall be considered the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.

(4) District reserves right to require Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.

B. Acceptance of Contractor's schedule by District will be based solely upon schedule's compliance with Contract requirements.

(1) By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.

(2) Upon submittal of schedule update, updated schedule shall be considered "current" CPM Schedule.

(3) Submission of Contractor's schedule to District shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed Work.

C. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.

D. Contractor shall distribute Original CPM Schedule to Subcontractors for review and written acceptance, which shall be noted on Subcontractors' letterheads to Contractor and transmitted to District for the record.

12.09 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.

(1) Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.

(2) Each update shall continue to show all Work activities including those already completed. These completed activities shall accurately reflect "as-built" information by indicating when activities were actually started and completed.

B. A meeting will be held on approximately the twenty-fifth (25th) of each month to review the schedule update submittal and progress payment application.

(1) At this meeting, at a minimum, the following items will be reviewed: Percent (%) complete of each activity; Time Impact Evaluations for Change Orders and Time Extension Request; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated Contractor delays.

(2) These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.

(3) Contractor shall plan on the meeting taking no less than four (4) hours.

C. Within five (5) working days after monthly schedule update meeting, Contractor shall submit the updated CPM Schedule update.

D. Within five (5) working days of receipt of above noted revised submittals, District will either accept or reject monthly schedule update submittal.

(1) If accepted, percent (%) complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.

(2) If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

E. Neither updating, changing or revising of any report, curve, schedule, or narrative submitted to District by Contractor under this Contract, nor District's

review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying in any way the Completion Date or milestone dates or of modifying or limiting in any way Contractor's obligations under this Contract.

12.10 SCHEDULE REVISIONS

A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.

B. To reflect revisions to the Schedule, the Contractor shall provide District with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram which compares the original sequence to the revised sequence of work. The Contractor shall provide the written narrative and schedule diagram for revisions two (2) working days in advance of the monthly schedule update meeting.

C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District. District may request further information and justification for schedule revisions and Contractor shall, within three (3) days, provide District with a complete written narrative response to District's request.

D. If the Contractor's revision is still not accepted by District, and the Contractor disagrees with District's position, the Contractor has seven (7) calendar days from receipt of District's letter rejecting the revision to provide a written narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of District's written rejection of a schedule revision shall be contractually interpreted as acceptance of District's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding District's position.

E. At District's discretion, the Contractor can be required to provide Subcontractor certifications of performance regarding proposed schedule revisions affecting said Subcontractors.

12.11 RECOVERY SCHEDULE

A. If the Schedule Update shows a completion date twenty-one (21) calendar days beyond the Contract Completion Date, or individual milestone completion dates, the Contractor shall submit to District the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.

B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District.

C. If the Contractor's revisions are not accepted by District, District and the Contractor shall follow the procedures in paragraph 1.09.C, 1.09.D and 1.09.E above.

D. At District's discretion, the Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.

12.12 TIME IMPACT EVALUATION ("TIE") FOR CHANGE ORDERS, AND OTHER DELAYS

A. When Contractor is directed to proceed with changed Work, the Contractor shall prepare and submit within fourteen (14) calendar days from the Notice to Proceed a TIE which includes both a written narrative and a schedule diagram depicting how the changed Work affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate the changed Work in the schedule and how it impacts the current schedule-update critical path. The Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram must be tied to the main sequence of schedule activities to enable District to evaluate the impact of changed Work to the scheduled critical path.

B. Contractor shall be required to comply with the requirements of Paragraph 1.09.A for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.

C. Contractor shall be responsible for all costs associated with the preparation of TIEs, and the process of incorporating them into the current schedule update. The Contractor shall provide District with four (4) copies of each TIE.

D. Once agreement has been reached on a TIE, the Contract Time will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Time may be extended in an amount District allows, and the Contractor may submit a claim for additional time claimed by contractor.

12.13 TIME EXTENSIONS

A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accord with the General Conditions.

B. Where an event for which District is responsible impacts the projected Completion Date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment, and material the Contractor would expend to mitigate District-caused time impact. The Contractor shall submit its mitigation plan to District within fourteen (14) calendar days from the date of discovery of the impact. The Contractor is responsible for the cost to prepare the mitigation plan.

C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.

D. No time will be granted under this Contract for cumulative effect of changes.

E. District will not be obligated to consider any time extension request unless the Contractor complies with the requirements of Contract Documents.

F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.

G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

12.14 SCHEDULE REPORTS

A. Submit four (4) copies of the following reports with the Initial CPM Schedule, the Original CPM Schedule, and each monthly update.

B. Required Reports:

(1) Two activity listing reports: one sorted by activity number and one by total Project Float. These reports shall also include each activity's early/late and actual start and finish dates, original and remaining duration, Project Float, responsibility code, and the logic relationship of activities.

(2) Cost report sorted by activity number including each activity's associated cost, percentage of Work accomplished, earned value- to date, previous payments, and amount earned for current update period.

(3) Schedule plots presenting time-scaled network diagram showing activities and their relationships with the controlling operations or critical path clearly highlighted.

(4) Cash flow report calculated by early start, late start, and indicating actual progress. Provide an exhibit depicting this information in graphic form.

(5) Planned versus actual resource (i.e., labor) histogram calculated by early start and late start.

C. Other Reports:

In addition to above reports, District may request, from month to month, any two of the following reports. Submit four (4) copies of all reports.

(1) Activities by early start.

(2) Activities by late start.

(3) Activities grouped by Subcontractors or selected trades.

(4) Activities with scheduled early start dates in a given time frame, such as fifteen (15) or thirty (30) day outlook.

D. Furnish District with report files on compact disks containing all schedule files for each report generated.

12.15 PROJECT STATUS REPORTING

A. In addition to submittal requirements for CPM scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each CPM Schedule as specified herein. Status reporting shall be in form specified below.

B. Contractor shall prepare monthly written narrative reports of status of Project for submission to District. Written status reports shall include:

(1) Status of major Project components (percent (%) complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.

(2) Progress made on critical activities indicated on CPM Schedule.

(3) Explanations for any lack of work on critical path activities planned to be performed during last month.

(4) Explanations for any schedule changes, including changes to logic or to activity durations.

(5) List of critical activities scheduled to be performed next month.

(6) Status of major material and equipment procurement.

(7) Any delays encountered during reporting period.

(8) Contractor shall provide printed report indicating actual versus planned resource loading for each trade and each activity. This report shall be provided on weekly and monthly basis.

(a) Actual resource shall be accumulated in field by Contractor and shall be as noted on Contractor's daily reports. These reports will be basis for information provided in computer-generated monthly and weekly printed reports.

(b) Contractor shall explain all variances and mitigation measures.

(9) Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by District at no additional cost.

(10) Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

12.16 WEEKLY SCHEDULE REPORT

At the Weekly Progress Meeting, the Contractor shall provide and present a time-scaled three (3) week look-ahead schedule that is based and correlated by activity number to the current schedule (i.e., Initial, Original CPM, or Schedule Update).

12.17 DAILY CONSTRUCTION REPORTS

On a daily basis, Contractor shall submit a daily activity report to District for each workday, including weekends and holidays when worked. Contractor shall develop the daily construction reports on a computer-generated database capable of sorting daily Work, manpower, and man-hours by Contractor, Subcontractor, area, sub-area, and Change Order Work. Upon request of District, furnish computer disk of this data base. Obtain District's written approval of daily construction report data base format prior to implementation. Include in report:

A. Project name and Project number.

B. Contractor's name and address.

C. Weather, temperature, and any unusual site conditions.

D. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work of Subcontractors. Descriptions shall be referenced to CPM scheduled activities.

E. Worker quantities for its own Work force and for Subcontractors of any tier.

F. Equipment, other than hand tools, utilized by Contractor and Subcontractors.

12.18 PERIODIC VERIFIED REPORTS

Contractor shall complete and verify construction reports on a form prescribed by the Division of the State Architect and file reports on the first day of February, May, August, and November during the preceding quarter year; at the completion of the Contract; at the completion of the Work; at the suspension of Work for a period of more than one (1) month; whenever the services of Contractor or any of Contractor's Subcontractors are terminated for any reason; and at any time a special verified report is required by the Division of the State Architect. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

PART 13 – PRODUCTS Not Used.

PART 14 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 33 00
SUBMITTALS

PART 15 - GENERAL

15.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Contractor's Submittals and Schedules, Drawings and Specifications;

B. Special Conditions.

15.02 SECTION INCLUDES:

A. Definitions:

(1) Shop Drawings and Product Data are as indicated in the General Conditions and include, but are not limited to, fabrication, erection, layout and setting drawings, formwork and falsework drawings, manufacturers' standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams. In addition, there are other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment or systems and all positions conform to the requirement of the Contract Documents, including, without limitation, the Drawings.

(2) "Manufactured" applies to standard units usually mass-produced; "fabricated" means specifically assembled or made out of selected materials to meet design requirements. Shop Drawings shall establish the actual detail of manufactured or fabricated items, indicated proper relation to adjoining work and amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure.

(3) Manufacturer's Instructions: Where any item of Work is required by the Contract Documents to be furnished, installed, or performed, at a minimum, in accordance with a specified product manufacturer's instructions, the Contractor shall procure and distribute copies of these to the District, the Architect, and all other concerned parties and shall furnish, install, or perform the work, at a minimum, in accordance with those instructions.

B. Samples, Shop Drawings, Product Data, and other items as specified, in accordance with the following requirements:

(1) Contractor shall submit all Shop Drawings, Product Data, and Samples to the District, the Architect, the Project Inspector, and the Construction Manager.

(2) Contractor shall comply with all time frames herein and in the General Conditions and, in any case, shall submit required information in sufficient time to permit proper consideration and action before ordering any materials or items represented by such Shop Drawings, Product Data, and/or Samples.

(3) Contractor shall allow sufficient time so that no delay occurs due to required lead time in ordering or delivery of any item to the Site. Contractor shall be responsible for any delay in progress of Work due to its failure to observe these requirements.

(4) Time for completion of Work shall not be extended on account of Contractor's failure to promptly submit Shop Drawings, Product Data, and/or Samples.

(5) Reference numbers on Shop Drawings shall have Architectural and/or Engineering Contract Drawings reference numbers for details, sections, and "cuts" shown on Shop Drawings. These reference numbers shall be in addition to any numbering system that Contractor chooses to use or has adopted as standard.

(6) When the magnitude or complexity of submittal material prevents a complete review within the stated time frame, Contractor shall make this submittal in increments to avoid extended delays.

(7) Contractor shall certify on submittals for review that submittals conform to Contract requirements. Also certify that Contractor-furnished equipment can be installed in allocated space. In event of any variance, Contractor shall specifically state in transmittal and on Shop Drawings, portions vary and require approval of a substitute. Submittals shall not be used as a means of requesting a substitution.

(8) Unless specified otherwise, sampling, preparation of samples, and tests shall be in accordance with the latest standard of the American Society for Testing and Materials.

(9) Upon demand by Architect or District, Contractor shall submit samples of materials and/or articles for tests or examinations and consideration before Contractor incorporates same in Work. Contractor shall be solely responsible for delays due to sample(s) not being submitted in time to allow for tests. Acceptance or rejection will be expressed in writing. Work shall be equal to approved samples in every respect. Samples that are of value after testing will remain the property of Contractor.

C. Submittal Schedule:

(1) Contractor shall prepare its proposed submittal schedule that is coordinated with the proposed construction schedule and submit both to the District within ten (10) days after the date of the Notice to Proceed. Contractor's proposed schedules shall become the Project

Construction Schedule and the Project Submittal Schedule after each is approved by the District.

(2) Contractor is responsible for all lost time should the initial submittal be rejected, marked "revise and resubmit", etc.

(3) All Submittals shall be forwarded to the District by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those Submittals shall be forwarded to the District so as not to delay the Construction Schedule.

(4) Contractor may be assessed $100 a day for each day it is late in submitting a shop drawing or sample. No extensions of time will be granted to Trade Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule.

15.03 SHOP DRAWINGS:

A. Contractor shall submit one reproducible transparency and six (6) opaque reproductions. The District will review and return the reproducible copy and one (1) opaque reproduction to Contractor.

B. Before commencing installation of any Work, the Contractor shall submit and receive approval of all drawings, descriptive data, and material list(s) as required to accomplish Work.

C. Review of Shop Drawings is regarded as a service to assist Contractor and in all cases original Contract Documents shall take precedence as outlined under General Conditions.

D. No claim for extra time or payment shall be based on work shown on Shop Drawings unless the claim is (1) noted on Contractor's transmittal letter accompanying Shop Drawings and (2) Contractor has complied with all applicable provisions of the General Conditions, including, without limitation, provisions regarding changes and payment, and all required written approvals.

E. District shall not review Shop Drawings for quantities of materials or number of items supplied.

F. District's and/or Architect’s review of Shop Drawing will be general. District and/or Architect review does not relieve Contractor of responsibility for dimensions, accuracy, proper fitting, construction of Work, furnishing of materials, or Work required by Contract Documents and not indicated on Shop Drawings. The District’s and/or Architect’s review of Shop Drawings is not to be construed as approving departures from Contract Documents.

G. Review of Shop Drawings and Schedules does not relieve Contractor from responsibility for any aspect of those Drawings or Schedules that is a violation of local, County, State, or Federal laws, rules, ordinances, or rules and

regulations of commissions, boards, or other authorities or utilities having jurisdiction.

H. Before submitting Shop Drawings for review, Contractor shall check Shop Drawings of its subcontractors for accuracy, and confirm that all Work contiguous with and having bearing on other work shown on Shop Drawings is accurately drawn and in conformance with Contract Documents.

I. Submitted drawings and details must bear stamp of approval of Contractor:

(1) Stamp and signature shall clearly certify that Contractor has checked Shop Drawings for compliance with Drawings.

(2) If Contractor submits a Shop Drawing without an executed stamp of approval, or whenever it is evident (despite stamp) that Drawings have not been checked, the District and/or Architect will not consider them and will return them to the Contractor for revision and resubmission. In that event, it will be deemed that Contractor has not complied with this provision and Contractor shall bear risk of all delays to same extent as if it had not submitted any Shop Drawings or details.

J. Submission of Shop Drawings (in either original submission or when resubmitted with correction) constitutes evidence that Contractor has checked all information thereon and that it accepts and is willing to perform Work as shown.

K. Contractor shall pay for cost of any changes in construction due to improper checking and coordination. Contractor shall be responsible for all additional costs, including coordination. Contractor shall be responsible for costs incurred by itself, the District, the Architect, the Project Inspector, the Construction Manager, any other Subcontractor or contractor, etc., due to improperly checked and/or coordination of submittals.

L. Shop Drawings must clearly delineate the following information:

(1) Project name and address.

(2) Specification number and description.

(3) Architect's name and project number.

(4) Shop Drawing title, number, date, and scale.

(5) Names of Contractor, Subcontractor(s) and fabricator.

(6) Working and erection dimensions.

(7) Arrangements and sectional views.

(8) Necessary details, including complete information for making connections with other Work.

(9) Kinds of materials and finishes.

(10) Descriptive names of materials and equipment, classified item numbers, and locations at which materials or equipment are to be installed in the Work. Contractor shall use same reference identification(s) as shown on Contract Drawings.

M. Contractor shall prepare composite drawings and installation layouts when required to solve tight field conditions.

(1) Shop Drawings shall consist of dimensioned plans and elevations and must give complete information, particularly as to size and location of sleeves, inserts, attachments, openings, conduits, ducts, boxes, structural interferences, etc.

(2) Contractor shall coordinate these composite Shop Drawings and installation layouts in the field between itself and its Subcontractor(s) for proper relationship to the Work, the work of other trades, and the field conditions. The Contractor shall check and approve all submittal(s) before submitting them for final review.

15.04 PRODUCT DATA OR NON REPRODUCIBLE SUBMITTALS:

A. Contractor shall submit manufacturer's printed literature in original form. Any fading type of reproduction will not be accepted. Contract must submit a minimum of six (6) each, to the District. District shall return one (1) to the Contractor, who shall reproduce whatever additional copies it requires for distribution.

B. Contractor shall submit six (6) copies of a complete list of all major items of mechanical, plumbing, and electrical equipment and materials in accordance with the approved Submittal Schedule, except as required earlier to comply with the approved Construction Schedule. Other items specified are to be submitted prior to commencing Work. Contractor shall submit items of like kind at one time in a neat and orderly manner. Partial lists will not be acceptable.

C. Submittals shall include manufacturer's specifications, physical dimensions, and ratings of all equipment. Contractor shall furnish performance curves for all pumps and fans. Where printed literature describes items in addition to that item being submitted, submitted item shall be clearly marked on sheet and superfluous information shall be crossed out. If highlighting is used, Contractor shall mark all copies.

D. Equipment submittals shall be complete and include space requirements, weight, electrical and mechanical requirements, performance data, and supplemental information that may be requested.

E. Imported Materials Certification must be submitted at least ten (10) days before material is delivered.

15.05 SAMPLES:

A. Contractor shall submit for approval Samples as required and within the time frame in the Contract Documents. Materials such as concrete, mortar, etc., which require on-site testing will be obtained from Project Site.

B. Contractor shall submit four (4) samples except where greater or lesser number is specifically required by Contract Documents including, without limitation, the Specifications.

(1) Samples must be of sufficient size and quality to clearly illustrate functional characteristics, with integrally related parts and attachment devices.

(2) Samples must show full range of texture, color, and pattern.

C. Contractor shall make all Submittals, unless it has authorized Subcontractor(s) to submit and Contractor has notified the District in writing to this effect.

D. Samples to be shipped prepaid or hand-delivered to the District.

E. Contractor shall mark samples to show name of Project, name of Contractor submitting, Contract number and segment of Work where representative Sample will be used, all applicable Specifications Sections and documents, Contract Drawing Number and detail, and ASTM or FS reference, if applicable.

F. Contractor shall not deliver any material to Site prior to receipt of District's and/or Architect's completed written review and approval. Contractor shall furnish materials equal in every respect to approved Samples and execute Work in conformance therewith.

G. District's and/or Architect's review, acceptance, and/or approval of Sample(s) will not preclude rejections of any material upon discovery of defects in same prior to final acceptance of completed Work.

H. After a material has been approved, no change in brand or make will be permitted.

I. Contractor shall prepare its Submittal Schedule and submit Samples of materials requiring laboratory tests to specified laboratory for testing not less than ninety (90) days before such materials are required to be used in Work.

J. Samples which are rejected must be resubmitted promptly after notification of rejection and be marked "Resubmitted Sample" in addition to other information required.

K. Field Samples and Mock-Ups are to be removed by Contractor at District's direction:

(1) Size: As Specified.

(2) Furnish catalog numbers and similar data, as requested.

15.06 REVIEW AND RESUBMISSION REQUIREMENTS:

A. The District will arrange for review of Sample(s), Shop Drawing(s), Product Data, and other submittal(s) by appropriate reviewer and return to Contractor as provided below within twenty-one (21) days after receipt or within twenty-one (21) days after receipt of all related information necessary for such review, whichever is later.

B. One (1) copy of product or materials data will be returned to Contractor with the review status.

C. Samples to be incorporated into the Work will be returned to Contractor, together with a written notice designating the Sample with the appropriate review status and indicating errors discovered on review, if any. Other Samples will not be returned, but the same notice will be given with respect thereto, and that notice shall be considered a return of the Sample.

D. Contractor shall revise and resubmit any Sample(s), Shop Drawing(s), Product Data, and other submittal(s) as required by the reviewer. Such resubmittals will be reviewed and returned in the same manner as original Sample(s), Shop Drawing(s), Product Data, and other submittal(s), within fourteen (14) days after receipt thereof or within fourteen (14) days after receipt of all related information necessary for such review. Such resubmittal shall not delay the Work.

E. Contractor may proceed with any of the Work covered by Sample(s), Shop Drawing(s), Product Data, and other submittal(s) upon its return if designated as no exception taken, or revise as noted, provided the Contractor proceeds in accordance with the District and/or the Architect's notes and comments.

F. Contractor shall not begin any of the work covered by a Sample(s), Shop Drawing(s), Product Data, and other submittal(s), designated as revise and resubmit or rejected, until a revision or correction thereof has been reviewed and returned to Contractor.

G. Sample(s), Shop Drawing(s), Product Data, and other submittal(s) designated as revise and resubmit or rejected and requiring resubmittal, shall be revised or corrected and resubmitted to the District no later than fourteen (14) days or a shorter period as required to comply with the approved Construction Schedule, after its return to Contractor.

H. Neither the review nor the lack of review of any Sample(s), Shop Drawing(s), Product Data, and other submittal(s) shall waive any of the requirements of the Contract Documents, or relieve Contractor of any obligation thereunder.

I. District's and/or Architect's review of Shop Drawings does not relieve the Contractor of responsibility for any errors that may exist. Contractor is responsible for the dimensions and design of adequate connections and details and for satisfactory construction of all the Work.

PART 16 – PRODUCTS Not Used.

PART 17 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 35 13.23
SITE STANDARDS

PART 18 – GENERAL

18.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including without limitation, Site Access, Conditions, and Regulations;

B. Special Conditions;

C. Drug-Free Workplace Certification;

D. Tobacco-Free Environment Certification;

E. Criminal Background Investigation/Fingerprinting Certification;

F. Temporary Facilities and Controls.

18.02 REQUIREMENTS OF THE DISTRICT:

A. Drug-Free Schools and Safety Requirements:

(1) All school sites and other District Facilities have been declared "Drug-Free Zones." No drugs, alcohol and/or smoking are allowed at any time in any buildings and/or grounds on District property. No students, staff, visitors, or contractors are to use drugs on these sites.

(2) Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property. Contractor shall post: "Non-Smoking Area" in a highly visible location in each work area, staging area, and parking area. Contractor may designate a smoking area outside of District property within the public right-of-way, provided that this area remains quiet and unobtrusive to adjacent neighbors. This smoking area is to be kept clean at all times.

(3) Contractor shall ensure that no alcohol, firearms, weapons, or controlled substances enter or are used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee(s) found in violation of this provision.

B. Language: Profanity or other unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students, staff, volunteers, parents or public will not be allowed.

C. Disturbing the Peace (Noise and Lighting):

(1) Contractor shall observe the noise ordinance of the Site at all times including, without limitation, all applicable local, city, and/or state laws, ordinances, and/or regulations regarding noise and allowable noise levels.

(2) The use of radios, etc., shall be controlled to keep all sound at a level that cannot be heard beyond the immediate area of use. District reserves the right to prohibit the use of radios at the Site, except for mobile phones or other handheld communication radios.

(3) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

D. Traffic:

(1) Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require.

(2) All paths of travel for deliveries, including without limitation, material, equipment, and supply deliveries, shall be reviewed and approved by District in advance. Any damage will be repaired to the pre-damaged condition by the Contractor.

(3) District shall designate a construction entry to the Site. If Contractor requests, District determines it is required, and to the extent possible, District shall designate a staging area so as not to interfere with the normal functioning of school facilities. Location of gates and fencing shall be approved in advance with District and at Contractor's expense.

(4) Parking areas shall be reviewed and approved by District in advance. No parking is to occur under the drip line of trees or in softscape areas that could otherwise be damaged.

E. All of the above shall be observed and complied with by the Contractor and all workers on the Site. Failure to follow these directives could result in individual(s) being suspended or removed from the work force at the discretion of the District. The same rules and regulations shall apply equally to delivery personnel, inspectors, consultants, and other visitors to the Site.

PART 19 - PRODUCTS Not Used.

PART 20 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 41 00
REGULATORY REQUIREMENTS

PART 21 - GENERAL

21.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Obtaining of Permits, Licenses and Registrations and Work to Comply with All Applicable Laws and Regulations;

B. Special Conditions; and

C. Quality Control.

21.02 DESCRIPTION:

This section covers the general requirements for regulatory requirements pertaining to the Work and is supplementary to all other regulatory requirements mentioned or referenced elsewhere in the Contract Documents.

21.03 REQUIREMENTS OF REGULATORY AGENCIES:

A. All statutes, ordinances, laws, rules, codes, regulations, standards, and the lawful orders of all public authorities having jurisdiction over the Work, are hereby incorporated into these Contract Documents as if repeated in full herein and are intended to be included in any reference to Code or Building Code, unless otherwise specified, including, without limitation, the references in the list below. Contractor shall make available at the Site copies of all the listed documents applicable to the Work as the District and/or Architect may request, including, without limitation, applicable portions of the California Code of Regulations ("CCR").

(1) California Building Standards Administrative Code, Part 1, Title 24, CCR.

(2) California Building Code (CBC), Part 2, Title 24, CCR; (International Building Code volumes 1-2 and California Amendments).

(3) California Electrical Code (CEC), Part 3, Title 24, CCR; (National Electrical Code and California Amendments).

(4) California Mechanical Code (CMC), Part 4, Title 24, CCR; (Uniform Mechanical Code and California Amendments).

(5) California Plumbing Code (CPC), Part 5, Title 24, CCR; (Uniform Plumbing Code and California Amendments).

(6) California Fire Code (CFC), Part 9, Title 24, CCR; (International Fire Code and California Amendments).

(7) California Green Building Standards Code (CALGreen), Part 11, Title 24, CCR.

(8) California Referenced Standards Code, Part 12, Title 24, CCR.

(9) State Fire Marshal Regulations, Public Safety, Title 19, CCR.

(10) Partial List of Applicable National Fire Protection Association (NFPA) Standards:

(a) NFPA 13 - Automatic Sprinkler System.

(b) NFPA 14 - Standpipes Systems.

(c) NFPA 17A - Wet Chemical System

(d) NFPA 24 - Private Fire Mains.

(e) (California Amended) NFPA 72 - National Fire Alarm Codes.

(f) NFPA 253 - Critical Radiant Flux of Floor Covering System.

(g) NFPA 2001 - Clean Agent Fire Extinguishing Systems.

(11) California Division of the State Architect interpretation of Regulations ("DSA IR"), including, without limitation:

(a) DSA IR A-6 — Construction Change Document Submittal and Approval Processes.

(b) DSA IR A-7 — Project Inspector Certification and Approval.

(c) DSA IR A-8 — Project Inspector and Assistant Inspector Duties and Performance.

(d) DSA IR A-12 — Assistant Inspector Approval.

(12) DSA Procedures ("DSA PR")

(a) DSA PR 13-01 – Construction Oversight Process

(b) DSA PR 13-02 – Project Certification Process

B. This Project shall be governed by applicable regulations, including, without limitation, the State of California's Administrative Regulations for the Division of the State Architect-Structural Safety (DSA/SS), Chapter 4, Part 1, Title 24, CCR, and the most current version on the date the bids are opened and as it pertains to school construction including, without limitation:

(1) Test and testing laboratory per Section 4-335. District shall pay for the testing laboratory.

(2) Special inspections per Section 4-333(c).

(3) Deferred Approvals per section 4-317(g).

(4) Verified reports per Sections 4-336 & 4-343(c).

(5) Duties of the Architect & Engineers shall be per Sections 4-333(a) and 4-341.

(6) Duties of the Contractor shall be per Section 4-343.

(7) Duties of Project Inspector shall be per Section 4-334.

(8) Addenda and Construction Change Documents per Section 4-338.

Contractor shall keep and make available all applicable parts of the most current version of Title 24 referred to in the plans and specifications at the Site during construction.

C. Items of deferred approval shall be clearly marked on the first sheet of the Architect's and/or Engineer's approved Drawings. All items later submitted for approval shall be per Title 24 requirements to the DSA.

(1) Contractor shall submit the following to Architect for review and endorsement:

(a) Product information on proposed material/system supplier.

(b) Drawings, specifications, and calculations prepared, signed, and stamped by an architect or engineer licensed in the State of California for that portion of the Work.

(c) All other requirements as may be required by DSA.

(2) Cost of preparing and submitting documentation per DSA Deferred Approval requirements including required modifications to Drawings and Specifications, whether or not indicated in the Contract Documents, shall be borne by Contractor.

(3) Contractor shall not begin fabrication and installation of deferred approval items without first obtaining DSA approval of Drawings and Specifications.

(4) Schedule of Work Subject to DSA Deferred Approval: Window wall systems exceeding 10 feet in span.

PART 22 – PRODUCTS Not Used.

PART 23 – EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 42 13
ABBREVIATIONS AND ACRONYMS

PART 24 – GENERAL

24.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions including without limitation, Definitions;

B. Special Conditions.

24.02 DOCUMENT INCLUDES:

A. Abbreviations used throughout the Contract Documents.

B. Reference to a technical society, organization, or body is by abbreviation, as follows:

1.	AA	The Aluminum Association
2.	AASHTO	American Association of State Highway and Transportation Officials
3.	ABPA	Acoustical and Board Products Association
4.	ACI	American Concrete Institute
5.	AGA	American Gas Association
6.	AGC	Associated General Contractors of America
7.	AHC	Architectural Hardware Consultant
8.	AHRI	Air Conditioning, Heating, Refrigeration Institute
9.	AI	Asphalt Institute
10.	AIA	American Institute of Architects
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AMCA	Air Movement and Control Association
14.	ANSI	American National Standards Institute
15.	APA	APA – The Engineered Wood Association
16.	ASCE	American Society of Civil Engineers
17.	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
18.	ASME	American Society of Mechanical Engineers
19.	ASTM	American Society of Testing and Materials International
20.	AWPA	American Wood Protection Association
21.	AWPI	American Wood Preservers Institute
22.	AWS	American Welding Society
23.	AWSC	American Welding Society Code
24.	AWI	Architectural Woodwork Institute
25.	AWWA	American Water Works Association
26.	BIA	The Brick Industry Association
27.	CCR	California Code of Regulations

28.	CLFMI	Chain Link Fence Manufacturers Institute
29.	CRA	California Redwood Association
30.	CRSI	Concrete Reinforcing Steel Institute
31.	CS	Commercial Standards
32.	CSI	Construction Specifications Institute
33.	CTI	Cooling Technology Institute
34.	FGIA	Fenestration and Glazing Industry Alliance
35.	FGMA	Flat Glass Manufacturers' Association
36.	FIA	Factory Insurance Association
37.	FM	Factory Mutual Global
38.	FS/FED SPEC	Federal Specification
39.	FTI	Facing Title Institute
40.	GA	Gypsum Association
41.	IAPMO	International Association of Plumbing and Mechanical Officials
42.	ICC	International Code Council
43.	IEEE	Institute of Electrical and Electronics Engineers
44.	IES	Illuminating Engineering Society
45.	MCAC	Mason Contractors Association of California
46.	MIMA	Mineral Wool Insulation Manufacturers Association
47.	MLMA	Metal Lath Manufacturers Association
48.	MS/MIL SPEC	Military Specifications
49.	NAAMM	National Association of Architectural Metal Manufacturers
50.	NBHA	National Builders Hardware Association
51.	NCMA	National Concrete Masonry Association
52.	NCSEA	National Council of Structural Engineers Associations
53.	NEC	National Electrical Code
54.	NEMA	National Electrical Manufacturers Association
55.	NIST	National Institute of Standards and Technology
56.	NSI	Natural Stone Institute
57.	NTMA	National Terrazzo and Mosaic Association, Inc.
58.	ORS	Office of Regulatory Services (California)
59.	OSHA	Occupational Safety and Health Act
60.	PCI	Precast/Prestressed Concrete Institute
61.	PCA	Portland Cement Association
62.	PCA	Painting Contractors Association
63.	PDI	Plumbing Drainage Institute
64.	PEI	Porcelain Enamel Institute, Inc.
65.	PG&E	Pacific Gas & Electric Company
66.	PS	Product Standards
67.	SDI	Steel Door Institute; Steel Deck Institute
68.	SJI	Steel Joist Institute
69.	SSPC	Society for Protective Coatings
70.	TCNA	Tile Council of North America, Inc.
71.	TPI	Truss Plate Institute
72.	UBC	Uniform Building Code
73.	UL	Underwriters Laboratories Code

74.	UMC	Uniform Mechanical Code
75.	USDA	United States Department of Agriculture
76.	VI	Vermiculite Institute
77.	WCLIB	West Coast Lumber Inspection Bureau
78.	WDMA	Window and Door Manufacturers Association
79.	WEUSER	Western Electric Utilities Service Engineering Requirements
80.	WIC	Woodwork Institute of California

PART 25 - PRODUCTS Not Used.

PART 26 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 42 16
DEFINITIONS

PART 27 - GENERAL

27.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions including without limitation, Definitions;

B. Special Conditions.

27.02 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, Contractor shall comply with requirements of the standard, except when more rigid requirements are specified in the Contract Documents, or are required by applicable codes.

B. Contractor shall conform to current reference standard publication date in effect on the date of bid opening.

C. Contractor shall obtain copies of standards unless specifically required not to by the Contract Documents.

D. Contractor shall maintain a copy of all standards at jobsite during submittals, planning, and progress of the specific Work, until final completion, unless specifically required not to by the Contract Documents.

E. Should specified reference standards conflict with Contract Documents, Contractor shall request clarification from the District and/or the Architect before proceeding.

F. The contractual relationship of the parties to the Contract shall not be altered from the contractual relationship as indicated in the Contract Documents by mention or inference otherwise in any referenced document.

G. Governing Codes shall be as shown in the Contract Documents including, without limitation, the Specifications.

END OF DOCUMENT

DOCUMENT 01 42 19
REFERENCES

PART 28 - GENERAL

28.01 SCHEDULE OF REFERENCES:

The following information is intended only for the general assistance of the Contractor, and the District does not represent that all of the information is current. It is the Contractor's responsibility to verify the correct information for each of the entities listed.

AA	The Aluminum Association 1400 Crystal Drive, Suite 430 Arlington, VA 22202 www.aluminum.org	703/358-2960
AABC	Associated Air Balance Council 2401 Pennsylvania Avenue NW, Suite 330 Washington, DC 20037 www.aabc.com	202/737-0202
AASHTO	American Association of State Highway and Transportation Officials 555 12th St. NW - Suite 1000 Washington, DC 20004 www.transportation.org	202/624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215Research Triangle Park, NC 27709-2215 www.aatcc.org	919/549-8141
ACA	American Coatings Association 901 New York Ave., NW, Suite 300 West Washington, DC 20001 www.paint.org	202/462-6272
ACI	American Concrete Institute 38800 Country Club Dr. Farmington Hills, MI 48331-3439 www.concrete.org	248/848-3800
ACPA	American Concrete Pipe Association 5605 N. MacArthur Blvd., Suite 340 Irving, TX 75038 www.concrete-pipe.org	972/506-7216

ADC	Air Duct Council 1901 N. Roselle Road, Suite 800 Schaumburg, IL 60195 www.flexibleduct.org	847/706-6750
AF&PA	American Forest and Paper Association 1101 K Street, NW, Suite 700 Washington, DC 20005 www.afandpa.org	202/463-2700
AGA	American Gas Association 400 North Capitol Street, NW, Suite 450 Washington, DC 20001 www.aga.org	202/824-7000
AGC	Associate General Contractors of America 2300 Wilson Blvd., Suite 300 Arlington, VA 22201 www.agc.org	703/548-3118
AHA	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067 http://domensino.com/AHA/default.htm	847/934-8800
AI	Asphalt Institute 2696 Research Park Drive Lexington, KY 40511-8480 www.asphaltinstitute.org	859/288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006-5292 www.aia.org	202/626-7300
AISC	American Institute of Steel Construction 130 East Randolph Street, Suite 2000 Chicago, IL 60601 www.aisc.org	312.670.2400
AISI	American Iron and Steel Institute 25 Massachusetts Ave., NW, Suite 800 Washington, DC 20001 www.steel.org	202/452-7100
AITC	American Institute of Timber Construction 1010 South 336th Street, #210 Federal Way, WA 98003-7394 https://www.plib.org/aitc/	253/835-3344

ALI	Associated Laboratories, Inc. P.O. Box 152837 Dallas, TX 75315 www.assoc-labs.com	214/565-0593
ALSC	American Lumber Standards Committee, Inc. 7470 New Technology Way, Suite F Frederick, MD 21703 www.alsc.org	301/972-1700
AMCA	Air Movement and Control Association International, Inc. 30 W. University Drive Arlington Heights, IL 60004 www.amca.org	847/394-0150
AMPP (formerly SSPC)	Association for Materials Protection and Performance (merger of Society for Protective Coatings and National Association of Corrosion Engineers International) (formerly Steel Structures Painting Council) 800 Trumbull Drive Pittsburgh, PA 15205 www.sspc.org	412/281-2331 877/281-7772
ANLA	AmericanHort (merger of American Nursery & Landscape Association and OFA – The Association of Horticultural Professionals) 2130 Stella Court Columbus, OH 43215 www.americanhort.org	614/487-1117
ANSI	American National Standards Institute 1899 L Street, NW, 11th Floor Washington, DC 20036 www.ansi.org	202/293-8020
APA	APA-The Engineered Wood Association 7011 S. 19th Street Tacoma, WA 98466-5333 www.apawood.org	253/565-6600

APA	Architectural Precast Association 325 John Knox Rd, Suite L-103 Tallahassee, FL 32303 www.archprecast.org	850/205-5637
APCIA	American Property Casualty Insurance Association (merger of American Insurance Association (formerly the National Board of Fire Underwriters) with the Property Casualty Insurers Association of America) 555 12th St, NW, Suite 550 Washington DC 20004 www.apci.org	202/828-7100
AHRI	Air Conditioning and Refrigeration Institute (now Air-Conditioning, Heating, & Refrigeration Institute) 2311 Wilson Blvd, Suite 400 Arlington, VA 22201 www.ahrinet.org	703/524-8800
ARMA	Asphalt Roofing Manufacturers Association 2331 Rock Spring Road Forest Hill, MD 21050 www.asphaltroofing.org	443/640-1075
ASA	The Acoustical Society of America Suite 300 1305 Walt Whitman Road Melville, NY 11747-4300 https://acousticalsociety.org/	516/576-2360
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 www.asce.org	800/548-2723 703/295-6300
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 180 Technology Parkway Peachtree Corners, GA 30092 www.ashrae.org	800/527-4723 404/636-8400
ASLA	American Society of Landscape Architects 636 Eye Street, NW Washington, DC 20001-3736 www.asla.org	202/898-2444
ASME	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990 www.asme.org	800/834-2763

ASPE	American Society of Plumbing Engineers 6400 Shafer Court, Suite 350 Rosemont, IL 60018 http://aspe.org	847/296-0002
ASQ	American Society for Quality P.O. Box 3005 Milwaukee, WI 53201-3005 or 600 North Plankinton Avenue Milwaukee, WI 53203 http://asq.org	800/248-1946 414/272-8575
ASSE	American Society of Sanitary Engineering 18927 Hickory Creek Dr., Suite 220 Mokena, IL 60448 www.asse-plumbing.org	708/995-3019
ASTM	ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 www.astm.org	610/832-9500
AWCI	Association of the Wall and Ceiling Industry 513 West Broad Street, Suite 210 Falls Church, VA 22046 www.awci.org	703/538-1600
AWPA	American Wood Protection Association (formerly American Wood Preservers Institute) P.O. Box 361784 Birmingham, AL 35236-1784 www.awpa.com	205/733-4077
AWS	American Welding Society 8669 NW 36 Street, Suite 130 Miami, FL 33166 www.aws.org	800/443-9353 305/443-9353
AWI	Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165-5874 www.awinet.org	571/323-3636
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 www.awwa.org	800/926-7337 303/794-7711

BHMA	Builders Hardware Manufacturers Association 355 Lexington Avenue, 15th Floor New York, NY 10017 www.buildershardware.com	212/297-2122
BIA	The Brick Industry Association 12007 Sunrise Valley Drive, Suite 430 Reston, VA 20191 www.gobrick.com	703/620-0010
CGA	Compressed Gas Association 8484 Westpark Drive, Suite 220 McLean, VA 22102 www.cganet.com	703/788-2700
CISCA	Ceilings & Interior Systems Construction Association 1010 Jorie Blvd, Suite 30 Oak Brook, IL 60523 www.cisca.org	630/584-1919
CISPI	Cast Iron Soil Pipe Institute 2401 Fieldcrest Dr. Mundelein, IL 60060 www.cispi.org	224/864-2910
CLFMI	Chain Link Fence Manufacturers Institute 10015 Old Columbia Road, Suite B-215 Columbia, MD 21046 chainlinkinfo.org	301/596-2583
CPA	Composite Panel Association 19465 Deerfield Avenue, Suite 306 Leesburg, VA 20176 www.compositepanel.org	703/724-1128
CPSC	Consumer Product Safety Commission 4330 East-West Highway Bethesda, MD 20814 www.cpsc.gov	800/638-2772
CRA	California Redwood Association 818 Grayson Road, Suite 201 Pleasant Hill, CA 94523 www.calredwood.org	925/935-1499

CRI	Carpet and Rug Institute 100 S. Hamilton Street Dalton, GA 30722-2048 www.carpet-rug.org	706/278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org	847/517-1200
CSI	The Construction Specifications Institute 123 North Pitt St, Suite 450 Alexandria, VA 22314 www.csinet.org	800/689-2900
CTIOA	Ceramic Tile Institute of America 12061 Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org	310/574-7800
DHA	Decorative Hardwoods Association (formerly Hardwood Plywood & Veneer Association) 42777 Trade West Dr. Sterling, VA 20166 https://www.decorativehardwoods.org/	703/435-2900
DHI	Door and Hardware Institute (formerly National Builders Hardware Association) 2001 K Street NW, 3rd Floor North Washington, DC 20006 www.dhi.org	202/367-1134
DIPRA	Ductile Iron Pipe Research Association P.O. Box 190306 Birmingham, AL 35219 www.dipra.org	205/402-8700
DOC	U.S. Department of Commerce 1401 Constitution Ave., NW Washington, DC 20230 www.commerce.gov	202/482-2000
DOT	U.S. Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590 www.dot.gov	855/368-4200
EJMA	Expansion Joint Manufacturers Association, Inc. 25 North Broadway Tarrytown, NY 10591 www.ejma.org	914/332-0040

EPA	Environmental Protection Agency Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, DC 20460 www.epa.gov	202/272-0167
FCICA	Floor Covering Installation Contractors Association 800 Roosevelt Rd., Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.fcica.com	630/672-3702
FGIA	Fenestration and Glazing Industry Alliance 1900 E Golf Rd, Suite 1250 Schaumburg, IL 60173 https://fgiaonline.org/	847/303-5664
FM Global	Factory Mutual Insurance Company Amy Daley Global Practice Leader – Education, Public Entities, Health Care FM Global 270 Central Avenue Johnston, RI 02919-4949 www.fmglobal.com	401/275-3000 401/275-3029
FS	General Services Administration (GSA) Index of Federal Specifications, Standards and Commercial Item Descriptions 470 East L'Enfant Plaza, SW, Suite 8100 Washington, DC 20407 www.gsa.gov	202/619-8925
GA	The Gypsum Association 962 Wayne Ave., Suite 620 Silver Spring, MD 20910 www.gypsum.org	301/277-8686
HMA	Hardwood Manufacturers Association One Williamsburg Place, Suite 108 Warrendale, PA 15086 http://hmamembers.org	412/244-0440

IAPMO	International Association of Plumbing and Mechanical Officials (formerly the Western Plumbing Officials Association) 4755 E. Philadelphia St. Ontario, CA 91761 www.iapmo.org	909/472-4100
ICC	International Code Council 500 New Jersey Avenue, NW, 6th Floor Washington, DC 20001 www.iccsafe.org	888/422-7233
IEEE	Institute of Electrical and Electronics Engineers 3 Park Avenue, 17th Floor New York, NY 10016-5997 www.ieee.org	212/419-7900
IES	Illuminating Engineering Society 120 Wall Street, Floor 17 New York, NY 10005-4001 www.ies.org	212/248-5000
ITRK	Intertek Testing Services 3933 US Route 11 Cortland, NY 13045 www.intertek.com	607/753-6711
MCAA	Mechanical Contractors Association of America 1385 Piccard Drive Rockville, MD 20850 www.mcaa.org	301/869-5800
MMPA (formerly WMMPA)	Moulding & Millwork Producers Association (formerly Wood Moulding & Millwork Producers Association) 507 First Street Woodland, CA 95695 www.wmmpa.com	530/661-9591 800/550-7889
MSS	Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. 127 Park Street, NE Vienna, VA 22180-4602 http://mss-hq.org	703/281-6613
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd. Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.naamm.org	630/942-6591

NAIMA	North American Insulation Manufacturers Association P.O. Box 1906 Alexandria, VA 22313 https://insulationinstitute.org/	703/684-0084
NALP	National Association of Landscape Professionals (formerly Professional Landcare Network) 12500 Fair Lakes Circle, Suite 200 Fairfax, VA 22033 https://www.landscapeprofessionals.org/	703/736-9666
NAPA	National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD 20770-1441 www.asphaltpavement.org	888/468-6499 301/731-4748
NCSPA	National Corrugated Steel Pipe Association 14070 Proton Road, Suite 100 Dallas, TX 75244 www.ncspa.org	972/850-1907
NCMA	National Concrete Masonry Association 13750 Sunrise Valley Drive Herndon, VA 20171-4662 www.ncma.org	703/713-1900
NEBB	National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877 www.nebb.org	301/977-3698
NECA	National Electrical Contractors Association 1201 Pennsylvania Ave. NW Washington, D.C., 20004 www.necanet.org	202/991-6300
NEMA	National Electrical Manufacturers Association 1300 North 17th Street N, Suite 900 Rosslyn, VA 22209 www.nema.org	703/841-3200
NEII	National Elevator Industry, Inc. 5537 SW Urish Road Topeka, KS 66610 https://nationalelevatorindustry.org/	703/589-9985
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA02169-7471 www.nfpa.org	800/344-3555 855/274-8525

NGA (formerly GANA)	National Glass Association (merged with Glass Association of North America) 1945 Old Gallows Road Suite 750 Vienna, VA 22182 www.glass.org	866/342-5642 Ext 127
NHLA	National Hardwood Lumber Association PO Box 34518 Memphis, TN 38184 www.nhla.com	901/377-1818
NIA	National Insulation Association 516 Herndon Pkwy., Ste. D Herndon, VA 20170 www.insulation.org	703/464-6422
NRCA	National Roofing Contractors Association 10255 W. Higgins Road, Suite 600 Rosemont, IL 60018-5607 www.nrca.net	847/299-9070
NSF	NSF International 789 N. Dixboro Road Ann Arbor, MI 48113-0140 www.nsf.org	800/673-6275 734/769-8010
NSI	Natural Stone Institute (formerly Marble Institute of America) 380 E. Lorain St. Oberlin, OH 44074 https://www.naturalstoneinstitute.org/	440/250-9222
NTMA	National Terrazzo and Mosaic Association 209 N. Crockett Street, Suite 2 PO Box 2605 Fredericksburg, TX 78624 www.ntma.com	800/323-9736
OSHA	Occupational Safety and Health Act U.S. Department of Labor Occupational Safety & Health Administration 200 Constitution Ave., NW Washington, DC 20210 www.osha.gov	800/321-OSHA (6742)

PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077 or 200 Massachusetts Ave NW, Suite 200 Washington, DC 20001 www.cement.org	847/966-6200 202/408-9494
PCA	Painting Contractors Association (formerly Painting and Decorating Contractors of America) 2316 Millpark Drive Maryland Heights, MO 63043 https://www.pcapainted.org/	800/322-7322
PCI	Precast/Prestressed Concrete Institute 8770 W. Bryn Mawr Ave., Suite 1150 Chicago, IL 60631 www.pci.org	312/786-0300
PDI	Plumbing & Drainage Institute 800 Turnpike Street, Suite 300 North Andover, MA 01845 http://pdionline.org	978/557-0720 800/589-8956
PEI	Porcelain Enamel Institute, Inc. P.O. Box 920220 Norcross, GA 30010 www.porcelainenamel.com	770/676-9366
PG&E	Pacific Gas & Electric Company P.O. Box 997300 Sacramento, CA 95899-7300 www.pge.com	800/743-5000
PLIB	Pacific Lumber Inspection Bureau (formerly West Coast Lumber Inspection Bureau) 1010 South 336th Street, Suite 210 Federal Way, WA 98003-7394 https://www.plib.org/	253/835-3344
RFCI	Resilient Floor Covering Institute 115 Broad Street, Suite 201 La Grange, GA 30240 www.rfci.com	706/882-3833
SDI	Steel Deck Institute P.O. Box 426 Glenshaw, PA 15116 www.sdi.org	412/487-3325

SDI	Steel Door Institute 30200 Detroit Road Westlake, OH 44145 www.steeldoor.org	440/899-0010
SJI	Steel Joist Institute 140 West Evans Street, Suite 203 Florence, SC 29501 http://steeljoist.org	843/407-4091
SMA	Stucco Manufacturers Association 5753 E Santa Ana Cyn Rd, #G-156 Anaheim, CA 92807 www.stuccomfgassoc.com	714/473-9579
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1219 www.smacna.org	703/803-2980
SPI	SPI: The Plastics Industry Trade Association, Inc. 1425 K St. NW, Suite 500 Washington, DC 20005 www.plasticsindustry.org	202/974-5200
TCA	The Tile Council of North America 100 Clemson Research Blvd. Anderson, SC 29625 www.tcnatile.com	864/646-8453
TPI	Truss Plate Institute 2670 Crain Highway, Suite 203 Waldorf, MD 20601 www.tpinst.org	240/587-5582
TPI	Turfgrass Producers International 444 E. Roosevelt Road #346 Lombard, IL 60148 www.turfgrasssod.org	800/405-8873 847/649-5555
TCIA	Tree Care Industry Association (formerly the National Arborist Association) 670 N Commercial Street, Suite 201 Manchester, NH 03101 www.tcia.org	603/314-5380 800/733-2622

TVI	The Vermiculite Institute c/o The Schundler Company 10 Central Street Nahant, MA 01908 www.vermiculiteinstitute.org	732/287-2244
UL	Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 www.ul.com	847/272-8800 877/854-3577
UNI	Uni-Bell PVC Pipe Association 201 E. John Carpenter Freeway, Suite 750 Irving, TX 75062 www.uni-bell.org	972/243-3902
USDA	U.S. Department of Agriculture 1400 Independence Ave., S.W. Washington, DC 20250 www.usda.gov	202/720-2791
WA	Wallcoverings Association 35 E Wacker Dr., Suite 850 Chicago, IL 60601 www.wallcoverings.org	312/224-2574
WCMA	Window Covering Manufacturers Association 355 Lexington Avenue 15th Floor New York, NY 10017 www.wcmanet.org	212/297-2122
WDMA	Window & Door Manufacturers Association 2001 K Street NW, 3rd Floor North Washington, D.C. 20006 www.wdma.com	202/367-1157
WI	Woodwork Institute 1455 Response Road, Suite 110 Sacramento, CA 95815 www.wicnet.org	916/372-9943
WRI	Wire Reinforcement Institute 942 Main Street, Suite 300 Hartford, CT 06103 www.wirereinforcementinstitute.org	860/240-9545
WWCA	Western Wall & Ceiling Contractors Association 1910 N. Lime St. Orange, CA 92865 www.wwcca.org	714/221-5520

WWPA	Western Wood Products Association (formerly Redwood Inspection Service) 1500 SW First Ave., Suite 870 Portland, OR 97201 www.wwpa.org	503/224-3930

PART 29 - PRODUCTS Not Used.

PART 30 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 43 00
MATERIALS AND EQUIPMENT

PART 31 - GENERAL

31.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Purchase of Materials and Equipment;

B. Special Conditions;

C. Imported Materials Certification.

31.02 MATERIAL AND EQUIPMENT

A. Only items approved by the District and/or Design Professional shall be used.

B. Contractor shall submit lists of products and other product information in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.

31.03 MATERIAL AND EQUIPMENT COLORS

A. The District and/or Architect will provide a schedule of colors.

B. No individual color selections will be made until after approval of all pertinent materials and equipment and after receipt of appropriate samples in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.

C. Contractor shall request priority in writing for any item requiring advance ordering to maintain the approved Construction Schedule.

31.04 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall deliver manufactured materials in original packages, containers, or bundles (with seals unbroken), bearing name or identification mark of manufacturer.

B. Contractor shall deliver fabrications in as large assemblies as practicable; where specified as shop-primed or shop-finished, package or crate as required to preserve such priming or finish intact and free from abrasion.

C. Contractor shall store materials in such a manner as necessary to properly protect them from damage. Materials or equipment damaged by handling, weather, dirt, or from any other cause will not be accepted.

D. Materials are not acceptable that have been warehoused for long periods of time, stored or transported in improper environment, improperly packaged, inadequately labeled, poorly protected, excessively shipped, deviated from normal distribution pattern, or reassembled.

E. Contractor shall store material so as to cause no obstructions of sidewalks, roadways, access to the Site or buildings, and underground services. Contractor shall protect material and equipment furnished under Contract.

F. Contractor may store materials on Site with prior written approval by the District, all material shall remain under Contractor's control and Contractor shall remain liable for any damage to the materials. Should the Project Site not have storage area available, the Contractor shall provide for off-site storage at a bonded warehouse and with appropriate insurance coverage at no cost to District.

G. When any room in Project is used as a shop or storeroom, the Contractor shall be responsible for any repairs, patching, or cleaning necessary due to that use. Location of storage space shall be subject to prior written approval by District.

PART 32 - PRODUCTS

32.01 MANUFACTURERS

A. Manufacturers listed in various sections of Contract Documents are names of those manufacturers that are believed to be capable of supplying one or more of items specified therein.

B. The listing of a manufacturer does not imply that every product of that manufacturer is acceptable as meeting the requirements of the Contract Documents.

32.02 FACILITIES AND EQUIPMENT

Contractor shall provide, install, maintain, and operate a complete and adequate facility for handling, the execution, disposal, and distribution of material and equipment as required for proper and timely performance of Work connected with Contract.

32.03 MATERIAL REFERENCE STANDARDS

Where material is specified solely by reference to "standard specifications" and if requested by District, Contractor shall submit for review data on actual material proposed to be incorporated into Work of Contract listing name and address of vendor, manufacturer, or producer, and trade or brand names of those materials, and data substantiating compliance with standard specifications.

PART 33 - EXECUTION

33.01 WORKMANSHIP

A. Where not more specifically described in any other Contract Documents, workmanship shall conform to methods and operations of best standards and accepted practices of trade or trades involved and shall include items of fabrication, construction, or installation regularly furnished or required for completion (including finish and for successful operation, as intended).

B. Work shall be executed by tradespersons skilled in their respective lines of Work. When completed, parts shall have been durably and substantially built and present a neat appearance.

33.02 COORDINATION

A. Contractor shall coordinate installation of Work so as to not interfere with installation of others. Adjustment or rework because of Contractor's failure to coordinate will be at no additional cost to District.

B. Contractor shall examine in-place work for readiness, completeness, fitness to be concealed or to receive other work, and in compliance with Contract Documents. Concealing or covering Work constitutes acceptance of additional cost which will result should in-place Work be found unsuitable for receiving other Work or otherwise deviating from the requirements of the Contract Documents.

33.03 COMPLETENESS

Contractor shall provide all portions of the Work, unless clearly stated otherwise, installed complete and operational with all elements, accessories, anchorages, utility connections, etc., in manner to assure well-balanced performance, in accordance with manufacturer's recommendations and by Contract Documents. For example, electric water coolers require water, electricity, and drain services; roof drains require drain system; sinks fit within countertop, etc. Terms such as "installed complete," "operable condition," "for use intended," "connected to all utilities," "terminate with proper cap," "adequately anchored," "patch and refinish," "to match similar," should be assumed to apply in all cases, except where completeness of functional or operable condition is specifically stated as not required.

33.04 APPROVED INSTALLER OR APPLICATOR

Installation by a manufacturer's approved installer or applicator is an understood part of Specifications and only approved installer or applicator is to provide on-site Work where specified manufacturer has on-going program of approving (i.e. certifying, bonding, re-warranting) installers or applicators. Newly established relationships between a manufacturer and an installer or applicator who does not have other approved applicator work in progress or completed is not approved for this Project.

33.05 MANUFACTURER'S RECOMMENDATIONS

All installations shall be in accordance with manufacturer's published recommendations and specific written directions of manufacturer's representative. Should Contract Documents differ from recommendations of manufacturer or directions of his representative, Contractor shall analyze differences, make recommendations to the District and the Architect in writing, and shall not proceed until interpretation or clarification has been issued by the District and/or the Architect.

END OF DOCUMENT

DOCUMENT 01 45 00
QUALITY CONTROL

PART 34 - GENERAL

34.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Inspector, Inspections and Tests, Uncovering of Work and Non-conforming of Work and Correction of Work;

B. Special Conditions.

34.02 RELATED CODES:

A. The Work is governed by requirements of Title 24, California Code of Regulations ("CCR"), and the Contractor shall keep a copy of these available at the job Site for ready reference during construction.

B. The Division of the State Architect ("DSA") shall be notified at or before the start of construction.

34.03 OBSERVATION AND SUPERVISION:

A. The District and Architect or their appointed representatives will review the Work and the Contractor shall provide facilities and access to the Work at all times as required to facilitate this review. Administration by the Architect and any consulting Structural Engineer will be in accordance with applicable regulations, including, without limitation, CCR, Part 1, Title 24, Section 4-341.

B. One or more Project Inspector(s) approved by DSA and employed by or in contract with the District, referred to hereinafter as the "Project Inspector", will observe the work in accordance with CCR, Part 1, Title 24, Sections 4-333(b) and 4-342:

(1) The Project Inspector and Special Inspector(s) shall have access to the Work wherever it is in preparation or progress for ascertaining that the Work is in accordance with the Contract Documents and all applicable code sections. The Contractor shall provide facilities and operation of equipment as needed, and access as required and shall provide assistance for sampling or measuring materials.

(2) The Project Inspector will notify the District and Architect and call the attention of the Contractor to any observed failure of Work or material to conform to Contract Documents.

(3) The Project Inspector shall observe and monitor all testing and inspection activities required.

The Contractor shall conform with all applicable laws as indicated in the Contract Documents, including, without limitation, to CCR, Part 1, Title 24, Section 4-343. The Contractor shall supervise and direct the Work and maintain a competent superintendent on the job who is authorized to act in all matters pertaining to the Work. The Contractor's superintendent shall also inspect all materials, as they arrive, for compliance with the Contract Documents. Contractor shall reject defective Work or materials immediately upon delivery or failure of the Work or material to comply with the Contract Documents. The Contractor shall submit verified reports as indicated in the Contract Documents, including, without limitation, the Specifications and as required by Part 1, Title 24, Section 4-336.

34.04 TESTING AGENCIES:

A. Testing agencies and tests shall be in conformance with the General Documents and the requirements of Part 1, Title 24, Section 4- 335.

B. Testing and inspection in connection with earthwork shall be under the direction of the District's consulting soils engineer, if any, referred to hereinafter as the "Soils Engineer."

C. Testing and inspection of construction materials and workmanship shall be performed by a qualified laboratory, referred to hereinafter as the "Testing Laboratory." The Testing Laboratory shall be under direction of an engineer registered in the State of California, shall conform to requirements of ASTM E329, and shall be employed by or in contract with the District.

34.05 TESTS AND INSPECTIONS:

A. The Contractor shall be responsible for notifying the District and Project Inspector of all required tests and inspections. Contractor shall notify the District and Project Inspector at least seventy-two hours (72) hours in advance of performing any Work requiring testing or inspection.

B. The Contractor shall provide access to Work to be tested and furnish incidental labor, equipment, and facilities to facilitate all inspections and tests.

C. The District will pay for first inspections and tests required by the "CCR", and other inspections or tests that the District and/or the Architect may direct to have made, including the following principal items:

(1) Tests and observations for earthwork and paving.

(2) Tests for concrete mix designs, including tests of trial batches.

(3) Tests and inspections for structural steel work.

(4) Field tests for framing lumber moisture content.

(5) Additional tests directed by the District that establish that materials and installation comply with the Contract Documents.

(6) Tests and observations of welding and expansion anchors.

D. The District may at its discretion, pay and then back charge the Contractor for:

(1) Re-tests or re-inspections, if required, and tests or inspections required due to Contractor error or lack of required identifications of material.

(2) Uncovering of work in accordance with Contract Documents.

(3) Testing done on weekends, holidays, and overtime will be chargeable to the Contractor for the overtime portion.

(4) Testing done off Site.

E. Testing and inspection reports and certifications:

(1) If initially received by Contractor, Contractor shall provide to each of the following a copy of the agency or laboratory report of each test or inspection or certification.

(a) The District;

(b) The Construction Manager, if any;

(c) The Architect;

(d) The Consulting Engineer, if any;

(e) Other engineers on the Project, as appropriate;

(f) The Project Inspector; and

(g) The Contractor.

(2) When the test or inspection is one required by the CCR, a copy of the report shall also be provided to the DSA.

PART 35 - PRODUCTS

35.01 TYPE OF TESTS AND INSPECTIONS

A. Testing and inspection shall be in accordance with DSA Form 103 (or current version)

B. Slump Test
ASTM C 143

C. Concrete Tests

Testing agency shall test concrete used in the work per the following paragraphs:

(1) Compressive Strength:

(a) Minimum number of tests required: One (1) set of three (3) cylinders for each 100 cubic yards (Sec. 2604(h) 01) of concrete or major fraction thereof, placed in one (1) day. See Title 24, Section 2605(g).

(b) Two cylinders of each set shall be tested at twenty-eight (28) days. One (1) cylinder shall be held in reserve and tested only when directed by the Architect or District.

(c) Concrete shall test the minimum ultimate compressive strength in twenty-eight 28 days, as specified on the structural drawings.

(d) In the event that the twenty-eight (28) day test falls below the minimum specified strength, the effective concrete in place shall be tested by taking cores in accordance with UBC Standard No. 26-13 and tested as required for cylinders.

(e) In the event that the test on core specimens falls below the minimum specified strength, the concrete will be deemed defective and shall be removed and replaced upon such direction of the Architect, and in a manner acceptable to the Division of the State Architect.

D. Reinforcing, Steel

E. Structural Steel Per Title 24 and as noted:

(1) Material: Steel per Table in Title 24, Section 2712.

(2) Qualification of Welders (UBC Std. 27-6).

(3) Shop fabrication (Section 2712(d). Structural steel only).

(4) Shop and field welding (Section 2712(e)).

PART 36 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 37 – GENERAL

37.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions;

C. Site Standards; and

D. Construction Waste Management and Disposal.

37.02 TEMPORARY UTILITIES:

A. Electric Power and Lighting:

(1) Contractor will pay for power during the course of the Work. To the extent power is available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver that power service from its existing location in the building(s) or on the Site to point of intended use.

(2) Contractor shall verify characteristics of power available in building(s) or on the Site. Contractor shall take all actions required to make modifications where power of higher voltage or different phases of current are required. Contractor shall be fully responsible for providing that service and shall pay all costs required therefor.

(3) Contractor shall furnish, wire for, install, and maintain temporary electrical lights wherever it is necessary to provide illumination for the proper performance and/or observation of the Work: a minimum of 20 foot-candles for rough work and 50 foot-candles for finish work.

(4) Contractor shall be responsible for maintaining existing lighting levels in the project vicinity should temporary outages or service interruptions occur.

B. Heat and Ventilation:

(1) Contractor shall provide temporary heat to maintain environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and curing of materials, and to protect materials and finishes from damage due to improper temperature and humidity conditions. Portable heaters shall be standard units complete with controls.

(2) Contractor shall provide forced ventilation and dehumidification, as required, of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, and gases.

(3) Contractor shall pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

C. Water:

(1) Contractor shall pay for water used during the course of the Work. Contractor shall coordinate and pay for installation or use of water meter in compliance with local water agency requirements. To the extent water is then available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver such utility service from its existing location in the building(s), on the Site, or other location approved by the local water agency, to point of intended use.

(2) Contractor shall use backflow preventers on water lines at point of connection to District's water supply. Backflow preventers shall comply with requirements of Uniform Plumbing Code.

(3) Contractor shall make potable water available for human consumption.

D. Sanitary Facilities:

(1) Contractor shall provide sanitary temporary facilities in no fewer numbers than required by law and such additional facilities as may be directed by the Inspector for the use of all workers. The facilities shall be maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by the Inspector or Contractor completes all other work at the Site.

(2) Use of toilet facilities in the Work under construction shall not be permitted except by consent of the Inspector and the District.

E. Telephone Service:

(1) Contractor shall arrange with local telephone service company for telephone service as required for the performance of the Work. Contractor shall, at a minimum, provide in its field office one line for telephone and one line for fax machine.

(2) Contractor shall pay the costs for telephone and fax lines installation, maintenance, service, and removal.

F. Fire Protection:

(1) Contractor shall provide and maintain fire extinguishers and other equipment for fire protection. Such equipment shall be designated for use for fire protection only and shall comply with all requirements of the California Fire, State Fire Marshall and/or its designee.

(2) Where on-site welding and burning of steel is unavoidable, Contractor shall provide protection for adjacent surfaces.

G. Trash Removal:

(1) Contractor shall provide trash removal on a timely basis**.** Under no circumstance shall Contractor use District trash service.

H. Field Office:

(1) If Contractor chooses to provide a field office, it shall be an acceptable construction trailer that is well-lit and ventilated. The construction trailer shall be equipped with shelves, desks, filing cabinet, chairs, and such other items of equipment needed. Trailer and equipment are the property of the Contractor and must be removed from the Site upon completion of the Work. Contractor may use the corridor adjacent to the construction area for an office area, if approved in writing by District.

(2) Contractor shall provide any additional electric lighting and power required for the trailer. Contractor shall make adequate provisions for heating and cooling as required.

I. Temporary Facilities:

(1)

37.03 CONSTRUCTION AIDS:

A. Plant and Equipment:

(1) Contractor shall furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting materials and equipment; and for conveyances for transporting workers. Include elevators, hoists, debris chutes, and other equipment, tools, and appliances necessary for performance of the Work.

(2) Contractor shall maintain plant and equipment in safe and efficient operating condition. Damages due to defective plant and equipment, and uses made thereof, shall be repaired by Contractor at no expense to the District.

B. None of the District's tools and equipment shall be used by Contractor for the performance of the Work.

37.04 BARRIERS AND ENCLOSURES:

A. Contractor shall obtain the District's written permission for locations and types of temporary barriers and enclosures, including fire-rated materials proposed for use, prior to their installation.

B. Contractor shall provide and maintain temporary enclosures to prevent public entry and to protect persons using other buildings and portions of the Site and/or Premises, the public, and workers. Contractor shall also protect the Work and existing facilities from the elements, and adjacent construction and improvements, persons, and trees and plants from damage and injury from demolition and construction operations.

C. Contractor shall provide site access to existing facilities for persons using other buildings and portions of the Site, the public, and for deliveries and other services and activities.

D. Tree and Plant Protection:

(1) Contractor shall preserve and protect existing trees and plants on the Premises that are not designated or required to be removed, and those adjacent to the Premises.

(2) Contractor shall provide barriers to a minimum height of 4'-0" around drip line of each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations, or as denoted on the Plans.

(3) Contractor shall not park trucks, store materials, perform Work or cross over landscaped areas. Contractor shall not dispose of paint thinners, water from cleaning, plastering or concrete operations, or other deleterious materials in landscaped areas, storm drain systems, or sewers. Plant materials damaged as a result of the performance of the Work shall, at the option of the District and at Contractor's expense, either be replaced with new plant materials equal in size to those damaged or by payment of an amount representing the value of the damaged materials as determined by the District.

(4) Contractor shall remove soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at Contractor's expense.

(5) Excavation around Trees:

(a) Excavation within drip lines of trees shall be done only where absolutely necessary and with written permission from the District.

(b) Where trenching for utilities is required within drip lines, tunneling under and around roots shall be by hand digging and shall be approved by the District. Main lateral roots and

taproots shall not be cut. All roots 2 inches in diameter and larger shall be tunneled under and heavily wrapped with wet burlap so as to prevent scarring or excessive drying. Smaller roots that interfere with installation of new work may be cut with prior approval by the District. Roots must first be cut with a Vermeer, or equivalent, root cutter prior to any trenching.

(c) Where excavation for new construction is required within drip line of trees, hand excavation shall be employed to minimize damage to root system. Roots shall be relocated in backfill areas wherever possible. If encountered immediately adjacent to location of new construction, roots shall be cut approximately 6 inches back from new construction.

(d) Approved excavations shall be carefully backfilled with the excavated materials approved for backfilling. Backfill shall conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities. Do not use mechanical equipment to compact backfill. Tamp carefully using hand tools, refilling and tamping until Final Acceptance as necessary to offset settlement.

(e) Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or roots shall be wrapped with four layers of wet, untreated burlap and temporarily supported and protected from damage until permanently relocated and covered with backfill.

(f) Accidentally broken roots should be sawed cleanly 3 inches behind ragged end.

37.05 SECURITY:

The Contractor shall be responsible for project security for materials, tools, equipment, supplies, and completed and partially completed Work.

37.06 TEMPORARY CONTROLS:

A. Noise Control:

(1) Contractor acknowledges that adjacent facilities may remain in operation during all or a portion of the Work period, and it shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents.

(2) Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to the District a minimum of forty-eight (48) hours in advance of their performance.

B. Noise and Vibration:

(1) Equipment and impact tools shall have intake and exhaust mufflers.

(2) Contractor shall cooperate with District to minimize and/or cease the use of noisy and vibratory equipment if that equipment becomes objectionable by its longevity.

C. Dust and Dirt:

(1) Contractor shall conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in the Work and adjacent areas including, without limitation, occupied facilities.

(2) Contractor shall periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.

(3) Contractor shall ensure that all hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins, and as otherwise required by local and state ordinance.

(4) Contractor shall prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.

D. Water:

(1) Contractor shall not permit surface and subsurface water, and other liquids, to accumulate in or about the vicinity of the Premises. Should accumulation develop, Contractor shall control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

E. Pollution:

(1) No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Premises.

(2) Contractor shall comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of the Work including, without limitation, demolition, construction, and disposal operations.

F. Lighting:

(1) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

37.07 JOB SIGN(S):

A. General:

(1) Contractor shall provide and maintain a Project identification sign with the design, text, and colors designated by the District and/or the Design Professional; locate sign as approved by the District.

(2) Signs other than the specified Project sign and or signs required by law, for safety, or for egress, shall not be permitted, unless otherwise approved in advance by the District.

B. Materials:

(1) Structure and Framing: Structurally sound, new or used wood or metal; wood shall be nominal 3/4-inch exterior grade plywood.

(2) Sign Surface: Minimum 3/4-inch exterior grade plywood.

(3) Rough Hardware: Galvanized.

(4) Paint: Exterior quality, of type and colors selected by the District and/or the Design Professional.

C. Fabrication:

(1) Contractor shall fabricate to provide smooth, even surface for painting.

(2) Size: 4'-0" x 8'-0", unless otherwise indicated.

(3) Contractor shall paint exposed surfaces of supports, framing, and surface material with exterior grade paint: one coat of primer and one coat of finish paint.

(4) Text and Graphics: As indicated.

37.08 PUBLICITY RELEASES:

A. Contractor shall not release any information, story, photograph, plan, or drawing relating information about the Project to anyone, including press and other public communications medium, including, without limitation, on website(s) without the written permission of the District.

PART 38 – PRODUCTS Not used.

PART 39 – EXECUTION Not used.

END OF DOCUMENT

DOCUMENT 01 50 13
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 40 - GENERAL

40.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions; and

C. Temporary Facilities and Controls.

40.02 SECTION INCLUDES:

A. Administrative and procedural requirements for the following:

(1) Salvaging non-hazardous construction waste.

(2) Recycling non-hazardous construction waste.

(3) Disposing of non-hazardous construction waste.

40.03 DEFINITIONS:

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

40.04 PERFORMANCE REQUIREMENTS:

A. General: Develop waste management plan that results in end-of Project rates for salvage/recycling of sixty-five percent (65%) by weight (or by volume, but not a combination) of total waste generated by the Work.

40.05 SUBMITTALS:

A. Waste Management Plan: Submit waste management plan within 30 days of date established for commencement of the Work.

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit copies of report. Include the following information:

(1) Material category.

(2) Generation point of waste.

(3) Total quantity of waste in tons or cubic yards.

(4) Quantity of waste salvaged, both estimated and actual in tons or cubic yards.

(5) Quantity of waste recycled, both estimated and actual in tons or cubic yards.

(6) Total quantity of waste recovered (salvaged plus recycled) in tons or cubic yards.

(7) Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Waste Reduction Calculations: Before request for final payment, submit copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

H. CHPS Submittal: CHPS letter template for Credit ME2.0 and ME2.1, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.

I. Qualification Data: For Waste Management Coordinator.

J. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

K. Submittal procedures and quantities are specified in Document 01 33 00.

40.06 QUALITY ASSURANCE:

A. Waste Management Coordinator Qualifications: LEED Accredited Professional by U.S. Green Building Council.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference: Conduct conference at Project site to comply with requirements. Review methods and procedures related to waste management including, but not limited to, the following:

(1) Review and discuss waste management plan including responsibilities of Waste Management Coordinator.

(2) Review requirements for documenting quantities of each type of waste and its disposition.

(3) Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.

(4) Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

(5) Review waste management requirements for each trade.

40.07 WASTE MANAGEMENT PLAN:

A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measurement throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

(1) Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

(2) Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

(3) Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

(4) Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

(5) Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

(6) Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 41 - PRODUCTS Not Used.

PART 42 - EXECUTION

42.01 PLAN IMPLEMENTATION:

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

(1) Comply with Document 01 50 00 for operation, termination, and removal requirements.

B. **[**Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.**]**

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

(1) Distribute waste management plan to everyone concerned within 3 days of submittal return.

(2) Distribute waste management plan to entities when they first begin work on site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

(1) Designate and label specific areas of Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

(2) Comply with Document 01 50 00 for controlling dust and dirt, environmental protection, and noise control.

42.02 RECYCLING CONSTRUCTION WASTE:

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to the Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

(1) Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project Site. Include list of acceptable and unacceptable materials at each container and bin.

(a) Inspect containers and bins for contamination and remove contaminated materials if found.

(2) Stockpile processed materials on site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

(3) Stockpile materials away from construction area. Do not store within drip line of remaining trees.

(4) Store components off the ground and protect from the weather.

(5) Remove recyclable waste off District property and transport to recycling receiver or processor.

D. Packaging:

(1) Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

(2) Polystyrene Packaging: Separate and bag material.

(3) Pallets: As much as possible, require deliveries using pallets to remove pallets from Project Site. For pallets that remain on Site, break down pallets into component wood pieces and comply with requirements for recycling wood.

(4) Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

E. Site-Clearing Wastes: Chip brush, branches, and trees on site.

F. Wood Materials:

(1) Clean Cut-Offs of Lumber: Grind or chip into small pieces.

(2) Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

(1) Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

42.03 DISPOSAL OF WASTE:

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

(1) Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on site.

(2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off District property and legally dispose of them.

END OF DOCUMENT

DOCUMENT 01 52 13
FIELD OFFICES

PART 43 – GENERAL

43.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions; and

C. Temporary Facilities and Controls.

43.02 SECTION INCLUDES:

A. Requirements for Field Offices and Field Office Trailers.

43.03 SUMMARY:

A. General: Contractor shall provide District's Field Office Trailer and contents, for District's use exclusively, during the term of the Contract.

B. Property: Trailer, furniture, furnishings, equipment, and the like, supplied by the Contractor with the Office Trailer shall remain the property of the Contractor; District property items installed, delivered, and the like by District within the Office Trailer will remain District's property.

C. Modifications: District reserves the right to modify the trailer or contents, or both, as may be deemed proper by District.

D. Condition: Trailer and contents shall be clean, neat, substantially finished, in good, proper, and safe condition for use, operation, and the like; the trailer and contents shall not be required to be new.

E. Installation Timing: Provide safe, fully furnished, functional, proper, complete, and finished trailer properly ready for entire use, within fourteen (14) calendar days of District's notification of the issuance of Notice to Proceed.

43.04 SUBMITTALS:

A. General: Submit submittals to District in quantity, format, type, and the like, as specified herein.

B. Office Trailer Data: One (1) copy of manufacturer's descriptive data, technical descriptions, regulatory compliance, industry standards, installation, removal, and maintenance instructions.

C. Equipment Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.

D. Furniture and Furnishings Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.

E. Plans: One (1) reproducible copy of appropriately scaled plans of trailer layout. Plans shall include, but not be limited to: lighting; furniture; equipment; telephone and electrical outlets; and the like.

F. Product Samples: One (1) complete and entire unit of each type, if directed by District.

43.05 QUALITY ASSURANCE

A. Standards: In the event that provisions of codes, regulations, safety orders, Contract Documents, referenced manufacturer's specifications, manufacturer's instructions, industry standards, and the like, are in conflict, the more restrictive and higher quality shall govern.

B. Installer: Installer or Installers engaged by Contractor must have a minimum of five (5) years of documented and properly authenticated successful experience of specialization in the installation of the items or systems, or both, specified herein.

C. Manufacturer: Contractor shall obtain products from nationally and industry recognized Manufacturer with five (5) years minimum, of immediately recent, continuous, documented and properly authenticated successful experience of specialization in the manufacture of the product specified herein.

D. State Personnel Training: Provide proper training for maintenance and operations, including emergency procedures, and the like, as directed by District.

E. Units: Shall be sound and free of defects, and shall not include any damage or defect that will impair the safety, installation, performance, or the durability of the entire Office Trailer and appurtenant systems.

43.06 REGULATORY REQUIREMENTS

A. General: Work shall be executed in accordance with applicable Codes, Regulations, Statutes, Enactments, Rulings, Laws, each authority having jurisdiction, and including, but not limited to, Regulatory Requirements specified herein.

B. California Building Standards Code ("CBSC").

C. California Code of Regulations, Title 25, Chapter 3, Sub Chapter 2, Article 3 ("CCR").

D. Coach Insignia: Trailer shall display California Commercial Coach Insignia; such insignia shall be deemed to show that the trailer is in accordance with the Construction and Fire Safety requirements of CCR.

PART 44 – PRODUCTS

44.01 FIELD OFFICE TRAILER

A. General: Provide entire Field Office Trailer of type, function, operation, capacity, size, complete with controls, safety devices, accessories, and the like, for proper and durable installation. Partitions, walls, ceiling, and other interior and exterior surfaces shall be appropriately finished, including, but not limited to, trim, painting, wall base, floor covering, suspended or similar ceiling, and the like; provide systems, components, units, nuts, bolts, screws, anchoring devices, fastening devices, washers, accessories, adhesives, sealants, and other items of type, grade, and class required for the particular use, not identified but required for a complete, weather-tight, appropriately operating, and finished installation.

B. Manufacturers: General Electric Capital Modular Space; The Space Place, Inc.; or equal.

C. Program: Provide a wheel-mounted trailer with stairs, landings, platforms, ramps, and the like, in good, proper, safe, clean, and properly finished condition; with proper heavy duty locks, and other proper and effective security at all doors, windows, and the like. Trailer shall be maintained in good, proper, safe, clean, and properly finished condition during the Contract.

(1) Nominal Trailer Size: Four hundred eighty (480) square feet, minimum.

(2) Stairs, Platform: Properly finished stairs, platforms, and ramps.

(3) Doors: Two (2), three (3) foot wide exterior doors with locksets; finished ramp, steps, and entry platform at each exterior door.

(4) Keys: Submit five (5) keys for each door, window, furniture unit, and the like. There shall be no other key copies or originals available; each key shall be identified for District; and shall be labeled, or tagged or both, as directed by District.

(5) HVAC:

(6) Lighting: Sixty-five (65) foot-candles illumination minimum at any point, at thirty (30) inches above finished floor throughout from fluorescent light source, exclusively, or as directed by District.

(7) Electrical Outlets: One (1) duplex outlet evenly spaced every twelve (12) linear horizontal feet of wall face, and electrical service ready for use.

(8) Telephones and Telephone Outlets: Two (2) telephone lines wired, connected to telephone utility service, and ready for use, and two (2) telephone instruments, each with two (2)-line capability, speed dial and hands-free feature. Locate each outlet as directed by District.

(9) Voicemail Messaging System or Answering Machine: One (1) unit, two (2)-line; digital.

44.02 FIELD OFFICE TRAILER ITEMS

A. General: Provide the Field Office Trailer with the following arranged into two (2) workstations:

(1) Desks: Two (2) desks: thirty-six (36) inches by sixty (60) inches; steel, laminated plastic top; locking, one (1) or two (2) file drawers single pedestal; steel; provide five (5) keys to District.

(2) Tables: Two (2) tables; thirty-six (36) inches by sixty (60) inches; twenty-nine (29) inches high; steel, laminated plastic top tables; one (1) at each desk.

(3) Chairs: Two (2) chairs: swivel; steel; with seat cushion and arms; one (1) at each desk.

(4) Waste Baskets: Two (2) waste baskets, one at each desk.

B. Furniture and Equipment: Provide in the space located to effect efficient and logical use.

(1) File cabinet: One (1); four (4) drawer; lateral; steel locking.

(2) Plan Table: One (1) plan table: thirty-six (36) inches deep by seventy-two (72) inches wide by forty-two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawers.

(3) Drafting Stool: One (1) drafting stool; swiveling; steel; padded; adjustable; with footrest and casters.

(4) Bookshelf: One (1) bookshelf: thirty-six (36) inches deep by seventy-two (72) inches wide by forty-two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawer.

(5) Plan Rack: One (1) wheel mounted plan rack.

(6) Waste Baskets: One (1) large waste basket.

(7) Coat/Hat Hanger: Wall mounted with minimum capacity for four (4) garments and ten (10) hats.

(8) Document Management System: Shall include an integrated high-volume printer, copier, and facsimile machine, including stand, base, and storage cabinet; and shall include the following features:

(a) Type: Laser, dry electrostatic transfer, plain paper, digital, multi-function imaging system.

(b) Network: Ethernet or Token Ring network ready, Plug-and-Play.

(c) Print, send/receive facsimile from any connected workstation.

(d) Resolution: Six hundred (600) dots per inch by six hundred (600) dots per inch, minimum.

(e) Print Speed: Twenty (20) pages per minute, minimum.

(f) Copies: Twenty (20) copies per minute, minimum.

(g) Document Handler: Forty (40) sheet, minimum

(h) Collator: Forty (40) bin, minimum, with stapling.

(i) Duplexing: Capable.

(j) Paper Size: Capable of handling paper sizes to eleven (11) inches by seventeen (17) inches.

(k) Paper Cassettes: One (1) each for eight and one half (8.5) inches by eleven (11) inches, eight and one half (8.5) inches by fourteen (14) inches, and eleven (11) inches by seventeen (17) inches paper sizes; minimum two hundred fifty (250) sheets per cassette.

(l) Reduction/Enlargement: Capable of reduction to twenty-five percent (25%) and enlargement to two hundred percent (200%).

(m) Facsimile Electronic Storage: Capable of storing minimum of fifty (50) speed dial numbers, group faxing and broadcast faxing.

(n) Facsimile Scanning: Capable of scanning into memory a minimum of one hundred (100) pages with maximum scan time of three (3) seconds per page.

(o) Halftone: Sixty-four (64) levels.

(p) Redial: Automatic and Manual.

(9) Maintenance: Contractor shall purchase service agreements for each unit of equipment for the duration of the project plus two (2) months, and shall maintain all equipment in proper working condition. Service agreements shall include provision for replacement of toner cartridges and other items required to effect proper unit use. Service agreements shall also provide for:

(a) Unlimited Service Calls.

(b) Same Day Response.

(c) All parts, labor, preventative maintenance and mileage.

(d) All chemicals, such as toner, fixing agent, and the like.

(e) System training and setup.

(10) Portable Toilets: Two (2); each shall include a urinal; each unit shall be a properly enclosed chemical unit conforming to ANSI Z4.3.

(a) Location: As directed by District.

(b) Maintenance: Maintain each unit and surrounding areas in a clean, hygienic and orderly manner, at all time. Empty, clean, and sanitize each unit each day at a location and time as directed by District.

(c) Removal: Relocate, or remove from the site, each Portable Toilet. Upon such directive by District, the Contractor shall forthwith relocate or remove each Portable Toilet and submit the affected areas to a condition which existed prior to the installation of each Portable Toilet, within three (3) calendar days, or as directed by District in writing, at no cost to District.

44.03 UTILITY AND SERVICES

A. Telephone Service: Contractor shall provide and interface the entire telephone service, and shall properly and timely pay for telephone service for District's non-long-distance use.

B. Electrical Service: Provide all proper connections and continuously pay for service for the duration of the Work.

44.04 FINISHES

A. General: Manufacturer standard finish system over surfaces properly cleaned, pretreated, and prepared to obtain proper bond; all visible surfaces shall be coated.

B. Finish: Color as selected by District from manufacturer standard palette.

PART 45 – EXECUTION

45.01 INSTALLATION

A. General: Properly prepare area and affected items to receive the Work. Set Work accurately in location, alignment, and elevation; rigidly, securely, and firmly anchor to appropriate structure; install plumb, straight, square, level, true, without racking, rigidly anchored to proper solid blocking, substrate, and

the like; provide appropriate type and quantity of reinforcements, fasteners, adhesives, self-adhesive and other tapes; lubricants, coatings, accessories, and the like, as required for a complete, structurally rigid, stable, sound, and appropriately finished installation, in accordance with manufacturer's published instructions, and as indicated. The more restrictive and higher quality requirement shall govern. Moving parts shall be properly secured, without binding, looseness, noise, and the like.

B. Installation: Install in accordance with 25 CCR 3.2.3 and as directed by District; jack up trailer and level both ways; mount on proper concrete piers with all load off wheels; provide required tie down and accessories per Section 4368 of referenced CCR, and as directed by District.

C. Rejected Work: Work, materials, unit, items, systems, and the like, not accepted by District shall be deemed rejected, and shall forthwith be removed and replaced with proper and new Work, materials, unit, items, systems, and the like at no cost to District.

D. Standard: Comply with manufacturer's published instructions, or with instructions as shown or indicated; the more restrictive and higher quality requirement shall govern.

E. Location: As directed by District.

F. Fire Resistance: Construct and install in accordance with UL requirements.

G. Maintenance: Contractor shall maintain trailer and adjacent areas in a safe, clean and hygienic condition throughout the duration of the Work, and as directed by District. Properly repair or replace furniture or other items, as directed by District. Properly remove unsafe, damaged, or broken furniture, or similar items, and replace with safe and proper items. Contractor shall pay cost of all services, repair, and maintenance, or replacement of each item.

H. Janitorial Service: Provide professional janitorial services, including, but not limited to, trash, waste paper baskets, fill paper dispensers; clean and dust all furniture, files, and the like; sweep and mop resilient and similar flooring; and vacuum carpeting and similar flooring.

(1) Frequency: Two (2) times per week, minimum.

I. Removal: Properly remove the Office Trailer and contents from the Site upon completion of the Contract, or as directed by District in writing. Forthwith properly patch and repair affected areas; replace damaged items with new items. Carefully and properly inventory, clean, pack, store, and protect District property; submit District property to District at a date, time and location as directed by District.

END OF DOCUMENT

DOCUMENT 01 64 00
OWNER-FURNISHED PRODUCTS

PART 46 – GENERAL

46.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions;

B. Special Conditions; and

C. Materials and Equipment.

46.02 SECTION INCLUDES

A. Requirements for the following:

(1) Installing Owner-furnished materials and equipment.

(2) Providing necessary utilities, connections and rough-ins.

46.03 DEFINITIONS

A. Owner: District, who is providing/furnishing materials and equipment.

B. Installing Contactor: Contractor, who is installing the materials and equipment furnished by the Owner.

46.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Receive, store and handle products in accordance with the manufacturer's instructions.

B. Protect equipment items as required to prevent damage during storage and construction.

PART 47 – PRODUCTS

47.01 GENERAL PRODUCT REQUIREMENTS

A. Installing Contractor's Responsibilities:

(1) Verify mounting and utility requirements for Owner-furnished materials and equipment items.

(2) Provide mounting and utility rough in for all items where required.

(a) Rough in locations, sizes, capacities, and similar type items shall be as indicated and required by product manufacturer.

B. Owner and Installing Contractor(s) Responsibilities:

(1) Owner-Furnished/Contractor Installed ("OFCI"): Furnished by the Owner; installed by the Installing Contractor.

(a) General: Owner and Installing Contractor(s) will coordinate deliveries of materials and equipment to coincide with the construction schedule.

(b) Owner will furnish specified materials and equipment delivered to the site. Owner/vendor's representative shall be present on Site at the time of delivery to comply with the contract requirements and Specifications Section 01 43 00, Materials and Equipment, Article 1.04.

(c) The Owner furnishing specified materials and equipment is responsible to provide manufacturer guarantees as required by the Contract to the Installing Contractor.

(d) The Installing Contractor shall:

1) Review, verify and accept the approved manufacturer's submittal/Shop Drawings for all materials and equipment required to be installed by the Installer Contractor and furnished by the Owner. Any discrepancies, including but not limited to possible space conflicts, should be brought to the attention of the Project Manager and/or Program Manager, if applicable.

2) Coordinate timely delivery. Installing Contractor shall receive materials and equipment at Site when delivered and give written receipt at time of delivery, noting visible defects or omissions; if such declaration is not given, the Installing Contractor shall assume responsibility for such defects and omissions.

3) Store materials and equipment until ready for installation and protect from loss and damage. Installing Contractor is responsible for providing adequate storage space.

4) Coordinate with other bid package contractors and field measurement to ensure complete installation.

5) Uncrate, assemble, and set in place.

6) Provide adequate supports.

7) Install materials and equipment in accordance with manufacturer's recommendations, instructions, and Shop Drawings, supply labor and material required, and

make mechanical, plumbing, and electrical connections required to operate equipment.

8) Be certified by equipment manufacturer for installation of the specific equipment supplied by the Owner.

9) Provide anchorage and/or bracing as required for seismic restraint per Title 24, UBC Standard 27-11 and all other applicable codes.

10) Provide the contract-required warranty and guarantee for all work, materials and equipment, and installation upon its completion and acceptance by the District. Guarantee includes all costs associated with the removal, shipping to and from the Site, and re-installation of any equipment found to be defective.

C. Compatibility with Space and Service Requirements:

(1) Equipment items shall be compatible with space limitations indicated and as shown on the Contract Documents and specified in other sections of the Specifications.

(2) Modifications to equipment items required to conform to space limitations specified for rough in shall not cause additional cost to the District.

D. Manufacturer's printed descriptions, specifications, and instructions shall govern the Work unless specifically indicated or specified otherwise.

47.02 FURNISHED MATERIALS AND EQUIPMENT

A. All furnished materials and equipment are indicated or scheduled on the Contract Documents.

PART 48 – EXECUTION

48.01 INSTALLATION

A. Install equipment items in accordance with the manufacturer's instructions.

B. Set equipment items securely in place, rigidly or flexibly mounted in accordance with manufacturers' directions.

C. Make electrical and mechanical connections as indicated and required.

D. Touch-up and restore damaged or defaced finishes to the Owner's satisfaction.

48.02 CLEANING AND PROTECTION

A. Repair or replace items not acceptable to the Architect or Owner.

B. Upon completion of installation, clean equipment items in accordance with manufacturer's recommendations, and protect from damage until final acceptance of the Work by the Owner.

END OF DOCUMENT

SECTION 01 66 00
PRODUCT DELIVERY, STORAGE AND HANDLING

PART 49 - GENERAL

49.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Site Access, Conditions and Requirements;

B. Special Conditions.

49.02 PRODUCTS

A. Products are as defined in the General Conditions.

B. Contractor shall not use and/or reuse materials and/or equipment removed from existing Premises, except as specifically permitted by the Contract Documents.

C. Contractor shall provide interchangeable components of the same manufacturer, for similar components.

49.03 TRANSPORTATION AND HANDLING

A. Contractor shall transport and handle Products in accordance with manufacturer's instructions.

B. Contractor shall promptly inspect shipments to confirm that Products comply with requirements, quantities are correct, and products are undamaged.

C. Contractor shall provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

49.04 STORAGE AND PROTECTION

A. Contractor shall store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Contractor shall store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated Products, Contractor shall place on sloped supports, above ground.

C. Contractor shall provide off-site storage and protection when Site does not permit on-site storage or protection.

D. Contractor shall cover products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.

E. Contractor shall store loose granular materials on solid flat surfaces in a well-drained area and prevent mixing with foreign matter.

F. Contractor shall provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

G. Contractor shall arrange storage of Products to permit access for inspection and periodically inspect to assure Products are undamaged and are maintained under specified conditions.

PART 50 – PRODUCTS Not Used.

PART 51 - EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 71 23
FIELD ENGINEERING

PART 52 - GENERAL

52.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Site Investigation, and Soils Investigation Report;

B. Special Conditions;

C. Site-Visit Certification.

52.02 REQUIREMENTS INCLUDED:

A. Contractor shall provide and pay for field engineering services by a California-registered engineer, required for the project, including, without limitations:

(1) Survey work required in execution of the Project.

(2) Civil or other professional engineering services specified, or required to execute Contractor's construction methods.

52.03 QUALIFICATIONS OF SURVEYOR OR ENGINEERS:

Contractor shall only use a qualified licensed engineer or registered land surveyor, to whom District makes no objection.

52.04 SURVEY REFERENCE POINTS:

A. Existing basic horizontal and vertical control points for the Project are those designated on the Drawings.

B. Contractor shall locate and protect control points prior to starting Site Work and preserve all permanent reference points during construction. In addition Contractor shall:

(1) Make no changes or relocation without prior written notice to District and Architect.

(2) Report to District and Architect when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

(3) Require surveyor to replace Project control points based on original survey control that may be lost or destroyed.

52.05 RECORDS:

Contractor shall maintain a complete, accurate log of all control and survey work as it progresses.

52.06 SUBMITTALS:

A. Contractor shall submit name and address of Surveyor and Professional Engineer to District and Architect prior to its/their work on the Project.

B. On request of District and Architect, Contractor shall submit documentation to verify accuracy of field engineering work, at no additional cost to the District.

C. Contractor shall submit a certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance or nonconformance with Contract Documents.

PART 53 – PRODUCTS Not Used.

PART 54 - EXECUTION

54.01 COMPLIANCE WITH LAWS:

Contractor is responsible for meeting all applicable codes, OSHA, safety and shoring requirements.

54.02 NONCONFORMING WORK:

Contractor is responsible for any re-surveying required by correction of nonconforming work.

END OF DOCUMENT

DOCUMENT 01 73 29
CUTTING AND PATCHING

PART 55 – GENERAL

55.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Inspector, Inspections, and Tests, Integration of Work, Nonconforming Work, and Correction of Work, and Uncovering Work;

B. Special Conditions;

C. Hazardous Materials Procedures and Requirements;

D. Hazardous Materials Certification;

E. Lead-Based Paint Certification;

F. Imported Materials Certification.

55.02 CUTTING AND PATCHING:

A. Contractor shall be responsible for all cutting, fitting, and patching, including associated excavation and backfill, required to complete the Work or to:

(1) Make several parts fit together properly.

(2) Uncover portions of Work to provide for installation of ill-timed Work.

(3) Remove and replace defective Work.

(4) Remove and replace Work not conforming to requirements of Contract Documents.

(5) Remove Samples of installed Work as specified for testing.

(6) Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

(7) Attaching new materials to existing remodeling areas – including painting (or other finishes) to match existing conditions.

B. In addition to Contract requirements, upon written instructions from the District, Contractor shall uncover Work to provide for observations of covered Work in accordance with the Contract Documents; remove samples of installed materials for testing as directed by District; and remove Work to provide for alteration of existing Work.

C. Contractor shall not cut or alter Work, or any part of it, in such a way that endangers or compromises the integrity of the Work, the Project, or work of others.

55.03 SUBMITTALS:

A. Prior to any cutting or alterations that may affect the structural safety of Project, or work of others, and well in advance of executing such cutting or alterations, Contractor shall submit written notice to District pursuant to the applicable notice provisions of the Contract Documents, requesting consent to proceed with the cutting or alteration, including the following:

(1) The work of the District or other trades.

(2) Structural value or integrity of any element of Project.

(3) Integrity or effectiveness of weather-exposed or weather-resistant elements or systems.

(4) Efficiency, operational life, maintenance or safety of operational elements.

(5) Visual qualities of sight-exposed elements.

B. Contractor's Request shall also include:

(1) Identification of Project.

(2) Description of affected Work.

(3) Necessity for cutting, alteration, or excavations.

(4) Effects of Work on District, other trades, or structural or weatherproof integrity of Project.

(5) Description of proposed Work:

(a) Scope of cutting, patching, alteration, or excavation.

(b) Trades that will execute Work.

(c) Products proposed to be used.

(d) Extent of refinishing to be done.

(6) Alternates to cutting and patching.

(7) Cost proposal, when applicable.

(8) The scheduled date the Contractor intends to perform the Work and the duration of time to complete the Work.

(9) Written permission of District or other District contractor(s) whose work will be affected.

55.04 QUALITY ASSURANCE:

A. Contractor shall ensure that cutting, fitting, and patching shall achieve security, strength, weather protection, appearance for aesthetic match, efficiency, operational life, maintenance, safety of operational elements, and the continuity of existing fire ratings.

B. Contractor shall ensure that cutting, fitting, and patching shall successfully duplicate undisturbed adjacent profiles, materials, textures, finishes, colors, and that materials shall match existing construction. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the District's decision shall be final.

55.05 PAYMENT FOR COSTS:

A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of the District, its consultants, including but not limited to the Construction Manager, the Architect, the Project Inspector(s), Engineers, and Agents, will be paid by Contractor and/or deducted from the Contract by the District.

B. District shall only pay for cost of Work if it is part of the original Contract Price or if a change has been made to the contract in compliance with the provisions of the General Conditions. Cost of Work performed upon instructions from the District, other than defective or nonconforming Work, will be paid by District on approval of written Change Order. Contractor shall provide written cost proposals prior to proceeding with cutting and patching.

PART 56 - PRODUCTS

56.01 MATERIALS:

A. Contractor shall provide for replacement and restoration of Work removed. Contractor shall comply with the Contract Documents and with the Industry Standard(s), for the type of Work, and the Specification requirements for each specific product involved. If not specified, Contractor shall first recommend a product of a manufacturer or appropriate trade association for approval by the District.

B. Materials to be cut and patched include those damaged by the performance of the Work.

PART 57 – EXECUTION

57.01 INSPECTION:

A. Contractor shall inspect existing conditions of the Site and the Work, including elements subject to movement or damage during cutting and patching,

excavating and backfilling. After uncovering Work, Contractor shall inspect conditions affecting installation of new products.

B. Contractor shall report unsatisfactory or questionable conditions in writing to District as indicated in the General Conditions and shall proceed with Work as indicated in the General Conditions by District.

57.02 PREPARATION:

A. Contractor shall provide shoring, bracing and supports as required to maintain structural integrity for all portions of the Project, including all requirements of the Project.

B. Contractor shall provide devices and methods to protect other portions of Project from damage.

C. Contractor shall, provide all necessary protection from weather and extremes of temperature and humidity for the Project, including without limitation, any work that may be exposed by cutting and patching Work. Contractor shall keep excavations free from water.

57.03 ERECTION, INSTALLATION AND APPLICATION:

A. With respect to performance, Contractor shall:

(1) Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.

(2) Execute cutting and demolition by methods that will prevent damage to other Work, and provide proper surfaces to receive installation of repairs and new Work.

(3) Execute cutting, demolition excavating, and backfilling by methods that will prevent damage to other Work and damage from settlement.

B. Contractor shall employ original installer or fabricator to perform cutting and patching for:

(1) Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants, waterproofing, and other trades.

(2) Sight-exposed finished surfaces.

C. Contractor shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes as shown or specified in the Contract Documents including, without limitation, the Drawings and Specifications.

D. Contractor shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Contractor shall conform to all Code requirements for penetrations or the Drawings and Specifications, whichever

calls for a higher quality or more thorough requirement. Contractor shall maintain integrity of both rated and non-rated fire walls, ceilings, floors, etc.

E. Contractor shall restore Work which has been cut or removed. Contractor shall install new products to provide completed Work in accordance with requirements of the Contract Documents and as required to match surrounding areas and surfaces.

F. Contractor shall refinish all continuous surfaces to nearest intersection as necessary to match the existing finish to any new finish.

END OF DOCUMENT

DOCUMENT 01 76 00
ALTERATION PROJECT PROCEDURES

PART 58 – GENERAL

58.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Integration of Work, Purchase of Materials and Equipment, Uncovering of Work and Non-conforming Work and Correction of Work and Trenches;

B. Special Conditions.

PART 59 - PRODUCTS

59.01 PRODUCTS FOR PATCHING AND EXTENDING WORK:

A. New Materials: As specified in the Contract Documents including, without limitation, in the Specifications, Contractor shall match existing products, conditions, and work for patching and extending work.

B. Type and Quality of Existing Products: Contractor shall determine by inspection, by testing products where necessary, by referring to existing conditions and to the Work as a standard.

PART 60 - EXECUTION

60.01 EXAMINATION:

A. Contractor shall verify that demolition is complete and that areas are ready for installation of new Work.

B. By beginning restoration Work, Contractor acknowledges and accepts the existing conditions.

60.02 PREPARATION:

A. Contractor shall cut, move, or remove items as necessary for access to alterations and renovation Work. Contractor shall replace and restore these at completion.

B. Contractor shall remove unsuitable material not as salvage unless otherwise indicated in the Contract Documents. Unsuitable material may include, without limitation, rotted wood, corroded metals, and deteriorated masonry and concrete. Contractor shall replace materials as specified for finished Work.

C. Contractor shall remove debris and abandoned items from all areas of the Site and from concealed spaces.

D. Contractor shall prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.

E. Contractor shall close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity. Contractor shall insulate ductwork and piping to prevent condensation in exposed areas. Contractor shall insulate building cavities for thermal and/or acoustical protection, as detailed.

60.03 INSTALLATION:

A. Contractor shall coordinate Work of all alternations and renovations to expedite completion and to accommodate District occupancy.

B. Designated Areas and Finishes: Contractor shall complete all installations in all respects, including operational, mechanical work and electrical work.

C. Contractor shall remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition.

D. Contractor shall refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat and square or straight transition to adjacent finishes.

E. Contractor shall install products as specified in the Contract Documents, including without limitation, the Specifications.

60.04 TRANSITIONS:

A. Where new Work abuts or aligns with existing, Contractor shall perform a smooth and even transition. Patched Work must match existing adjacent work in texture and appearance.

B. When finished surfaces are cut so that a smooth transition with new Work is not possible, Contractor shall terminate existing surface along a straight line at a natural line of division and make a recommendation for resolution to the District and the Architect for review and approval.

60.05 ADJUSTMENTS:

A. Where removal of partitions or walls results in adjacent spaces becoming one, Contractor shall rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

B. Where a change of plane of 1/4 inch or more occurs, Contractor shall submit a recommendation for providing a smooth transition to the District and the Architect for review and approval.

C. Contractor shall trim and seal existing wood doors and shall trim and paint metal doors as necessary to clear new floor finish and refinish trim as required.

D. Contractor shall fit Work at penetrations of surfaces.

60.06 REPAIR OF DAMAGED SURFACES:

A. Contractor shall patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections, in the area where the Work is performed.

B. Contractor shall repair substrate prior to patching finish.

60.07 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS:

A. Cultivated or planted areas and other surface improvements which are damaged by actions of the Contractor shall be restored by Contractor to their original condition or better, where indicated.

B. Contractor shall protect and replace, if damaged, all existing guard posts, barricades, and fences.

C. Contractor shall give special attention to avoid damaging or killing trees, bushes and/or shrubs on the Premises and/or identified in the Contract Documents, including without limitation, the Drawings.

60.08 FINISHES:

A. Contractor shall finish surfaces as specified in the Contract Documents, including without limitations, the provisions of all Divisions of the Specifications.

B. Contractor shall finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, Contractor shall refinish entire surface to nearest intersections.

60.09 CLEANING:

A. Contractor shall continually clean the Site and the Premises as indicated in the Contract Documents, including without limitation, the provisions in the General Conditions and the Specifications regarding cleaning.

END OF DOCUMENT

DOCUMENT 01 77 00

CONTRACT CLOSEOUT AND FINAL CLEANING

PART 61 - GENERAL

61.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

A. General Conditions, including, without limitation, Completion of Work;

B. Special Conditions;

C. Temporary Facilities and Controls.

61.02 CLOSEOUT PROCEDURES

Contractor shall comply with all closeout provisions as indicated in the General Conditions.

61.03 FINAL CLEANING

A. Contractor shall execute final cleaning prior to final inspection.

B. Contractor shall clean interior and exterior glass and all surfaces exposed to view; remove temporary labels, tape, stains, and foreign substances, polish transparent and glossy surfaces, wax and polish new vinyl floor surfaces, vacuum carpeted and soft surfaces.

C. Contractor shall clean equipment and fixtures to a sanitary condition.

D. Contractor shall replace filters of operating equipment.

E. Contractor shall clean debris from roofs, gutters, down spouts, and drainage systems.

F. Contractor shall clean Site, sweep paved areas, and rake clean landscaped surfaces.

G. Contractor shall remove waste and surplus materials, rubbish, and construction facilities from the Site and surrounding areas.

61.04 ADJUSTING

Contractor shall adjust operating products and equipment to ensure smooth and unhindered operation.

61.05 RECORD DOCUMENTS AND SHOP DRAWINGS

A. Contractor shall legibly mark each item to record actual construction, including:

(1) Measured depths of foundation in relation to finish floor datum.

(2) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permit surface improvements.

(3) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

(4) Field changes of dimension and detail.

(5) Details not on original Contract Drawings

(6) Changes made by modification(s).

(7) References to related Shop Drawings and modifications.

B. Contractor will provide one set of Record Drawings to District.

C. Contractor shall submit all required documents to District and/or Architect prior to or with its final Application for Payment.

61.06 INSTRUCTION OF DISTRICT PERSONNEL

A. Before final inspection, at agreed upon times, Contractor shall instruct District's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. For equipment requiring seasonal operation, Contractor shall perform instructions for other seasons within six months or by the change of season.

C. Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Contractor shall prepare and insert additional data in Operation and Maintenance Manual when the need for such data becomes apparent during instruction.

E. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

61.07 SPARE PARTS AND MAINTENANCE MATERIALS

A. Contractor shall provide products, spare parts, maintenance, and extra materials in quantities specified in the Specifications and in Manufacturer's recommendations.

B. Contractor shall provide District with all required Operation and Maintenance Data at one time. Partial or piecemeal submissions of Operation and Maintenance Data will not be accepted.

PART 62 – PRODUCTS Not Used.

PART 63 – EXECUTION Not Used.

END OF DOCUMENT

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requests for Information (RFI).

1.02 RELATED REQUIREMENTS

A. Section 01 66 00 - Product Delivery, Storage, and Handling: General product requirements.

B. Section 01 78 39 - Record Documents: Project record documents; operation and maintenance data; warranties and bonds.

C. Section 01 91 00 - Commissioning: Additional procedures for submittals relating to commissioning.
   1. Where submittals are indicated for review by both Architect and the Commissioning Provider (CxP), submit one extra and route to Architect first for forwarding to the Commissioning Provider.
   2. Where submittals are not indicated to be reviewed by Architect, submit directly to the Commissioning Provider (CxP); otherwise, the procedures specified in this section apply to commissioning submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 REQUESTS FOR INFORMATION (RFI)

A. Definition: A request seeking one of the following:
   1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
   2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item.
      a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
      b. Do not forward requests which solely require internal coordination between subcontractors.
   2. Prepare using an electronic version of the form appended to this section.

3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
   1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
   2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
      a. Approval of submittals (use procedures specified elsewhere in this section).
      b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
      c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
   3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
   4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
      a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.

E. Architect reserves the right to return response unanswered if missing key information required to render an actionable response or requests regarding information that is clearly indicated on, or reasonable inferred from Contract Documents, with no additional input required to clarify the question.

F. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following.
   1. Project name.
   2. Name of Contractor.
   3. RFI number, numbered sequentially.
   4. RFI subject.
   5. Date.
   6. Drawing number and detail references, as appropriate.
   7. Specification section number, title, and paragraph(s), as appropriate.
   8. Field dimensions and conditions, as appropriate.
   9. Contractor's suggested resolution. If Contractor's suggested resolution impacts the contract time or the contract sum, Contractor will state impact in the RFI.

G. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

H. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.
   3. Highlight items requiring priority or expedited response.
   4. Highlight items for which a timely response has not been received to date.
   5. Identify and include improper or frivolous RFIs.

I. Review Time: Architect will review each RFI, determine action required, and respond to Contractor within seven working days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 1:00 p.m. will be considered as having been received on the following regular working day.
   1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

J. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
   1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
   2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
   3. Upon receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven working days if Contractor disagrees with response.
   4. Notify Architect within three working days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION

SECTION 01 41 13.11
REGULATORY REQUIREMENTS - GLOBAL WARMING POTENTIAL (GWP)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mandatory requirements for maximum allowable global warming potential (GWP) value of products.

1.02 RELATED REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Additional sustainable product requirements.

1.03 DEFINITIONS

A. Embodied Carbon: The sum of greenhouse gas (GHG) emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials. Embodied carbon is expressed as Global Warming Potential (GWP).

B. Environmental Product Declaration (EPD): A document which quantifies environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function. EPDs are conducted in accordance with a Product Category Rule (PCR) for the specific product being evaluated. EPDs are available as Industry-Wide EPDs (IW-EPD) or Factory / Product Specific EPDs.
   1. Type III EPDs are third-party verified and compliant with the ISO 14025 standard.

C. Global Warming Potential (GWP): The heat absorbed by any greenhouse gas in the atmosphere as a multiple of the heat that would be absorbed by the same mass of carbon dioxide, usually over a 100-year period. GWP is reported as carbon dioxide equivalent (CO_2e).

D. Life Cycle Assessment (LCA): A methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service.

E. Product Category Rules (PCR): A set of rules, requirements, and guidelines for developing Environmental Product Declarations (EPD) for one or more categories.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal requirements.

B. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling.
   1. Life Cycle Data: Provide Type III environmental product declarations (EPD) for products listed in Part 2 of this Section but specified in other Sections.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS - GLOBAL WARMING POTENTIAL (GWP)

A. CBC 5.409.3 Product GWP Compliance: Permanently installed products listed in this Section must have a Type III environmental product declaration (EPD), either product-specific or factory-specific, showing compliance with the maximum allowable GWP value specified.

B. Concrete Reinforcement: See Structural drawings and Section 03 20 00 - Concrete Reinforcing for maximum allowable GWP values for the following:
   1. Deformed bar reinforcing steel.

C. Concrete: See Structural drawings and Section 03 30 00 - Cast-in-Place Concrete for maximum allowable GWP values for the following:
   1. Ready-mixed concrete.
   2. Lightweight ready-mixed concrete.

D. Steel: See Structural drawings and Section 05 12 00 - Structural Steel Framing for maximum allowable GWP values for the following:
   1. Hot-rolled structural steel.
   2. Hollow structural sections.
   3. Steel plate.

E. Flat Glass:
   1. Maximum Allowable GWP Value: 2.50 kg CO_2e/MT.

F. Light-Density Mineral Wool Board Insulation:
   1. Maximum Allowable GWP Value: 5.83 kg CO_2e/l m^2.

G. Heavy-Density Mineral Wool Board Insulation:
   1. Maximum Allowable GWP Value: 14.28 kg CO2e/l m^2.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 56 39
TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Tree protection of existing trees and plants

B. Tree pruning of existing trees

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 32 93 00 - Landscape Work.

1.03 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of the following:
   1. Organic Mulch: 1-pint (0.5-L) 1-quart (1-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
   2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
   3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
   1. Species and size of tree.
   2. Location on site plan. Include unique identifier for each.
   3. Reason for pruning.
   4. Description of pruning to be performed.
   5. Description of maintenance following pruning.

D. Qualification Data: For qualified arborist and tree service firm.

E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
   1. Use sufficiently detailed photographs or videotape.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.05 QUALITY ASSURANCE

A. Arborist Qualifications:
   1. Certified Arborist as certified by ISA.
   2. Licensed Arborist in jurisdiction where Project is located.

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
      a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
      b. Enforcing requirements for protection zones.
      c. Arborist's responsibilities.
      d. Contractor responsibilities
      e. Field quality control.

1.06 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or trenching or digging unless otherwise indicated.
   7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
   8. Do not direct vehicle or equipment exhaust toward protection zones.
   9. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) Insert dimension in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.
2. Refer to Section 32 Landscape Work for material requirements.

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
1. Type: Wood and bark chips.
2. Size Range: 1-1/2" inch minimum, 3" maximum.
3. Color: Natural.

C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Architect.
1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts; with 1-5/8-inch- (42-mm-) OD top rails and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
a. Height: 6 feet (1.8 m).
b. Galvanized
c. Polymer-Coating Color: Black.
2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm) .

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
1. Size: as required
2. Text: "TREE PROTECTION ZONE - KEEP OUT. No unauthorized entry. No storage of vehicles, materials, or debris. No dumping of chemicals, slurry, paint, oil, etc. "
3. Lettering: 3-inch (75-mm-)high minimum, black characters on white background.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag - Tie a 1-inch (25-mm) blue-vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
1. Apply 3-inch (76-mm) average thickness of organic mulch. Do not place mulch within 6 inches (152 mm) of tree trunks.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
   1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
   2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
   3. Access Gates: Install as required; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
   1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
   2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only roots smaller than 2” in diameter that interfere with installation of utilities. Cut roots as required for root pruning.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.05 ROOT PRUNING

A. Do Not prune any roots without written authorization from Arborist or Client.

B. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
   1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
   2. Cut Ends: Do not paint cut root ends. Coat cut ends of roots more than 1-1/2 inches (38 mm) in diameter with emulsified asphalt or other coating formulated for use on damaged plant tissues as approved by the arborist.
   3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
   4. Cover exposed roots with burlap and water regularly.
   5. Backfill as soon as possible according to requirements in Division 31 Section "Grading"

C. Root Pruning at Edge of Protection Zone: Prune roots 12 inches (300 mm) outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

D. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.06 CROWN PRUNING

A. Do not prune any branches without written authorization from Arborist or Client.

B. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
   1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
   2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
      a. Type of Pruning: Cleaning Thinning Raising Reduction.
   3. Cut branches with sharp pruning instruments; do not break or chop.
   4. Do not apply pruning paint to wounds.

C. Chip removed branches and dispose of off-site.

3.07 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
   1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 4 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.08 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.09 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
   1. Submit details of proposed root cutting and tree and shrub repairs.
   2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
   3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
   4. Perform repairs within 24 hours.
   5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
   1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches (100 mm) or smaller in caliper size.
   2. Provide one new tree(s) of 6-inch (150-mm) caliper size for each tree being replaced that measure more than 4 inches (100 mm) in caliper size.
      a. Species: Species selected by Architect.
   3. Plant and maintain new trees as specified in Division 32 Section "Landscape Work"

C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) O.C. Backfill holes with an equal mix of native soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01 57 13
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.

B. Section 31 22 00 - Grading: Temporary and permanent grade changes for erosion control.

1.03 REFERENCE STANDARDS

A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus; 2021.

B. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015 (Reapproved 2023).

C. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a (Reapproved 2023).

D. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile; 2021a.

E. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017 (Reapproved 2021).

F. California State Water Resources Control Board, Construction General Permit; current edition.

G. California Stormwater Quality Association (CASQA), California Stormwater Best Management Practice (BMP) Handbook; current edition.

H. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of State Water Resources Control Board for erosion and sedimentation control .

B. Best Management Practices Standard: CASQA Stormwater BMP Handbook, latest edition.

C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

1. Owner will obtain permits and pay for securities required by authority having jurisdiction.

2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
1. Control movement of sediment and soil from temporary stockpiles of soil.
2. Prevent development of ruts due to equipment and vehicular traffic.
3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

J. Open Water: Prevent standing water that could become stagnant.

K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide materials in conformance with the California Stormwater Quality Association Best Management Practices (BMP) fact sheets for Construction.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. The project SWPPP shall be prepared and electronically uploaded to the State Water Board's SMARTS system database by the Owner's Qualified SWPPP Developer (QSD), the Owner's Approved Signatory (AS), or as by a data submitter as designated by the Owner.

B. The Contractor shall employ the services of a Qualified SWPPP Practitioner (QSP). The QSP shall download copies of the approved SWPPP from SMARTS, and is responsible for imnplementation and enforcement of the SWPPP and erosion control plans. At least one (1) copy of the SWPPP shall be available on the site at all times.

C. The QSP is responsible for training of personnel for proper implementation of the SWPPP, monitoring, and all required reports.

D. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 MAINTENANCE

A. Inspect preventive measures as required by the Storm Water Pollution Prevention Plan (SWPPP).

B. Repair deficiencies immediately.

C. Clean out temporary sediment control structures and relocate soil on site.

D. Place sediment in appropriate locations on site; do not remove from site.

3.04 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

3.05 SWPPP CLOSEOUT

A. Within 90 days of construction completion, the QSP shall electronically file a Notice of Termination (NOT) in the Stormwater Multiple Application and Report Tracking System (SMARTS) online.

B. The QSP shall provide a Final Site Map for inclusion with the NOT. The Final Site Map shall provide sufficient information, including photos, to demonstrate compliance with the Permit regarding final site stabilization. All photo locations and directions sall be identified on the Final Site Map. All photos shall clearly labeled.

C. The QSP is reponsible for filing the annual report.

END OF SECTION

SECTION 01 61 16
VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.

B. Requirements for VOC-Content-Restricted products, including:
   1. Adhesives.
   2. Sealants.
   3. Paints and coatings.
   4. Wood.

C. Toxic and hazardous materials to avoid.

D. Toxic and hazardous materials to limit.

E. Requirement for installer certification that they did not use any non-compliant products.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

1.03 DEFINITIONS

A. Volatile: The tendency of a substance to transition from a solid or liquid state to vapor (evaporate).

B. Volatile Organic Compounds (VOC): Organic compounds that evaporate under normal atmospheric conditions. Some VOCs impact human health and comfort as odor, irritation, chronic toxicity, or carcinogenicity. Materials which produce significantly harmful VOCs are regulated by local, state, and national laws.

C. Ground Level Ozone: A "secondary" pollutant that is produced when nitrogen oxides and VOCs (primary pollutants) react with sunlight and stagnant air. Ozone in the lower atmosphere (ground level to approximately 30,000 feet) is known as ground level ozone. Aerosol sprays contribute to the production of this pollutant.

D. Global Warming Potential: Global warming potential is a measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon, relative to carbon dioxide.

E. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Flooring.
   4. Composite wood.
   5. Products making up wall and ceiling assemblies.
   6. Thermal and acoustical insulation.
   7. Free-standing furniture.
   8. Other products when specifically stated in the specifications.

F. Interior of Building: Anywhere inside the exterior weather barrier.

G. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

H. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

I. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Stone.
   2. Concrete.
   3. Clay brick.
   4. Metals that are plated, anodized, or powder-coated.
   5. Glass.
   6. Ceramics.
   7. Solid wood flooring that is unfinished and untreated.

J. Hazardous Materials: Pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA), the International Agency for Research on Cancer (IARC) or regulated under OSHA Hazard Communication Standard, 29 CFR 1910.1200.

K. Harmful Materials: Materials which contain the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

L. Composite Wood and Agrifiber: Products such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores that are a composite of wood and / or plant material pressed and adhered together.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).

C. BIFMA e3 - Furniture Sustainability Standard; Business and Institutional Furniture Manufacturers Association; 2019.

D. BIFMA M7.1 - Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components, and Seating; 2011 (Reaffirmed 2021).

E. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers; 2017.

F. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; Current Edition.

G. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.

H. CHPS (HPPD) - High Performance Products Database; Current Edition.

I. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.

J. GreenSeal GS-36 - Standard for Adhesives for Commercial Use; 2025, with Editorial Revision (2026).

K. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).

L. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

M. SCS (CPD) - SCS Certified Products; Current Edition.

N. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
   1. See Section 01 66 00 - Product Delivery, Storage, and Handling, for acceptable documentation.

C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

PART 2 PRODUCTS

2.01 PRODUCT EMISSIONS TESTING AND STANDARDS REQUIREMENTS, GENERAL

A. Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
   1. Wet-Applied Products: State amount applied in mass per surface area.
   2. Paints and Coatings: Test tinted products, not just tinting bases.
   3. Evidence of Compliance: Acceptable types of evidence are the following;
      a. Current UL (GGG) Greenguard Gold certification.
      b. Current SCS (CPD) Floorscore certification.
      c. Current SCS (CPD) Indoor Advantage Gold certification.
      d. Current listing in CHPS (HPPD) as a low-emitting product.
      e. Current CRI (GLP) certification.
      f. Test report showing compliance and stating exposure scenario used.
   4. Product data submittal showing VOC content is NOT acceptable evidence.
   5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
   6. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1 percent weight by mass (total exempt compounds) shall be disclosed.

B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

C. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Current SCS "No Added Formaldehyde (NAF)" certification.
         1) Web: www.scscertified.com.
      b. Report of laboratory testing performed in accordance with requirements.
      c. Published product data showing compliance with requirements.

D. Flooring: Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Ceilings, Walls, and Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Furnishings Emissions Standard and Test Method: BIFMA e3 Sections 7.6.1 and 7.6.2, tested in accordance with BIFMA M7.1.
   1. Evidence of Compliance:
      a. Test report showing compliance and stating exposure scenario used.
   2. Any furniture procured as part of this project must meet the Healthier Hospitals Initiative: Healthy Interiors (HHI-Healthy Interiors) standard for 100 percent of furniture, including being free of chemical flame retardants, unless required by code.

2.02 MATERIAL REQUIREMENTS, GENERAL

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
   1. Composite Wood, Wood Fiber, and Wood Chip Products: Comply with Composite Wood Emissions Standard or contain no added formaldehyde resins.
   2. Furnishings: Comply with Furnishings Emissions Standard and Test Method.
   3. Inherently Non-Emitting Materials.

C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Aerosol Adhesives: GreenSeal GS-36.
   3. Joint Sealants: SCAQMD 1168 Rule.
   4. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).
   5. Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.

2.03 ADHESIVES

A. The volatile organic compound (VOC) content of all field-applied adhesives, adhesive bonding primers, and adhesive primers used on the interior of this Project to not exceed the limits defined in Rule 1168 - "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California, with a rule amendment date of October 6, 2017.

B. General: For specified building construction related applications, the allowable VOC content is as follows, measured in grams per liter (g/L), less water and less exempt compounds:
   1. Architectural Applications:
      a. Building Envelope Membrane Adhesive: 250.
      b. Carpet pad adhesive: 50.
      c. Ceramic Tile Adhesive: 65.
      d. Cove Base Adhesive: 50.
      e. Gypsum Board and Panel Adhesive: 50.

f. Multipurpose Construction Adhesive: 70.
g. Roofing:
    1) Single-Ply Roof Membrane Adhesive: 250.
    2) All Other Roof Adhesive: 250.
h. Rubber Floor Adhesive: 60.
i. Structural Glazing Adhesive: 100.
j. Structural Wood Member Adhesive: 140.
k. Subfloor Adhesive: 50.
l. VCT and Asphalt Tile Adhesive: 50.
m. Wood Flooring Adhesive: 100.
n. All Other Indoor Floor Covering Adhesives: 50.
o. All Other Outdoor Floor Covering Adhesives: 50.

2. Specialty Applications:
    a. Contact Adhesive: 80.
    b. Edge Glue Adhesive: 250.
    c. All Other Plastic Cement:
        1) ABS Welding: 325.
        2) ABS to PVC Transition Cement: 510.
        3) PVC Welding: 510.
        4) CPVC Welding: 490.
        5) All Other Plastic Welding Cements: 250.
    d. Adhesive Primer for Plastic: 550.
    e. Special Purpose Contact Adhesive: 250.
    f. Adhesive Primer for Traffic Marking Tape: 150.
    g. Structural Wood Member Adhesive: 140.
    h. Top and Trim Adhesive: 250.
    i. Plastic Foams: 50.
3. Substrate and Specific Applications:
    a. Metal to Metal: 30.
    b. Plastic Foams: 50.
    c. Porous Material, Except Wood: 50.
    d. Wood: 30.
    e. Fiberglass: 80.
    f. Reinforced Plastic Composite: 250.
4. Other:
    a. Other Adhesives: 250.
    b. Adhesive Bonding Primers: 250.
    c. Adhesive Primers, or Any Other Primers: 250.
5. Adhesive Primers:
    a. Plastic: 550.
    b. Pressure-Sensitive: 785.
    c. Traffic Marking Tape: 150.
    d. All Other Adhesive Primers: 250.

2.04 SEALANTS

A. The volatile organic compound (VOC) content of all field-applied adhesives, adhesive bonding primers, sealant primers and sealants used on the interior of this Project to not exceed the limits defined in Rule 1168 - "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California, with a rule amendment date of October 6, 2017.

B. General: For specified building construction related applications, the allowable VOC content is as follows, measured in grams per liter, less water and less exempt compounds:
   1. Sealants:
      a. Clear, Paintable, and Immediately Water-Resistant Sealant: 280.
      b. Foam Insulation and Sealant: 250.
      c. Grout Sealant: 65.
      d. Non-Staining Plumbing Putty: 150.
      e. Potable Water Sealant: 100.
      f. Roofing:
         1) Single-Ply Roofing Membrane Sealant: 450.
         2) Other Roofing Sealant: 300.
   2. Sealant Primer:
      a. Architectural, Nonporous: 250.
      b. Architectural, Porous: 775.
      c. Modified Bituminous: 500.
      d. Other: 750.

2.05 PAINT AND COATINGS

A. VOC Content Requirements for Wet Applied Products: All paint and coatings wet-applied on site must meet the applicable VOC limits of the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.

B. Product specific requirements are as follows, measured in grams per liter, less water and less exempt compounds:
   1. Paint:
      a. Flat: 50.
      b. Non-Flat: 100.
      c. Non-Flat High-Gloss: 150.
   2. Coatings:
      a. Aluminum Roof Coatings: 400.
      b. Basement Specialty Coatings: 400.
      c. Roofing:
         1) Bituminous Roof Coatings: 50.
         2) Bituminous Roof Primers: 350.
         3) Roof Coatings: 50.
      d. Bond Breakers: 350.
      e. Building Envelope Coatings: 50.
      f. Clear Wood Finish:
         1) Varnish: 275.
         2) Sanding Sealers: 275.
         3) Lacquer: 275.
      g. Concrete Curing Compounds: 100.
      h. Concrete / Masonry Sealers: 100.
      i. Concrete Surface Retarders: 50.
      j. Dry Fog Coatings: 50.
      k. Faux Finishing Coatings:
         1) Clear Topcoat: 100.
         2) Decorative Coatings: 350.
         3) Glazes: 350.
         4) Japan: 50.
      l. Fire-Resistive Coatings: 150.

m. Floor Coatings: 50.
n. Form-Release Compounds: 100.
o. Graphic Arts Coatings / Sign Paints: 200.
p. High-Temperature Coatings: 420.
q. Industrial Maintenance Coatings: 100.
    1) Color-Indicating Safety Coatings: 480.
    2) High-Temperature IM Coatings: 420.
    3) Non-Sacrificial Anti-Graffiti Coatings: 100.
    4) Zinc-Rich IM Primers: 100.
r. Low-Solids Coatings: 120.
s. Magnesite Cement Coatings: 450.
t. Mastic Texture Coatings: 100.
u. Metallic Pigmented Coatings: 150.
v. Multi-Color Coatings: 250.
w. Pre-Treatment Wash Primers: 420.
x. Primers, Sealers, and Undercoaters: 100.
y. Reactive Penetrating Sealers: 350.
z. Recycled Coatings: 250.
aa. Rust-Preventative Coatings: 100.
bb. Sacrificial Anti-Graffiti Coatings: 50.
cc. Shellacs:
    1) Clear: 730.
    2) Opaque: 550.
dd. Specialty Primers, Sealers, and Undercoaters: 50.
ee. Stains: 250.
ff. Stone Consolidants: 450.
gg. Swimming Pool Coatings: 340.
hh. Tile and Stone Sealers: 100.
ii. Traffic Marking Coatings: 100.
jj. Tub and Tile Refinish Coatings: 420.
kk. Waterproofing Membranes: 250.
ll. Waterproofing Sealers: 100.
mm. Waterproofing Concrete / Masonry Sealers: 100.
nn. Wood Coatings: 275.
oo. Wood Preservatives: 350.
pp. Zinc-Rich Primers: 340.

2.06 WOOD

A. Composite Wood: Use no-added-formaldehyde (NAF) or ultra-low-emitting formaldehyde (ULEF) resins.

2.07 TOXIC AND HAZARDOUS MATERIALS TO AVOID

A. Asbestos and Lead, General:
    1. No materials may be used in this project or in any tools, devices, clothing or equipment used to affect this construction that contain asebestos or lead-based paint. All work or materials found to contain asbestos or lead-base paint, or material installed with asbestos containing equipment or lead-base paint will be immediately rejected and this work will be removed by a certified EPA hazard material Contractor under the supervision of a certified hazard material consultant at no additional cost to Owner.

2. Contractor and subcontractors shall certify that no asbestos containing materials and no lead-base paint were used in this project. Certification letter must be addressed to Owner, including project and Contractors' information; to be notarized.

B. Avoid the use of the following toxic and hazardous materials. Refer to Definitions article above.
1. Asbestos: No products containing asbestos.
2. Lead: Products containing lead content, including older or flux containing not more than 0.25 percent lead in wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures, and 0.20 percent for solder or flux used in plumbing for water intended for human consumption.
3. Mercury:
   a. No new mercury containing thermometers, switches and electrical relays.
   b. All lamps compliant with low-mercury limits.
      1) Illuminated exit signs only use Light-Emitting Diode (LED) or Light-Emitting Capacitor (LEC) lamps.
   c. No mercury vapor or probe-start metal halide high intensity discharge lamps.
4. Added Urea-Formaldehyde: Prefabricated wood products, composite wood, and agrifiber products to contain no added urea-formaldehyde resins.
   a. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
5. Sealants: Provide products that comply with specified VOC limits. Refer to Section 07 92 00 - Joint Sealants, for additional requirements.
   a. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.
6. Avoid the use of the following products: butyl rubber, solvent acrylic, neoprene, styrene butadiene rubber, and nitril.
7. Avoid the use of products containing CFC's or HCFC's.

2.08 TOXIC AND HAZARDOUS MATERIALS TO LIMIT

A. Limit the use of the following toxic and hazardous materials. Refer to Definitions article above.
1. Halogenated and Organophosphorous Flame Retardants: Limit to 100ppm in the following categories to the extent allowable by local code:
   a. Window and waterproofing membranes, door and window frames and siding.
   b. Flooring, ceiling tiles and wall coverings.
   c. Piping and electrical cables, conduits and junction boxes.
2. Phthalate (Plasticizers): DEHP, DBP, BBP, DINP, DIDP or DNOP (often found in polyvinyl chloride PVC) are limited in the following components to 0.01 percent (100 ppm):
   a. Flooring, including resilient and hard surface flooring and carpet.
   b. Wall coverings, window blinds and shades, shower curtains, furniture and upholstery.
   c. Plumbing pipes.
   d. Moisture barriers.
3. Isocyanate-Based Polyurethane: Not to be used in interior finishes.
4. Urea-Formaldehyde: Limited to 100 ppm in the following components:
   a. Furniture.
   b. Composite wood products.
   c. Laminating adhesives and resins.
   d. Thermal insulation.
5. Perfluoroalkyl and polyfluoroalkyl substances (such as stain and water repellants).
6. Antimicrobials.
7. Fly ash.
8. Methylene chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, or sealants.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control.

B. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

C. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 66 00 - Product Delivery, Storage, and Handling: Handling and storage of items removed for salvage and relocation.

D. Section 01 76 00 - Alteration Project Procedures: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

E. Section 01 50 13 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 DEFINITIONS

A. Demolish: Dismantle, raze, destroy, or wreck any building or structure or any part thereof.

B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.

C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.

D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.

E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.04 REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Site Plan: Indicate:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.

3. Areas for temporary and permanent placement of removed materials.

C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
   1. Indicate extent of demolition, removal sequencing, bracing and shoring, and location and construction of barricades and fences.
   2. Summary of safety procedures.
   3. Demolition firm qualifications.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove paving and curbs required to accomplish new work.

B. Remove portions of concrete slabs on grade as indicated on drawings.

C. Remove other items indicated, for salvage, relocation, and recycling.

D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with requirements in Section 01 76 00 - Alteration Project Procedures.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
   6. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Protect existing structures and other elements to remain in place and not removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
   1. Verify construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.

C. Remove existing work as indicated and required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
   2. Remove items indicated on drawings.

D. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
   1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure. Provide shoring and bracing as required.
   2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch to match new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Comply with Section 01 50 13 - Construction Waste Management and Disposal.

B. Remove debris, junk, and trash from site.
C. Remove materials not to be reused on site.
D. Leave site in clean condition, ready for subsequent work.
E. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP)

B. Section 03 10 00 - Concrete Forming and Accessories.

C. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. The applicable version of the standards listed below shall be per Chapter 35 of Part 2 of the 2022 edition of the California Building Code (CBC), including addendums and errata. Where the standard is not listed, then the most current version of the standard shall be used or as referenced by other standards.
   1. ACI 301 - Specifications for Concrete Construction.
   2. ACI 315 – Details and Detailing of Concrete Reinforcement.
   3. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
   4. ACI MNL-66 - ACI Detailing Manual.
   5. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
   6. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   7. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
   8. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
   9. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
   10. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination
   11. AWS A5.1 – Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
   12. AWS A5.5 – Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
   13. AWS D1.1/D1.1M – Structural Welding Code – Steel.
   14. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.
   15. AWS D1.8/D1.8M - Structural Welding Code - Seismic Supplement.
   16. CRSI (DA4) - Manual of Standard Practice.
   17. CRSI (P1) - Placing Reinforcing Bars.

B. California Code of Regulations (CCR):
   1. CBSC, Title 24, Part 2- California Building Code (CBC), 2022 edition.
      a. Chapter 17A - Structural Tests and Inspections
      b. Chapter 19A - Concrete
   2. CBSC, Title 24, Part 11 - California Green Building Standards Code (CALGreen)

a. Supplement 1, July 2024

C. US Army Corps of Engineers (USACE)
1. CW03210: Civil Works Construction Guide Specifications for Steel Bars, Welded Wire Fabric and Accessories for Concrete Reinforcement

D. United States Green Building Council (USGBC):
1. Leadership in Energy and Environmental Design (LEED):
2. Green Building Rating System.

1.04 GENERAL

A. Coordination: Refer to Section 01 50 13 - Construction Waste Management and Disposalregarding procedures for implementing construction waste management requirements.

B. Coordination: Coordinate Work specified in this Section with other Sections which require placement of embedded products and provision of openings and recesses. If formwork is placed after reinforcing, resulting in insufficient concrete cover over reinforcing, request instructions from Architect (Structural Engineer) before proceeding.

C. Refer to Section 01 30 00 - Administrative Requirements for RFI requirements.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Reinforcing Shop Drawings:
1. Prepare Shop Drawings in accordance with the applicable requirements of ACI 318 and the CRSI Manual.
2. Provided scaled, dimensioned reinforcing plans for each floor level indicating size and spacing of reinforcing. Coordinate additional bars with locations of slab openings, penetrations, depressions and steps. Shop drawing shall be coordinated with concrete shop drawings. Ensure penetrations from affected trades for utilites are coordinated.
3. Provide scaled, dimensioned reinforcing elevations for each wall line indicating size and spacing of reinforcing. Coordinate additional bars with locations of openings, penetrations, and recesses. Shop drawing shall be coordinated with concrete shop drawings. Ensure penetrations from affected trades for utilites are coordinated.
4. Indicate welds in accordance with AWS D1.4/D1.4M and AWS A2.4.
5. Indicate type of corrosion resistant reinforcing proposed and locations, if applicable.
6. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

C. Test Reports: Submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this Section.
1. Where reinforcing is subject to welding, submit carbon equivalent determination reports in accordance with requirements of Source Quality Control.

D. Certificates: Submit copies of steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel. Transmit copy to installer for welded splices.

E. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

F. Sustainable Design Submittals:
1. Type III factory-specific or product-specific environmental product declarations (EPD) for each grade of reinforcement proposed for the project.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 318, ACI 301, CRSI and CBC Chapter 19A.

B. Fabricator's Qualifications:
   1. When required, show evidence of approval by governmental agencies having jurisdiction.

C. Welding of reinforcing shall be in conformance with AWS D1.1/D1.1M, AWS D1.4/D1.4M, AWS D1.8/D1.8M, and CBC Chapter 19.

D. Qualification of Welds, Welding operators, and welders:
   1. Comply with applicable building code standard. Perform welding procedure qualification, except for prequalified procedures, as required by AWS D1.4/D1.4M, prior to executing any welding of reinforcing steel.
   2. Only AWS Certified Welding Inspectors shall be used for tests and qualifications associated with welding of reinforcing steel.
   3. Only AWS qualified welders or welding operators shall perform welding of reinfocing steel.
   4. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months and in accordance with AWS D1.4/D1.4M.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage. Deliver reinforcing materials bundled and with identifying labels or tags affixed and legible.
   1. Bundle reinforcing, tag with identification, and transport and store so as not to damage any material. Use metal tags indicating size, length and other marking shown on placement drawings. Maintain tags after bundles are broken.

B. The Inspector and/or Architect reserves the right to observe deliveries, to review bills of lading, and to reject the following:
   1. Reinforcing not accompanied by required mill certificates.
   2. Reinforcing exhibiting rusting or other contamination which might prohibit or inhibit bonding of concrete.

C. Store materials off ground and under cover.
   1. Store reinforcement to avoid excessive rusting or fouling with grease, oil, dirt or other bond-weakening contaminants.
   2. Store welding electrodes in accordance with AWS standards.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Provide deformed-type reinforcing conforming to ASTM Standards and material Grades as noted on Structural Contract Drawings.
   1. When welding is indicated, provide reinforcing conforming to the requirements of ASTM A 706, Grade 60.

B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
   1. Form: Flat Sheets.
   2. WWR Style: As indicated on drawings.

C. Global Warming Potential (GWP) Limit: as indicated on the drawings.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch, conforming to ASTM A1064/A1064M , Grade 60.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Do not fabricate reinforcing until shop drawings have been reviewed by Architect.

B. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice, ACI MNL-66: Detailing Manual, and ACI 318.

C. In case of fabrication errors, do not rebend or straighten reinforcing in a manner that will injure or weaken the material.

D. Do not heat reinforcing to faciliate bending.

E. Welding of reinforcement is permitted only where shown on drawings using ASTM A706 reinforcing. Perform welding in accordance with AWS D1.4/D1.4M.
   1. Protect joints from drafts during cooling process. Accelerated cooling is prohibited.
   2. Do not tack weld reinforcing.
   3. Fusion welding is not permitted unless approved by Engineer of Record.

F. Locate reinforcing splices not indicated on drawings at point of minimum stress.

G. Comply with tolerances per ACI 117 and CRSI Manual.

H. Reinforcing with any of the following defects will not be permitted:
   1. Lengths, depths, and bends not conforming to the spcified fabrication tolerances.
   2. Bends or kinks not indicated in the drawings.
   3. Reinforcing with reduced cross-section due to excessive rusting or other causes.

2.03 SOURCE QUALITY CONTROL

A. Tests: Materials for which physical characteristics have been stipulated shall have had such characteristics independently confirmed by laboratory tests employing industry recognized procedures.

B. Reinforcing to be welded:
   1. Submit a copy of the mill test report to the Architect prior to placement of reinforcing steel in concrete members.
   2. If mill test reports are not available, perform a chemical analysis of reinforcing representative of the reinforcing to be welded. The carbon equivalent (CE) shall not exceed 0.55.
   3. Special inspection is required for welding of steel reinforcing.

C. Source Quality Control: Testing Laboratory shall test samples of reinforcing, ties, and stirrups from the material at the site or from place of distribution. Each sampling shall include at least two 18-inch long pieces. Perform the following tests according to ASTM A615:
   1. Identified Reinforcing: Samples shall be obtained from bundles delivered from the mill, identified by heat number and accompanied by mill analyses and mill test reports. Reinforcing shall be properly tagged with Identification Certificate so as to be readily identified. Then perform one tensile and one bend test for each 10 tons or fraction thereof of each size of reinforcing per CBC Section 1910A.2. Submit mill reports when samples are selected.
   2. Unidentified reinforcing is not permitted.
   3. Refer to Section 01 45 00 - Quality Control.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Preparation: Clean reinforcing to remove loose rust and mill scale, earth, and other materials which might reduce or destroy bond with concrete.

3.02 PLACEMENT

A. General: Comply with the CRSI Manual of Standard Practice and CRSI Placing Reinforcing Bars, 10th edition, for details and methods of placing reinforcing and supports.
   1. Do not displace or damage vapor barrier while placing concrete reinforcing. If damage occurs, repair vapor barrier before placing concrete.
      a. Provide for movement which equals joint width plus 1/2-inch.
   2. Expansion Joints in Slab-on-grade: Interrupt reinforcing at expansion joints. Provide No. 5 by 24-inch long dowelled joints at 18 inches on centers with one end of dowel set in capped dowel sleeve.
   3. Construction Joints: Allow reinforcing to run through without interruption, unless otherwise noted on Contract Structural Drawings.

B. Support: Position, support, and secure reinforcing against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required and as indicated on Contract Drawings.
   1. Provide sufficient numbers and sizes of supports to carry reinforcing.
      a. Do not place reinforcing more than 2 inches beyond the last leg of any continuous reinforcing support.
      b. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
      c. Provide additional reinforcing for support where required to support reinforcing shown on Contract Drawings.
   2. Repair and resupport reinforcing which may have moved during concrete placement operations.

C. Securing in Place:
   1. Accurately place reinforcing and wire tie in precise position where reinforcing cross. Bend ends of wire ties away from the forms. Wire tie reinforcing to corners of ties and stirrups.
   2. Support reinforcing according to the current edition of CSRI Recommended Practice for Placing Reinforcing Supports using approved accessories and chairs.
   3. Place precast concrete cubes with embedded wire ties to support reinforcing steel in concrete placed on grade and in footings. Precast concrete cubes are not acceptable in elevated concrete slabs, beams, or concrete filled metal deck.
   4. Use care not to damage vapor barriers where they occur.
   5. Dowel Bar Couplers:
      a. Attach flanged, internally threaded end of dowel bar coupler to inside of formwork, using nails or screws.

D. Coverage: Place reinforcing to obtain minimum coverages for concrete protection in accordance with ACI 318 Chapter 20.5.1.3, or as indicated on Contract Structural Drawings. Securely tie reinforcing and related supports together with tie wire to hold reinforcing accurately in position during concrete placement operations. Place wire ties so that twisted ends are directly away from exposed concrete surfaces.

E. Clearance Between Reinforcing: Per ACI 318 and as indicated on Contract Drawings.

F. Splicing:
   1. Provide standard reinforcing splices by lapping ends and tying securely with tie wire. Comply with details indicated on Contract Structural Drawings.

a. Unless noted otherwise on Contract Drawings, comply with requirements of ACI 318 for minimum lap of Class B spliced reinforcing, including ACI 318 as amended by CBC.

2. Provide 1-1/2-inch minimum clearance between sets of splices. Stagger horizontal reinforcing so that adjacent splices are greater than 4 feet apart, unless noted otherwise on Structural Contract Drawings.
3. Field Welding: Comply with the requirements of AWS D1.4 where field welding is required. Prior to field welding, determine the weldability of reinforcing in accordance with section "Source Quality Control" in Part 2. Only steel conforming to the chemical requirements of AWS D1.4 may be welded.
4. Splices: Do not splice reinforcing at the points of maximum stress except where indicated. Lap splices as shown or required to develop the full strength of reinforcing. Stagger splices in horizontal wall reinforcing at least 24" longitudinally in alternate reinforcing and opposite faces.

G. Wire Fabric: Install welded wire fabric in longest lengths practicable. Lap adjoining pieces at least 12 inches minimum, and lace splices with tie wire. Offset end laps in adjacent widths to prevent continuous laps.
1. Extend fabric to within 1 inch of edge at slabs.

H. Slab on Grade Reinforcing: Do not displace or damage vapor retarder at slab on grade.

I. Dowels: Secure tie dowels in place before depositing concrete. Provide No. 3 reinforcing for securing dowels where no other reinforcing is provided

J. Maintaining Reinforcing in Position: Provide adequate means to ensure that reinforcing position and spacing is maintained during placement of concrete.

K. Adjustment and Inspection: Do not bend or straighten reinforcing in a manner injurious to material. Do not use reinforcing with kinks or bends not shown on Drawings and reviewed shop drawings or reinforcing with reduced cross-section due to corrosion or other cause.

L. Tolerances: Placement tolerances shall conform to CRSI Manual of Standard Practice and ACI 117.

3.03 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 40 00 - Quality Requirements, will inspect installed reinforcement for conformance to contract documents before concrete placement.

B. Inspection and Tests of Welds: Provide special inspection of shop and field welding in accordance with CBC Section 1704A, 1705A, 1903A, and Structural Contract Drawings.
1. Tests will be made by testing laboratory for reinforcing welds, as follows:
a. Qualification of welders engaged in electric-arc welding of reinforcing.
b. Verification of location of reinforcing for accuracy.
c. Inspection of reinforcing welds by certified welding inspectors.
d. X-ray test of one of the first three arc-welds made by each welder.
2. Tensile tests of sample welds of the largest size reinforcing for each type of welding.
3. When welds are judged to be deficient, provide and pay for such additional X-rays and tests as directed by the Architect. Defective welds shall be repaired, replaced, and retested.

C. Placing: Provide special inspection as required by CBC 1705A.
1. Placement of Grade 60 or higher reinforcing steel for concrete above grade requires special inspection.
2. Schedule inspecting of reinforcing steel for conduit, sleeves, and embedded items to allow for correction, if necessary, before placement of overlying grids on reinforcing steel.

3.04 ADJUSTING

A. Defective Reinforcing Work: The following shall be considered defective and may be ordered removed and reconstructed at no change in Contract Time or Contract Sum:
   1. Reinforcing with kinks or bends not shown on Contract Drawings.
   2. Reinforcing injured due to bending or straightening.
   3. Reinforcing heated or bent.
   4. Reinforcing not placed in accordance with Contract Documents.
   5. Reinforcing that is rusty or oily.
   6. Reinforcing exposed in surface of concrete

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Joint devices associated with concrete work.

C. Site Concrete Elements, including, but not limited to freestanding walls and their foundations, retaining walls and their foundations, light pole bases and their foundations, and flagpole bases and their foundations.

D. Miscellaneous concrete elements, including equipment pads and equipment pits.

E. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP)

B. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.

C. Section 03 20 00 - Concrete Reinforcing.

D. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

E. Section 323353 for additional requirements for retaining walls and other site concrete.

1.03 REFERENCE STANDARDS

A. The applicable version of the standards listed below shall be per Chapter 35 of Part 2 of the 2022 edition of the California Building Code (CBC), including addendums and errata. Where the standard is not listed, then the most current version of the standard shall be used or as referenced by other standards.

1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
2. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.
3. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
4. ACI 232.2R – Report on the Use of Fly Ash in Concrete
5. ACI 233R – Guide to the Use of Slag Cement in Concrete
6. ACI 234R – Guide for the Use of Silica Fume in Concrete
7. ACI 301 - Specifications for Concrete Construction.
8. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
9. ACI 303R – Guide to Cast-in-Place Architectural Concrete Practice
10. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
11. ACI 305R - Guide to Hot Weather Concreting.
12. ACI 306R - Guide to Cold Weather Concreting.
13. ACI 308R - Guide to External Curing of Concrete.
14. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
15. ACI 347R - Guide to Formwork for Concrete.
16. ACI 360R – Guide to Design of Slabs-on-Ground
17. ACI 503.4 – Standard Specification for Repairing Concrete with Epoxy Mortars

18. ACI MNL-15 – Field Reference Manual
19. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
20. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
21. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
22. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
23. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
24. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens).
25. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
26. ASTM C150/C150M - Standard Specification for Portland Cement.
27. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
28. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
29. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
30. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
31. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
32. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
33. ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
34. ASTM C295/C295M - Standard Guide for Petrographic Examination of Aggregates for Concrete.
35. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
36. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.
37. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
38. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
39. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements.
40. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
41. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
42. ASTM C755 - Standard Practice for Selection of Water Vapor Retarders for Thermal Insulation.
43. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
44. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars.
45. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
46. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
47. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
48. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
49. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

50. ASTM D1709 - Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
51. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
52. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.
53. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
54. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
55. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
56. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
57. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
58. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
59. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
60. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

B. California Code of Regulations (CCR):
   1. CBSC, Title 24, Part 2- California Building Code (CBC), 2022 edition.
      a. Chapter 11b - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 3 - Building Blocks.
            (a) Section 11B-302 - Floor or Ground Surfaces.
         2) Division 4 - Accessible Routes.
            (a) Section 11B-403 - Walking Surfaces.
      b. Chapter 17 - Structural Tests and Inspections.
      c. Chapter 19 - Concrete.
   2. CBSC, Title 24, Part 11 - California Green Building Standards Code (CALGreen), 2022 edition.
      a. Supplement 1, July 2024

C. US Army Corps of Engineers (USACE)
   1. COE CRD-C 513 - Handbook for Concrete and Cement Corps of Engineers Specifications for Rubber Waterstops 1974.

D. ICC Evaluation Service, Inc. (ICC ES), a subsidiary corporation of the International Code Council:
   1. ICC ES Evaluation Reports (ESR) for Materials, Products, Methods, and Types of Construction with current report conforming to the applicable building code.

E. International Association of Plumbing and Mechanical Officials (IAPMO):
   1. IAPMO Uniform Evaluation Service (UES) Report for Materials, Products, Methods, and Types of Construction with current report conforming to the applicable building code.

F. Public Works Standards, Inc. (PWS):
   1. Standard Specifications for Public Works Construction, (Greenbook), latest edition with amendments, published by BNi Building News.

1.04 GENERAL

A. Identify finish flooring manufacturers' concrete slab vapor emission and alkalinity requirements and coordinate concrete slab mixing and installation procedures to achieve desired results. Concrete slab requirements for finish flooring may be more restrictive than general requirements of the Contract Documents, and may require additional materials, means, or methods. Additional materials, means, or methods shall be included as part of the work.

B. Coordinate method of securing reinforcing and other embedded items in concrete slabs on grade without penetrating vapor barriers.

1.05 DEFINITIONS

A. Embodied Carbon Footprint: Embodied carbon is the carbon dioxide equivalent (CO2e) footprint of the Project before it becomes operational. Embodied carbon is expressed as Global Warming Potential (GWP).

B. Global Warming Potential: Global Warming Potential (GWP) is the heat absorbed by any greenhouse gas in the atmosphere as a multiple of the heat that would be absorbed by the same mass of carbon dioxide. GWP is 1 for CO2. GWP for reinforcing is expressed as kg of CO2e per metric ton of fabricated steel reinforcing.

C. Environmental Product Declaration: An Environmental Product Declaration (EPD) quantifies environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function. EPDs are conducted in accordance with a Product Category Rule for the specific product being evaluated.

D. Product Category Rule: Product Category Rules (PCR) are a set of rules, requirements, and guidelines for developing Environmental Product Declarations (EPD) for one or more categories.

E. Life Cycle Assessment: Life Cycle Assessment (LCA) is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions, along with agency approvals (ICC, IAPMO, etc.) where applicable.

C. Mix Design: Submit proposed concrete mix design for approval.
   1. Submit design mix data for each type of concrete and each compressive strength required on the Contract Drawings. Submittal of mix designs shall not relieve Contractor of its responsibility to furnish concrete of proper consistency and specified strengths. Where used for concrete subject to special inspections, submit mix designs to testing laboratory for review and written acceptance.
      a. Indicate proposed mix design complies with requirements of ACI 301, Section 4 and ACI 318 26.4.3.
      b. Design mix submittal shall be stamped and signed by a professional engineer licensed in the State of California.
      c. For each material, including admixtures and water, state water-cement ratio and maximum allowable water content.
      d. For each material, state manufacturer's name, designation, and source.
      e. Submit shrinkage and creep factors for each type of aggregate, and each source proposed for use, for acceptance-review.
      f. For each mix design:

1) Pay costs associated with mix design preparation.
2) Consider concrete cover and clear distances between reinforcing bars as indicated on the Contract Drawings in determining the aggregate size for mix designs. This may result in an aggregate size smaller than specified elsewhere in this Specification.
3) Submit a schedule which identifies the locations within the structure where each mix design is proposed for use.
4) Submit project specific 28-day shrinkage test results in accordance with shrinkage test requirements in Part 2 "CONCRETE MIX DESIGN."
5) Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.

D. Shop Drawings. Concrete shop drawings shall be coordinated with shop drawings requirements for reinforcement and formwork. Submit the following items for review:
1. Layout drawings showing locations of slab-on-grade joints.
2. Scaled, dimensioned plans for each floor level indicating size and location of slab openings, penetrations, depressions, and steps. Shop drawing shall be coordinated with reinforcing shop drawings. Ensure penetrations from affected trades for utilities are coordinated.
a. Provided review stamp, with signature and date, of each trade proposed to work within the opening or penetration.
3. Proposed Construction Joints.
4. Scaled, dimensioned concrete elevations for each wall line indicating size and location of openings, penetrations, and recesses. Shop drawing shall be coordinated with reinforcing shop drawings. Ensure penetrations from affected trades for utilities are coordinated.
a. Provided review stamp, with signature and date, of each trade proposed to work within the opening or penetration.

E. Concrete Placement Schedule: Submit the proposed concrete placement schedule to the Architect for review prior to start of concrete placement.

F. Samples:
1. Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.
2. Submit samples of underslab vapor retarder to be used.
3. Submit two, 12 inch long samples of waterstops and construction joint devices.
4. Aggregate proposed for exposed finish, indicating color, texture, and size, for acceptance-review. Submit not less than 1 pound of aggregate.

G. Test Reports: Submit report for each test or series of tests specified.
1. Submit certified laboratory test reports to Architect and, when applicable, the authority having jurisdiction, confirming physical characteristics of materials used.
2. Shrinkage and petrographic tests on concrete with the proposed aggregate.

H. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Aggregates and sand.
3. Admixtures.
4. Fiber reinforcement.
5. Curing compounds.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Vapor retarders.
10. Semi-rigid joint filler.
11. Joint-filler strips.

12. Repair materials.

I. Sustainable Design Submittals:
   1. Embodied Carbon Footprint Submittals
      a. Plant-specific Environmental Product Declaration (EPD) for each concrete mixture proposed for the project accompanying each concrete mixture submittal.
      b. A calculation showing that the Global Warming Potential (GWP) of all the concrete supplied for the project shall be lower than the GWP target set in Section 2.

J. Project Record Documents:
   1. Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
   2. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
   3. Concrete Placement: Date and time of each placement as provided in the placement schedule. Include start and end times, temperatures, humidities, and wind velocities.
   4. Test Cylinders: Cross-reference to placement record entries

1.07 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with CBC Chapter 19A.
   1. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.

B. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

C. Follow recommendations of ACI 305R when concreting during hot weather.

D. Follow recommendations of ACI 306R when concreting during cold weather.

E. Installer Qualifications: A qualified installer who employs on the Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

F. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   1. Manufacturer shall be certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities." The certificate shall indicate that the plant has automatic batching and recording capabilities such that requirements of CBC 1705A.3.3.1 are met.

G. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

H. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

I. Pre-installation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.

b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.
e. Special concrete finish subcontractor.

2. As applicable to the Work, review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures and concrete protection.

J. Mock-up
1. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish as result of formwork.
a. Panel Size: Sufficient to illustrate full range of treatment.
2. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
3. Mock-up may not remain as part of the Work.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

C. Warrant concrete floor sealer to be free from manufacturing defects for a period of 15 years. Applications completed by an approved installer in accordance with published technical data will be warranted for the suppression and control of water vapor emission, alkalinity, and relative humidity from concrete during the warranty period.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of ASTM C595/C595M for packaging and marking for cement delivery.

PART 2 PRODUCTS

2.01 GENERAL

A. Regulations: Refer to Section 01 45 33 regarding compliance with applicable codes and regulations.

B. Comply with ACI 301 and ACI 318 for interpreting design requirements of reinforced concrete.
1. Contractor shall keep a copy of ACI Field Reference Manual MNL-15(16) in the field office.

C. Comply with, regulations of the air quality management district in force at the time of the performance of the work of this Section regarding sealers and curing compounds.

D. Finish concrete surfaces shall be stable, firm, and in compliance with CBC Section 11B-403 requirements for slip resistance.
1. Concrete paving shall have a minimum slip resistance coefficient of friction of 0.6 as tested in accordance with ASTM D2047.
2. Refer to Part 3 for non-slip finish procedures at exterior concrete platforms, steps, and ramps.

E. Sloping Floors:
   1. The running slope of walking surfaces shall not be steeper than 1:20.
   2. The cross slope of walking surfaces shall not be steeper than 1:48.
   3. At plazas where there is no dominant direction of travel, and at turns, slope shall not exceed 1:48 in any direction.

2.02 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.03 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 20 00.

2.04 CONCRETE MATERIALS

A. Hydraulic Cement: Type as indicated on drawings
   1. Acquire cement for the entire project from the same source
   2. Color: Standard Gray UNO.

B. Normal Weight Aggregates: ASTM C33/C33M and CBC 1903A.5.
   1. Aggregate shall be nonreactive as determined by one of the methods in ASTM C33/C33M Appendix XI: Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate.
   2. Fine Aggregate: Washed natural sand consisting of hard particles, containing not more than the maximum limits of deleterious material allowed by Table 1 of ASTM C33/C33M.
      a. Fineness modulus shall be in the range of 2.90 to 3.10.
   3. Coarse Aggregate, Structural Concrete:
      a. Clean washed gravel or sound crushed rock, containing not more than 5 percent flat, thin, elongated, or laminated material, and containing not more than the maximum limits of deleterious material allowed by Table 3 of ASTM C33/C33M for moderate weathering regions.
         1) Grade 1-inch aggregate from No. 100 sieve to 1 inch.
         2) Grade 1-1/2-inch aggregate from No. 100 sieve to 1-1/2 inches.
      b. Maximum Size: As indicated on drawings and as noted below.
         1) Aggregate shall be no larger than:
            (a) 3/4 of the clear space between reinforcing bars or between reinforcing bars and forms
            (b) 1/5 of the narrowest dimension between sides of forms
            (c) 1/3 of the depth of slab.
         2) 3/8" aggregate may be utilized at areas of congestion only when submitted for review, indicating specifically where intended use will be, and approved by the architect.
         3) Pea Gravel shall not be used.
   4. Acquire aggregates for entire project from same source.

C. Lightweight Aggregate: ASTM C330/C330M.

D. Fly Ash: ASTM C618, Class C or F.

E. Slag Cement: ASTM C989/C989M

F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

G. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.

H. Water: ASTM C1602/C1602M; clean and not detrimental to concrete.

2.05 ADMIXTURES

A. General:
   1. Admixtures and additives shall be reviewed by architect prior to use.
   2. Admixtures and additives shall be incorporated and tested in accepted combinations and mixes
   3. Admixtures containing chlorides will not be permitted.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
   1. Manufacturers:
      a. Euclid Chemical Company; PLASTOL 6420: www.euclidchemical.com/#sle.
      b. Master Builders Solutions; MasterRheobuild 1000: www.master-builders-solutions.com/en-us
      c. Substitutions: See Section 01 66 00 - Product Delivery, Storage, and Handling.

D. Water Reducing Admixture: ASTM C494/C494M Type A.
   1. Water reduction: Not less than 5%.
   2. Increase in compressive strength: Not less than 10% at 28 days.
   3. Dry Shrinkage: Less than concrete without admixture at 21 days.
   4. Manufacturers:
      a. Euclid Chemical Company; EUCON NW: www.euclidchemical.com/#sle.
      b. Substitutions: See Section 01 25 13 - Product Options and Substitutions

E. Shrinkage Reducing Admixture:
   1. ASTM C494/C494M, Type S.
   2. Manufacturers:
      a. Euclid Chemical Company; Eucon SRA Floor: www.euclidchemical.com/#sle.
      b. Euclid Chemical Company; Eucon SRA-XT: www.euclidchemical.com/#sle.
      c. Substitutions: See Section 01 25 13 - Product Options and Substitutions

F. Plasticizer: ASTM C494/C494M , Type F

2.06 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Min 15 mils thick, reinforced high density polyethylene sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
   1. Water Vapor Permeance: 0.02 Perms maximum, in accordance with ASTM E154/E154M Section 7.
   2. Puncture Resistance: 2200 grams minimum, in accordance with ASTM D1709 Method B.
   3. Tensile Strength: 45 lbf/in minimum, in accordance with ASTM E154/E154M Section 9, Method ASTM D882.
   4. Installation: Comply with ASTM E1643.
   5. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   6. Manufacturers: Comply with ASTM C755
      a. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
      b. Stego Industries, LLC: www.stegoindustries.com/#sle.
      c. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com/#sle.
      d. Substitutions: See Section 01 25 13 - Product Options and Substitutions

B. Subslab Waterproofing (At Floor Slabs Subject to Minor Hydraulic Moisture Pressures): Vapor barrier under slab on grade with hydraulic moisture pressures or wet soils.

1. Reinforced high density polyethylene (HDPE), mylar geomembrane, or 1/8-inch thick pre-molded membrane having the following minimum properties:
   a. Water Vapor Permeance: 0.005 Perms maximum, in accordance with ASTM E96/E96M.
   b. Water Vapor Barrier Classification: Class A, in accordance with ASTM E1745.
   c. Puncture Resistance: 2400 grams minimum, in accordance with ASTM D1709 Method B.
   d. Tensile Strength: 70 lbf/in minimum, in accordance with ASTM E154/E154M Section 9, Method ASTM D882.
2. Accessory Products: Provide vapor proofing mastic, pipe boots, and related accessory products recommended by manufacturer of vapor retarder.
3. Manufacturers: Comply with ASTM C755.
   a. Alumiseal Corporation; Alumiseal Zero Perm Vapor Barrier.
   b. Reef Industries; Griffolyn VAPORguard.
   c. Stego Industries, LLC; Stego Wrap 15-Mil Class A Vapor Barrier.
   d. Substituitions: See Section 01 25 13 - Product Options and Substitutions
4. Seam Tape:
   a. High density reinforced polyethylene vapor retarding seam tape with pressure sensitive adhesive as recommended by manufacturer of vapor retarder/barrier. Minimum 6 inches in width and of a contrasting color.
5. Non-Shrink Cementitious Grout:
   a. Non-Shrink Grout: Prepackaged, non-metallic, non-gaseous, aggregate grout complying with ASTM C1107/C1107M. Contractor shall select type for each special application as recommended by manufacturer.
   b. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: As indicated on the Contract Drawings.
   c. Flowable Products:
      1) Euclid Chemical Company; NS GROUT: www.euclidchemical.com/#sle.
      2) Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com/#sle.
      3) The QUIKRETE Companies; QUIKRETE® Exterior Use Anchoring Cement: www.quikrete.com/#sle.
      4) Substitutions: See Section 01 60 00 - Product Requirements.
   d. Low-Slump, Dry Pack Products:
      1) Euclid Chemical Company; DRY PACK GROUT: www.euclidchemical.com/#sle.
      2) Five Star Products, Inc; Five Star Grout: www.fivestarproducts.com/#sle.
      3) The QUIKRETE Companies; QUIKRETE® FastSet™ Non-Shrink Grout: www.quikrete.com/#sle.
      4) Substitutions: See Section 01 25 13 - Product Options and Substitutions.
6. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
   a. Minimum Compressive Strength at 7 days, ASTM C579: 12,000 pounds per square inch.
   b. Manufacturers:
      1) Euclid Chemical Company; E3-DEEP POUR: www.euclidchemical.com/#sle.
      2) Five Star Products, Inc; Five Star DP Epoxy Grout: www.fivestarproducts.com/#sle.
      3) Five Star Products, Inc; Five Star HP Epoxy Grout: www.fivestarproducts.com/#sle.
      4) Substitutions: See Section 01 25 13 - Product Options and Substitutions.
7. Patching Mortar:

a. Provide Polymer modified portland cement mortar. Compressive strength shall equal or exceed compressive strength of substrate concrete.
b. Mortars shall conform to ASTM C928.
c. Manufacturers:
1) Horizontal Application:
(a) Durapatch Industrial, manufactured by L&M Construction Chemicals.
(b) Embeco R310, manufactured by BASF Admixture Systems.
(c) ProSpec Vinyl Concrete Patch, as manufactured by Bonsal American.
2) Vertical and Overhead application: equal to:
(a) Durapatch VOH, manufactured by L&M Construction Chemicals.
(b) Emaco R350, manufactured by BASF Admixture Systems.
(c) ProSpec Vertical Leveling Mortar, as manufactured by Bonsal American.

8. Floor Leveling Compound: Two-part acrylic polymer latex concrete with compressive strength as tested by ASTM C109/C109M equal or greater than substrate concrete compressive strength.
a. Manfacturers:
1) Ardex; K-15.
2) L&M Construction Chemicals; Levelex.
3) Maxxon Corporation; Level-Right Plus.
4) Substitutions: See Section 01 25 13 - Product Options and Substitutions.
9. Floor Patching Materials:
a. Patching Materials shall match or exceed compressive strength of the substrate concrete.
1) Interstate Epoxy Patching Compound.
2) Sakrete Fast Setting Cement Patcher.
3) ProSpec Floor Patch Pro, manufactured by Bonsal American.
10. Skim Coat: Blended compound of portland cement, graded silica aggregates, and special chemical additives formulated for bonding, smoothing, rubbing, and thin coating concrete surfaces.
a. Pavecrete manufactured by Lyons Manufacturing or Rapid Set WunderFixx manufactured by CTC Cement.
b. Bonding Agent: Manufacturer's Type II acrylic bonding agent, when applicable. Do not use PVA Type I bonding agents.
c. Pigment: SGS ColorFlo Liquid iron oxide color pigments, as manufactured by Solomon Colors, or equal, in accordance with ASTM C 979.
d. Admixture: Chromix-L manufactured by L.M. Scofield Products, or equal product manufactured by Davis Colors.
11. Isolation Joint Sealant: Provide polyurethane type compatible with fiber joint filler.

2.07 BONDING AND JOINTING PRODUCTS

A. Chemical Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II. Agent shall be freeze-thaw resistant and suitbable for brush or spray application.
1. Manufacturers:
a. Euclid Chemical Company; AKKRO-7T: www.euclidchemical.com/#sle.
b. Larsen Products Corp.; Weldcrete.
c. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com/#sle.
d. W. R. Meadows, Inc; ACRY-LOK-: www.wrmeadows.com/#sle.
e. Substitutions: See Section 01 25 13 - Product Options and Substitutions

B. Waterstops: Rubber, complying with COE CRD-C 513.

1. Configuration: As indicated on drawings.
2. Size: As indicated on drawings.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.08 CURING AND SEALING MATERIALS

A. Floor Liquid Curing Compound Type FCC: For use on concrete slabs that will be exposed with separately applied floor sealer finish, or on slabs that will be covered by breathable floor coverings or mortar beds.
   1. Compound shall be a water-based non-staining dissipating, translucent resin, conforming to ASTM C309, Type 1, Class B.
      a. Sodium silicate compounds will not be permitted.
   2. Product shall be compatible with subsequently applied toppings (sealers, hardeners, finishes, or coverings).
   3. Manufacturers:
      a. Euclid Chemical Co,; Kurex Vox.
      b. L&M Construction Chemicals; L&M Cure R.
      c. Sonneborn Building Products; Sonosil.
      d. W.R. Meadows; Sealtight 1100 Clear.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions

B. Curing Barriers:
   1. Waterproof Curing Paper: Conform to ASTM C171, non-staining reinforced type.
      a. Manufacturer:
         1) Fortifiber Corporation; Orange Label Sisalkraft.
   2. Reinforced Curing Barriers: Transguard 4000 manufactured by Reef Industries or equal.

C. Floor Remedial Vapor Emission and Alkalinity Control Sealer Type FCS: For remedial use on concrete slabs on grade that do not meet manufacturer's specific moisture emission and alkalinity limits for non-breathable floor finishes.
   1. Manufacturers:
      a. Sinak Corporation; Sinak VC5: www.sinak.com.
      b. Bonsal American; ProSpec Moisture Guard Max.
      c. Synthetics International; Synthetic30 two-component liquid-applied, waterborne polymer-based ultra-low viscosity clear sealer. www.syntheticsintl.com.
      d. Substitutions: See Section 01 25 13 - Product Options and Substitutions

D. Floor Sealer Finish Type FSF: For general use at exposed concrete slab areas for appearance.
   1. Design is based on the use of high solids, minimum 25% non-yellowing water-based acrylic cure/sealer conforming to ASTM C309, Type 1, Class B and ASTM C1315, Type 1, Grade B, low VOC compliant meeting all local air quality regulations.
   2. Product shall be in compliance with volatile organic compounds (VOC) content limits required by air quality management district at the time of performance of the work.
   3. At Exposed Concrete Surfaces at Garage Areas:
      a. Compound shall be a water-based non-staining dissipating, translucent resin, conforming to ASTM C309, Type 1, Class B.
   4. Sodium silicate compounds will not be permitted.
   5. Manufacturers:
      a. Euclid Chemical Co.; Euclid Aqua Cure VOX Super.
      b. L&M Construction Chemicals; Dress & Seal WB30.

c. W.R. Meadows; VOComp 25.
d. Sinak Corporation; HLQ-125.
e. Substitutions: See Section 01 25 13 - Product Options and Substitutions

E. Wall Sealer and Water Repellent Finish Type WSR: For general use at exposed concrete wall surfaces in Restrooms for code compliance.
1. Design is based on the use of a modified neat silane repellent system offering invisible protection and low volatility combined with water and oil repellency on concrete substrates to prevent staining by waterborne and oily substance.
2. Product shall be in compliance with volatile organic compounds (VOC) content limits required by air quality management district at the time of performance of the work.
3. Manufacturers:
a. Miracle Sealants Co.; 511 Impregnator.
b. Prosoco, Inc.; Stand Off SLX100 Water & Oil Repellent.
c. Substitutions: See Section 01 25 13 - Product Options and Substitutions

2.09 CONCRETE MIX DESIGN

A. Global Warming Potential (GWP) Limit: As Indicated, per mix
1. Exception: Concrete may be considered one product category. A weighted average of the maximum GWP for all concrete mixes installed in the project shall be less than the weighted average maximum GWP specified on the structural drawings. Calculation shall be submitted to the Architect (Engineer) for approval

B. Mix design shall be stamped and signed by a professional engineer licensed in the State of California.

C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

D. Proportioning Structural Lightweight Concrete: Comply with ACI PRC-213 recommendations.

E. The proportioning of ingredients shall be such that the concrete can be readily worked into forms and around reinforcement under the conditions of placement to be used, without segregation or excessive bleeding.

F. Concrete Compressive Strengths: Provide compressive strengths as noted on drawings, when tested in accordance with ASTM C39/C39M at 28 days.
1. Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
a. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

G. Fly Ash or other pozzolans Content: Maximum 25 percent of cementitious materials by weight.

H. Total of fly ash or natural pozzolans and silica fume: Maximum 35 percent by weight.

I. Total of fly ash or natural pozzolans slag cement and silica fume: Maximum 50 percent by weight.

J. Water-Cementitious Material Ratio: As indicated on the Contract Drawings
1. Slabs-on-Grade: Water to cement content shall not exceed a ratio of 0.42 upon delivery at site.
2. Other Concrete Not in Contact with Soils: Water to cement content shall not exceed a ratio of 0.45 upon delivery to site.

K. Maximum Slump: As indicated on the Contract Drawings

L. Accurately control the proportions, water content, and air content. Use weighing equipment accurate to within 1 percent for cement and 2 percent for aggregates, and adjustable for varying aggregate moisture content. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.

1. Proportion concrete by weight of loose, dry material.
2. Fine aggregate volume shall be at least 35 percent of the sum of the separate fine and coarse aggregate volumes.

M. Admixtures: Admixtures may only be used if they are incorporated into the accepted concrete mix designs and testing. Where admixture is proposed for use by concrete supplier, conform to types accepted by Architect in writing.
1. Proposed admixtures shall be as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

N. Fiber Reinforcement: Add to mix at rate indicated on drawings and in accordance to manufacturer's instructions. Provide uniform and complete distribution based on manufacturer's recommendations.

O. Tests for Concrete Materials at Batch Plant: Utilizing batch plant test records, perform the following tests in accordance with provisions of the building code:
1. Cement: Sample and test cement, or provide mill test reports, as accepted, certifying that the cement conforms to the requirements of this Specification.
2. Aggregate:
a. Sample and test concrete aggregate for grading and soundness before concrete mix designs are established.
b. Test aggregate for shrinkage characteristics in accordance with ASTM C157/C157M.
c. Conduct petrographic examinations of aggregate proposed for use in accordance with ASTM C295/C295M.
3. Air Content: ASTM C173/C173M, volumetric method or ASTM C231/C231M, pressure method. One test for each set of compressive strength test specimens.
4. Refer to "Field Quality Control" in Part 3 for testing of actual concrete mix and placement.

P. Inspection: Accompany each load of materials or concrete with a signed copy of batch plant's certificate stating quantity of each material, design strength, amount of water added at plant, admixtures, departure time and date, and maximum amount of water allowed to be added at site.

Q. Shrinkage Test:
1. Before placing any concrete, prepare a trial batch of the mix design, using the same aggregates, cement, and admixtures (if any) proposed for use on the project. Prepare at least three specimens for determining the drying shrinkage of the mix design.
2. The drying shrinkage specimens shall be 4"x4"x11" prisms, made, cured, dried, and measured as specified in ASTM C157/C157M7. Measure and report separately for 7, 14, 21, and 28 days of drying. After 7 days of moist curing. The effective gauge length of the specimens shall be 10 inches.
3. The average drying shrinkage of the test specimens after 28 days of drying shall not exceed 0.045 percent for footing and grade beams, and 0.035 percent for all other locations. Use adequate amount of shrinkage reducing admixture as required.

2.10 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M and ASTM C94/C94M.
1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 60 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

4. Colored Concrete: Add pigments in strict accordance with manufacturer's instructions to achieve consistent color from batch to batch.
5. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions.

B. Transit Mixers: Comply with ASTM C94/C94M.
1. With each load, provide ticket certifying the materials and quantities as well as compliance with the accepted mix design.

C. On the transit mix ticket, state the time water was first added to the mix.
1. At the batch plant, withhold 2-1/2 gallons of water per cubic yard of concrete.
2. Upon arrival at the job site, as directed by the Testing Laboratory Inspector, add all or part of the withheld water before the concrete is discharged from the mixer.
3. Mix concrete for not less than 5 minutes after the withheld water has been added, and not less than 1 minute of that time immediately prior to discharge of the batch.
   a. Drum shall rotate approximately 70 to 100 revolutions at a mixing speed of approximately 6 to 18 rpm.
   b. After mixing, drum shall rotate at an agitating speed of approximately 2 to 6 rpm.
   c. Unless otherwise directed, provide 15 minutes total mixing per batch after first addition of water.
4. Discharge of the concrete shall be completed within 90 minutes after water is introduced into the mix, or before the drum has completed 300 revolutions.

D. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

E. Weather Requirements:
1. Hot Weather Usage: Adjust mix as required to counteract effects of anticipated or probable hot weather on strength of concrete. Conform to recommendations of ACI 305R regarding admixtures, temperature of mixing water, and delivery times.
   a. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection and curing to prevent excessive concrete temperatures or water evaporation that may impair required strength or serviceability of the member or structure.
   b. When air temperature is between 85 degrees F. and 90 degrees F, limit mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, limit mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to performing work and placing concrete, verify:
1. Lines, levels, and dimensions before proceeding with work of this section.
2. Elevations and depressions of floor finishes
3. Final excavation required for foundations and footings prior to placing concrete.
4. Locations of proposed and future breathable and nonbreathable floor finishes in advance of placing concrete to determine type of floor sealers to be applied in finishing operations.
5. Formwork is properly located such that the unshored concrete will maintain specified tolerances after forms are removed.

3.02 PREPARATION

A. Formwork: Comply with Section 03 10 00 - Concrete Forming and Accessories.

B. Reinforcing: Comply with Section 03 20 00 - Concrete Reinforcing.

C. Verify that forms are clean and free of rust before applying release agent.

D. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

E. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning, roughening to exposed aggregate, and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use latex bonding agent only for non-load-bearing applications.

F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade over properly prepared subbase per Geotechnical recommendations. Lap joints minimum 6 inches. Tape and seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Place Slab on Grade directly on vapor retarder.
   2. Avoid grade staking through vapor retarder.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.
   1. Pour concrete in accordance with accepted pour schedule and construction joint layout.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 48 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously between predetermined construction joints per ACI and CBC requirements. Where construction joints are located, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

H. Compacting:
   1. General: Spade, rod, vibrate, and consolidate concrete in forms. Vibrators shall not be left in any one spot longer than 30 seconds and shall be kept constantly in motion. One vibrator shall be assigned to each location where concrete is being placed and a standby vibrator shall be kept ready at all times. Avoid creating rock pockets, air bubbles, honeycomb, or separation of ingredients.
   2. Work concrete thoroughly around reinforcement and embedded items and into corners and angles of forms by spading, rodding, and tamping.
   3. Consolidation: Vibrate to consolidate each layer with previously placed layers, completely embedding reinforcing and fixtures, and bringing fine material to surface of slab to produce proper finish.

I. Hot Weather Placing: Comply with recommendations of ACI 305R.

J. Cold Weather Placing: Comply with recommendations of ACI 306R.

3.04 GROUTING

A. Non-Shrink Grout: Install non-shrink grout per drawing properly beneath bearings of plates, columns, and other structural members using product recommended by manufacturer for specific application and in accordance with printed instructions.
   1. Compressive strength of grout shall be tested in accordance with ASTM C109/C109M .

3.05 CONTROL AND CONSTRUCTION JOINTS

A. Control Joints:
   1. Location: As indicated on the Contract Drawings, but not more than 20 feet on centers in both directions at exterior slabs. Limit interior slabs on grade to 400 square foot bays with length to width ratios of 1 to 1.5 maximum.
      a. Locate on column center lines and at re-entry corners wherever practical.
      b. Avoid areas receiving tile or paver floor finish.
      c. Coordinate locations with proposed floor finish joint layout.
      d. Limit length to width ratios to 1 to 1.25.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; with width and depth as indicated on drawings.
   1. Fill saw cuts in interior walkways with control joint filler specified.

E. Construction Joints:
   1. Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:
   2. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.
   3. A mix containing the same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.
   4. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.

3.06 TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS

A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.

B. Conform to requirements of ACI 117, except as modified by the requirements of these Specifications and CBC.

C. Formed Surfaces:
   1. Maintain bowing, warping, and dimensional tolerances within the maximum tolerances stated in ACI 117 for Class A surfaces.
   2. Overall Dimension for Height and Width: Plus zero to minus 3/32-inch for surfaces that are 10 feet and over.
   3. Thickness: Plus-or-minus 1/8-inch maximum.
   4. Openings: Accurate to within a tolerance of plus 1/8-inch to minus zero.
   5. Exposed Slab Edges: Free of jogs exceeding 1/8-inch.

D. Concrete Slabs: Floor finish tolerances shall be measured in accordance with ASTM E1155/E1155M and ACI 302.1R the F-Number System (Inch-Pound Units) for the following conditions:

Element	Specified Overall Value		Minimum Local Value	
	FF	FL	FF	FL
Slab-on-Grade:				
Mech and Electrical Rooms, parking structures	20	15	15	10

Carpeted	25	20	17	15
Thinset Tile, Resilient Flooring	35	25	24	17
Wood Flooring	50	35	35	35
Other not indicated	35	25	24	17

E. Verify flatness requirements in accordance with Owner's specification requirements prior to installation.

F. Suspended Slab Levelness: Where FL is not specified (unshored conditions) floors must be level, and the elevation of the top surface shall fall within a 3/4-inch envelope in accordance with ASCC Tolerances for Suspended Concrete Slabs, unless part of a sloping floor or as otherwise noted.

G. Concrete Door Sills:
   1. Slabs Under Operable Partitions or Sound-Rated Accordion Doors: 1/8-inch from level along line under partition or door.
   2. Slabs Under Roll-up Doors: 1/8-inch from level along line under partition or door.

H. Levelness tolerances shall be measured within 72 hours after slab concrete placement.
   1. Tolerances for sloped floors shall not exceed the slopes specified in "REGULARTORY REQUIREMENTS" in Part 2.

I. Owner reserves the right to test floors and concrete members for conformance to ACI 117 by Use of the Dipstick Floor Profiler. Should tolerances not be within the limits specified, the Contractor shall be required to pay the cost of the tests, as well as the repairs required to bring work into compliance.

J. Corrective Procedures: See "FILLING, LEVELING AND PATCHING."
   1. Areas requiring corrective work should be identified and submitted to Architect. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

A. Formed Concrete
   1. Surface Repairs: Repair surface defects, including defective areas and tie holes as recommended in ACI 301 Section 2 or 6.
   2. Rough-Formed Finish: Cast concrete texture imparted by form-facing material, not arranged in any specific visual manner. Repair and patch tie holes and defective areas. Rub down or chip off fins and other projections exceeding 1/4-inch in height.
      a. Apply to concrete surfaces not exposed to public view.
   3. Smooth-Formed Finish: Cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
      a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, or painting.
      b. Apply the following rubbed finish, defined in ACI 301 Section 6, to smooth-formed finished concrete.
         1) Grout-cleaned finish.
         2) Smooth-rubbed finish.
   4. Painted Finish: Entire surface area exposed to view shall be free of voids, cracks, spalls, protrusions, or non-uniform textures.
      a. Prior to sacking, prepare surfaces in accordance with Section 09 91 13 - Exterior Painting and Section 09 91 23 - Interior Painting as applicable.

b. Entire surface area of concrete exposed to view shall be repaired, resurfaced, and made ready to receive paint finish specified under Section 09 91 13 - Exterior Painting and Section 09 91 23 - Interior Painting as applicable.
   1) Resurfacing of concrete panel surfaces shall be accomplished with specified resurfacing materials in accordance with manufacturer's instructions and the preparation and application procedures of ACI 503.4.
c. Interior surfaces at window openings shall be ground smooth, resurfaced, and prepared to receive sealants.
   1) Resurface concrete sills, jambs, and heads with specified resurfacing, patching, and finishing materials in accordance with manufacturer's instructions.
      (a) Interior surfaces at openings shall be ground smooth, resurfaced, and prepared to receive sealants.
d. Finish repaired surfaces with primer and two coats of paint finish as specified under Section 09 91 13 - Exterior Painting and Section 09 91 23 - Interior Painting as applicable.

5. Related Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
6. Electrostatic Coatings: Install in accordance with manufacturer's printed instructions.
7. Patching and Skim Coating: Refer to "FILLING, LEVELING AND PATCHING."

B. Flatwork
1. Screeding: Work out irregularities and bring surfaces to true finish grade or elevation. Remove excess water and debris worked to the surface during compaction and screeding.
2. Initial Troweling:
   a. Do not commence troweling until surface water sheen has disappeared.
   b. Use wood bullfloats to open top of slab to allow bleed water out.
   c. Do not use metal floats.
   d. Do not apply dry cement, sand, or water to surface.
   e. Slabs to Receive Mortar-bed with Topping or Bonded Finish: Upon completion of pour, and before concrete has hardened, texture surface of slab with stiff broom, or roughen surface.
   f. Slabs to Receive Crack Isolation Membrane or Mortar-bed with Cleavage Membrane: Finish slabs with typical smooth troweled surface.
3. Final Troweling:
   a. Interior Slabs: Steel trowel and burnish.
      1) Do not finish slab until bleed water has evaporated.
      2) Do not apply water to the concrete during finishing.
      3) Do not allow rainwater to stand on slab.
   b. Sills and Other Weather Surfaces: Smooth trowel and burnish. Finish external angles uniform and tooled.
   c. Sealer: Where specified, apply in accordance with the requirements of Section 033511.
4. Finish for Interior Stairs:
   a. Sprinkle abrasive aggregate uniformly on unhardened surface immediately prior to finishing, at the rate of 2 pounds per square yard. Work into surface during finishing. Rub lightly to expose abrasive aggregate while concrete is green.
   b. Concrete walking surfaces shall have a minimum slip resistance coefficient of friction of 0.6 as tested in accordance with ASTM D 2047.
   c. Stairs: Apply grooves and tooled edges to tread nosing in accordance with the Contract Drawings.
      1) Provide medium broom finish.

d. Warning Stripes: Apply 2-inch wide warning stripe of 70 percent contrasting color at top and bottom nosing of each run at interior stairs, 1 inch maximum from edge of nosing.
e. Pedestrian, General:
    1) Provide medium broom finish.
    2) Medium acid etch finish.

5. Float Finish:
    a. After screeding, consolidating, and straightening concrete slabs, do not work surface until ready for floating.
    b. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats. The application of Portland cement to slab during floating or troweling is prohibited.
    c. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and frill low spots. Repeat float passes and straightening until surface is left with a uniform, smooth, granular texture.
    d. Finish to straightedge tolerance.
    e. Cut down high areas and fill in low areas.
    f. After straightening, refloat surface to uniform, smooth, granular texture.
    g. Locations:
        1) Surfaces scheduled for trowel and broom finishes.
        2) Surfaces scheduled to receive adhered roofing or waterproofing membrane.
        3) Surfaced scheduled to receive thick-set mortar beds on cleavage membrane.
6. Trowel Finish:
    a. After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
    b. Finish to straightedged tolerance.
    c. Locations:
        1) Surfaces scheduled to receive thin-set mortar beds, resilient flooring, carpet, and wood flooring.
        2) Exposed surfaces.
        3) Surfaces scheduled to receive paint or other thin film finish coating.
7. Medium Broom Finish:
    a. Provide float finish and let set.
    b. While surface is still plastic draw medium stiff fiber bristle broom uniformly over surface to provide texture perpendicular to main traffic direction.
    c. Locations:
        1) Stair treads.
8. Heavy Broom Finish:
    a. Provide float finish and let set.
    b. Texture: While surface is still plastic, swirl stiff fiber bristle broom uniformly over level surfaces and perpendicular to main traffic direction at ramp surfaces.
    c. Locations:
        1) Parking garage areas.
9. Acid Wash: Top-Cast No. 3 Light Etch.
    a. Provide acid containment area and comply with CAL OSHA for application and cleanup.
    b. First Wash: Three days after pour.
    c. Second Wash: Three weeks after first application.

d. Third Wash: At time of final completion of Project.
e. Appearance: Slab surfaces shall exhibit an aggregate exposure of fine aggregate particles constituting not less than 60 percent and not more than 80 percent of the surface, as directed by Architect. Exposure shall be of sufficient depth to provide a surface profile of between 1/16-inch and 3/16-inch.

10. Electrostatic Control Coating: Install in accordance with manufacturer's recommendations.

C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.08 SEALING

A. Formed Concrete Surface:
1. Interior Vertical Surfaces: Where indicated on Contract Drawings, treat vertical surfaces of interior exposed formed concrete with specified sealer finish Type WSR.
a. Apply protective treatment in saturating applications without atomizing the product. Use enough to thoroughly wet the surface and create a slight rundown below the spray pattern. Apply uniformly. Don’t over apply.
1) Provide two applications of protective treatment at exposed concrete toilet room wall locations. Apply the second coat within a few minutes after the first coat has penetrated and appears dry; do not atomize the product during application.
b. Brush heavy runs and drips thoroughly into the surface.
c. Protect treated surfaces from contact or by water or for 4 hours.
2. Exterior Vertical Surfaces: Where indicated on Contract Drawings, treat vertical surfaces of exterior exposed formed concrete with sealer in accordance with specified sealer finish Type FSF.

B. Flatwork
1. Grind and clean floors prior to sealing.
2. Sealer/Dustproofer:
a. Prepare substrates and spray apply curing sealer in accordance with manufacturer's directions.
b. Locations:
c. Mechanical rooms, main trash room, electrical rooms, and telephone rooms.
d. Other locations where indicated or scheduled in Contract Drawings.
3. Penetrating Sealer:
a. Sealed Concrete Type SC2: Polish with clear finish in accordance with Section 03 35 13 - High-Tolerance Concrete Floor Finishing.

3.09 CURING

A. Comply with requirements of ACI 308R and ACI 318. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
1. Normal concrete: Not less than seven days.

C. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.

D. Surfaces Not in Contact with Forms:
1. Curing Compound: Cure by completely and uniformly applying liquid curing compound in accordance with manufacturer's printed instructions. Apply at least two coats at right angles to each other.

a. Reapply curing membrane at saw cut joints and at exposed edges of slab after removal of forms.
b. Omit curing compound and use moisture curing where required to provide floor sealer.
c. Omit curing compound where curing/sealing compound specified provides a concurrent curing function and is applied at the time of concrete placement appropriate to such function.
d. Slabs and floors to receive adhesive-applied flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.

2. Continuous Moisture: Cure by keeping concrete continuously wet for a period of at least 7 days after pouring in accordance with ACI 308R and ACI 318 for curing interior slabs to receive flooring finishes. During periods of high temperature, low humidity, or wind, wet concrete as often as required to keep concrete continuously moist for a period of at least 10 days. Cover with waterproof curing paper or reinforced vapor retarder, maintaining a film of water.
3. Final Curing: Begin after initial curing but before surface is dry.

E. Ambient Conditions:
1. Hot Weather Curing:
2. Conform to recommendations of ACI 305R regarding curing of concrete flatwork in hot weather.

3.10 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed testing agency.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Testing:
1. Sample fresh concrete in accordance with ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M.
2. Slump: Test will be performed in accordance with ASTM C143/C143M. One test will be made for each concrete load at point of discharge and one test for each set of compressive strength test specimens.
3. Concrete Temperature: Test will be taken hourly when air temperature is 40 degrees F or below, and when 80 degrees F or above, and each time a set of compression test specimens is made.
4. Curing: Cure specimens in accordance with ASTM C31/C31M.
5. Frequency of Compressive Strength Testing: Test will be made in accordance with ASTM C39/C39M, ACI 318, CBC Chapter 19, and Table 1705.3.
a. Test one set of four cylinders for each concrete class placed in any one day for each 50 cubic yards or fraction thereof, or for each 2000 square feet of surface area placed. One specimen will be tested at 7 days, two at 28 days, and:
1) When frequency of testing will provide less than five strength tests for a given class of concrete, testing from at least five randomly selected batches, or from each batch if fewer will be conducted.

b. If the average of strength tests of all strength tests of a given class of concrete equals or exceeds the specified strength at 28 days, with no individual strength test less than 500 psi below that specified, the strength level of concrete will be considered satisfactory.
c. Retain one cylinder for testing at 56 days if 28-day test fails.

E. Moisture Vapor Emission Testing: After concrete slabs have cured and prior to installation of finish flooring materials, verify that moisture content and alkali content of concrete slabs do not exceed limits acceptable to manufacturer of flooring materials.
1. Testing Equipment: Test methods based on ASTM F2170 using RH meters and testing kits equal to AMT Moisture/Relative Humidity Meter manufactured by American Moisture Test, Inc., or equivalent by Vaprecision Testing Systems may be used at testing agency's option except at concrete floors with exposed or polished finish.
2. Alkalinity: Concrete pH test using calibrated digital 1-14 wide range pH meter equal to PH100 to determine alkalinity level in accordance with ASTM F710. Paper and pencil type tests are not acceptable.
3. Calcium Chloride Testing: After building air conditioning has been in operation for at least 15 days, calcium chloride and pH testing kits may be used: Prepackaged test kit of commercial consistency, equipped with a sealed dish of anhydrous calcium chloride, a metering dome with butyl rubber gasket and instructions for implementation. Weigh dishes on site prior to installation. Conform with requirements of ASTM F1869.

F. Vapor Emission and Alkalinity Testing:
1. Perform vapor emission and alkalinity testing and take appropriate action based on results in relation to finish floor manufacturer's moisture and alkalinity requirements.

3.11 FILLING, LEVELING AND PATCHING

A. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired, or as directed by Architect.
1. High spots shall be honed, or ground with power-driven machines to required tolerances with approval from Architect.
2. Low spots shall be filled with floor leveling compound, installed in accordance with manufacturer's written recommendations.

B. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

C. Patching Exposed Concrete: After flushing with water, pack tie wire, nail, bolt, and core sample holes which will be exposed as soon as possible after form removal. Grout and repair rough pockets, cracks, or honeycomb. If patches are required, chip defective areas to a uniform depth of at least 1 inch with sides at right angles to surface.
1. Match surrounding concrete surfaces in color and texture. Make trial patch to determine color match. Before applying, moisten surrounding concrete and apply specified bonding compound.
2. Smooth Formed Concrete: Grind off ridges, offsets, and other prominent marks of smooth formed concrete while concrete is green and grind smooth. Sack exposed concrete surfaces.
a. Painted concrete shall be considered as being exposed.
3. Patch defects deeper than 1/2-inch in panels with specified patching material and methods deemed by the Architect as the appropriate method to correct such defects.

D. Skim Coating: Where sack and patch is noted on Contract Drawings, apply to architectural formed cast-in-place concrete walls in accordance with manufacturer's instructions.
1. New concrete must be cured 28 days.

2. pH must be verified prior to skim coating application to determine if primer needs to be applied, as required by manufacturer.
3. Clean concrete in accordance with ASTM D4258.
4. Mixing Skim Coat:
   a. Add to water, adding only enough to make a stiff trowelable consistency like soft putty.
   b. Add color additive.
   c. Working Time: Approximately 15 minutes.
5. Apply to walls with trowel in smooth uniform coat in continuous operations to maintain a uniform shade.
6. Patching: Broad deep areas in concrete surface shall be filled with skim coat material in accordance with manufacturer's directions prior to application of skim coat. Where surfaces are shiny smooth, apply manufacturer's Type II bonding agent.

E. Patching Unexposed Concrete: Ridges, offsets, and other prominent marks need not be ground off, cleaned, or sacked. This requirement applies to concrete areas that will be concealed by other construction.
   1. Finish below-grade concrete indicated to receive waterproofing in the same manner as exposed, smooth-formed concrete, except that surfaces need not be sacked.
   2. Patch and repair concrete slabs ready to receive future finish materials installed by Owner.

3.12 DEFECTIVE CONCRETE

A. Strength
   1. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
   2. If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.
   3. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective and shall be evaluated by Architect and replaced or adequately strengthened in a manner acceptable to the Architect and DSA.
   4. Test Cores: Should required test cylinders fail to show minimum design compressive strength, take test cores at locations coordinated with the Architect.
      a. If results show compressive strength to be less than design stress, concrete shall be deemed defective and shall be replaced in a manner acceptable to the Architect and DSA.
      b. If results show compressive strength to conform to design stress, grout solid coring holes with grout exceeding design compressive strength and finish to match adjacent surface.

B. Concrete Work that is not formed as indicated, is not true within tolerances of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, cracked, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.

C. Concrete substrates for non-breathable floor finishes that indicate by testing excess quantities of moisture and alkalinity shall require remedial measures, as specified in this Section.

D. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing, including patching for cores, shall be borne by Contractor when defective concrete is identified.

E. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.13 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

B. Wash and clean flatwork surfaces. Leave free from oil, paint, plaster, form coating, and other foreign substances, ready to receive scheduled finishes.

3.14 PROTECTION

A. Protect the Work of this section until Substantial Completion.

B. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 05 05 13
SHOP-APPLIED COATINGS FOR METAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory-applied, heat-cured coating systems for metal substrates.

1.02 RELATED REQUIREMENTS

A. Section 09 91 13 - Exterior Painting: For shop and field applied air-cured paint for steel substrates.

1.03 DEFINITIONS

A. Coil Coating: Coating system applied in liquid form to continuous flat metal stock. The finished metal is wound into a circular coil for later fabrication by others. This is a type of pre-painting.

B. Extrusion Coating: Coating system spray-applied to extruded components, flat metal that is too thick to be coil coated (greater than 0.080 inches), and decorative metal with voids and other openings. This is a type of post-painting. Extrusion coatings can be both liquid and powder form.

C. Mica Finish: Utilizes mica, a naturally occurring mineral, which provides a pearlescent appearance. Mica powder provides better color consistency than metal flakes.

D. Metallic Finish: Utilizes metal flakes for a sparkle appearance.

E. Barrier Coat: Used in a four-coat system only, to protect the prime coat below from UV damage.

1.04 REFERENCE STANDARDS

A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

D. ASTM D523 - Standard Test Method for Specular Gloss; 2014 (Reapproved 2018).

E. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2022.

F. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.

G. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.

H. ASTM D7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals; 2022.

1.05 SUBMITTALS

A. See Section Section 01 33 00 - Submittals.

B. Refer to submittals in other Sections which specify finishes in this Section.

C. Maintenance Materials: Where field repair of shop-applied coating is acceptable, provide container of material to perform minor corrective work.

D. Qualification Statement: For installer.

1.06 COORDINATION

A. Coordinate substrates and shop-applied coating systems. Where items are indicated to match coatings selected for other items, adjust formulations as required to achieve match.

1.07 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Applicator Qualifications: Coating manufacturer's certified applicator equipped and trained for application of coatings, and approved to provide warranty specified.

1.08 DELIVERY, STORAGE & HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver, unload, and store coated items so that they remain free of damage and deformation. Package and protect items during shipping and handling. Protect stored items from water. Keep coated items out of contact with materials that may adversely affect the coating.

C. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.09 WARRANTY

A. See Section 01 78 36 - Warranties.

B. Contractor to provide Single Source Specimen Warranty (color, chalk, and fade), as provided by Coating Manufacturer, as part of Total System Executed Warranty (corrosion, adhesion) as provided by end manufacturer for both coil and extrusion products.

C. Special Coating Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which coatings do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Superior Coatings (AAMA 2605) Warranty Period: 20 years from date of Substantial Completion.
   3. High-Performance Coatings (AAMA 2604) Warranty Period: 10 years from date of Substantial Completion.
   4. Pigmented Coatings (AAMA 2603) Warranty Period: 1 year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Coatings in this Section are divided into three performance levels, from highest to lowest, as defined by organization standards and supported by manufacturer's warranty:
   1. Superior.
   2. High-Performance.
   3. Pigmented.

B. Refer to referenced standards for additional performance requirements not listed here.

C. Superior Coatings:
   1. Warrantied Substrates:
      a. Aluminum extrusions (AAMA 2605).
      b. Aluminum coil (AAMA 2605 Appendix).
      c. Galvanized steel coil (AAMA 2605).
   2. Minimum Performance Requirements:
      a. Test Duration: 4,000 hours.
      b. Dry Film Thickness (ASTM D7091): 1.2 mils minimum.
      c. Abrasion Resistance (ASTM D968): Coefficient of 40 minimum.
      d. Color Retention (ASTM D2244): Maximum of 5 Hunter units of color change.
      e. Chalk Resistance (ASTM D4214): No more than No. 8 rating for color, No. 6 rating for whites, after 10 years.
      f. Gloss Retention (ASTM D523): More than 50 percent retention after 10 years.

D. High-Performance Coatings:
   1. Warrantied Substrates:
      a. Aluminum extrusions (AAMA 2604).
      b. Aluminum coil (AAMA 2604 Appendix).
   2. Minimum Performance Requirements:
      a. Test Duration: 3,000 hours.
      b. Dry Film Thickness (ASTM D7091): 1.2 mils minimum.
      c. Abrasion Resistance (ASTM D968): Coefficient of 20 minimum.
      d. Color Retention (ASTM D2244): Maximum of 5 Hunter units of color change.
      e. Chalk Resistance (ASTM D4214): No more than No. 8 rating for color after 5 years.
      f. Gloss Retention (ASTM D523): Minimum 30 percent retention after 5 years.

E. Pigmented Coatings:
   1. Warrantied Substrates:
      a. Aluminum extrusions (AAMA 2603).
      b. Aluminum coil (AAMA 2603 Appendix).
   2. Minimum Performance Requirements:
      a. Test Duration: 1,500 hours.
      b. Dry Film Thickness (ASTM D7091): 0.8 mils minimum.
      c. Color Retention (ASTM D2244): Slight change allowed.
      d. Chalk Resistance (ASTM D4214): Slight change allowed.
      e. Gloss Retention (ASTM D523): Slight change allowed.

2.02 MANUFACTURERS

A. Manufacturers:
   1. AkzoNobel.
   2. Sherwin Williams (formerly Valspar).

3. PPG.
4. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Single Source: For each coating system, provide all components of system from same manufacturer.

2.03 SHOP-APPLIED COATINGS, GENERAL

A. Comply with coating manufacturer's written instructions for cleaning, conversion coating, applying, and baking finish.

B. UV-Stable Primers: For finish coats that are transparent, translucent, iridescent, and metallic, provide UV-stable primer to protect coating system integrity.

C. Gloss: As selected by Architect from manufacturer's range for specific system, typical.

D. Clear coat: Optional protection to color coat, except for metallic flake or as another barrier coat that can easily be rinsed with fresh water to eliminate salt residue or used to improve chalk and fade resistance.

2.04 SUPERIOR COATINGS (AAMA 2605)

A. 70 percent PVDF Fluoropolymer, Two-Coat: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.
   1. System Components: Primer and PVDF color coat.
   2. Extrusion Products:
      a. AkzoNobel; Trinar Ultra.
      b. PPG; Duranar.
      c. Sherwin Williams; Fluropon.
   3. Coil Products:
      a. AkzoNobel; Trinar Ultra.
      b. PPG; Duranar.
      c. Sherwin Williams; Fluropon.
   4. Basis of Design Colors:
      a.
   5. Gloss: As selected from manufacturer's full range.

B. 70 percent PVDF Mica Fluoropolymer, Two-Coat: Fluoropolymer finish with suspended mica, and containing not less than 70 percent PVDF resin by weight in color coat.
   1. System Components: Primer, PVDF color coat with mica.
   2. Extrusion Products:
      a. AkzoNobel; Tri-Escent II.
      b. PPG; Duranar Sunstorm.
      c. Sherwin Williams; Fluropon Classic II.
   3. Coil Products:
      a. AkzoNobel; Tri-Escent II.
      b. PPG; Duranar Sunstorm.
      c. Sherwin Williams; Fluropon Classic II.
   4. Basis of Design Colors:
      a.
   5. Gloss: As selected from manufacturer's full range.

C. 70 percent PVDF Metallic Fluoropolymer, Three-Coat: Fluoropolymer finish with suspended metallic flakes, and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
   1. System Components: Primer, PVDF color coat with metallic flakes, and PVDF clear coat.
   2. Extrusion Products:

a. AkzoNobel; Trinar TMC.
b. PPG; Duranar XL Metallic.
c. Sherwin Williams; Fluropon Classic.

3. Coil Products:
a. AkzoNobel; Trinar TMC.
b. PPG; Duranar XL Metallic.
c. Sherwin Williams; Fluropon Classic.

4. Basis of Design Colors:
a.

5. Gloss: As selected from manufacturer's full range.

D. Powder Coating, One-Coat: Fluoropolymer finish containing resin and solar-reflective, metal-oxide pigments.
1. System Components: Color coat.
2. Extrusion Products:
a. AkzoNobel; Interpon D3000.
b. PPG; Coraflon Powder.
c. Sherwin Williams; Powdura OneCure.

3. Basis of Design Colors:
a.

4. Gloss: As selected from manufacturer's full range.

E. Powder Coating, Mica, One-Coat: Fluoropolymer finish containing resin with suspended mica, and solar-reflective metal-oxide pigments.
1. System Components: Color coat with mica.
2. Extrusion Products:
a. AkzoNobel; Interpon D3000.
b. PPG, Coraflon Sunstorm Powder.

3. Basis of Design Colors:
a.

4. Gloss: As selected from manufacturer's full range.

2.05 HIGH-PERFORMANCE COATINGS (AAMA 2604)

A. 50 percent PVDF Fluoropolymer, Two-Coat: Fluoropolymer finish containing not less than 50 percent PVDF resin by weight in color coat.
1. System Components: Primer and PVDF color coat.
2. Extrusion Products:
a. AkzoNobel; Alum-A-Star 50.
b. PPG; Acrynar.
c. Sherwin Williams; Acroflur.

3. Basis of Design Colors:
a.

4. Gloss: As selected from manufacturer's full range.
5. Locations:
a. Interior exposed aluminum for aluminum framing systems.

2.06 FIELD TOUCH-UP MATERIAL

A. Field Touch-Up Material: Field-applied, air-dry system recommended by coating manufacturer for substrate and location.

2.07 FACTORY AND SHOP FINISHING

A. Pretreatment: Mechanically clean and chemically pre-treat fabricated items in accordance with coating manufacturer's requirements and AAMA requirements for finish indicated.

B. Apply primer and finish coats in accordance with coating manufacturer's requirements for finish indicated.

C. Thermally cure coating immediately following application.

D. Process coil coatings in one production run for metallic coatings.

E. Surface Appearance: Cured coating must be visibly free from flowlines, streaks, blisters and other surface imperfections on exposed surfaces.
   1. Surfaces shall have no signs of mill finish aluminum or galvanized material showing.
   2. No rack or gripper marks caused by the finishing process on exposed aluminum surfaces will be permitted.

PART 3 EXECUTION

3.01 EXAMINATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Examine finished metal products to confirm no damage has occurred.
   1. Damaged products that cannot be fixed by field touch-up, to the satisfaction of the Architect, will be rejected.

3.02 REPAIR AND TOUCH-UP

A. Repair with coating manufacturer's recommended products or system.

B. Apply to all minor areas of exposed metal due to scratches, abrasions, in-field end cuts or of the like typically occurring during transit or installation of product, to ensure protection of the metal substrate.

3.03 PROTECTION

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Provide barrier or other delineation to prevent damage to installed Work from subsequent construction activities.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.
B. Non-structural dimension lumber framing.
C. Rough opening framing for doors, windows, and roof openings.
D. Sheathing.
E. Roof-mounted curbs.
F. Roofing nailers.
G. Roofing cant strips.
H. Preservative treated wood materials.
I. Concealed wood blocking, nailers, and supports.
J. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.
B. Section 06 17 33 - Wood I-Joists.
C. Section 06 18 00 - Glued-Laminated Construction.
D. Section 07 25 00 - Weather Barriers: Air barrier over sheathing.
E. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
F. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.
G. Section 07 72 00 - Roof Accessories: Prefabricated roof curbs.
H. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. The applicable version of the standards listed below shall be per Chapter 35 of Part 2 of the 2022 edition of the California Building Code (CBC), including addendums and errata. Where the standard is not listed, then the most current version of the standard shall be used or as referenced by other standards.
    1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 20.
    2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
    3. PS 1 - Structural Plywood.
    4. PS 2 - Performance Standard for Wood Structural Panels.
    5. PS 20 - American Softwood Lumber Standard.
    6. SPIB (GR) - Standard Grading Rules.
    7. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.
    8. WWPA G-5 - Western Lumber Grading Rules.A

B. American Wood Council (AWC):
   1. NDS - National Design Specification
   2. SDPWS - Special Design Provisions for Wind and Seismic
C. California Code of Regulations (CCR):
   1. CBSC, Title 24, Part 2- California Building Code (CBC), 2022 edition.
      a. Chapter 17A - Structural Tests and Inspections.
      b. Chapter 23 - Wood.
   2. CBSC, Title 24, Part 11 - California Green Building Standards Code (CALGreen), 2022 edition.
      a. Supplement 1, July 2024
D. ICC Evaluation Service, Inc. (ICC ES), a subsidiary corporation of the International Code Council:
   1. ICC ES Evaluation Reports (ESR) for Materials, Products, Methods, and Types of Construction with current report conforming to the applicable building code.
E. International Association of Plumbing and Mechanical Officials (IAPMO):
   1. IAPMO Uniform Evaluation Service (UES) Report for Materials, Products, Methods, and Types of Construction with current report conforming to the applicable building code.
F. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):
   2. Green Building Rating System.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials.
C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.
D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 ACCESSORIES

A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.03 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
b. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges provide solid edge blocking where joints occur between roof framing members.
   2. Nail panels to framing; staples are not permitted.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.09 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 74 19 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 05 13
SELECTIVE ROOF MODIFICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Limited demolition of existing roof assembly for new roof work, including new roof components and penetrations.

B. Temporary roofing.

C. Protection of roof to remain adjacent to area of Work.

D. Installation of new roofing materials at new roof components and penetrations

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Progress photographs.

B. Section 01 70 00 - Execution and Closeout Requirements: Cutting and patching.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal requirements.

B. Photographs: Of existing roof locations to be modified, and adjacent areas.

C. Product Data: For each item of temporary and permanent roofing systems to be installed.

D. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. Life cycle data.
   3. Sustainable wood data.
   4. Regional product data.
   5. Recycled content data.

E. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including but not limited to the following:
   1. Extents of Work.
   2. Direction of slope and existing drain locations.
   3. Location and alignment of new pads or supports, including new cricketing as required.
   4. Runs of new electrical, mechanical, and plumbing services and required supports on existing and new roof surfaces.
   5. Transition detail of existing to new roof assemblies.

F. Samples: Permanent roofing material.

G. Certified statement from manufacturer for existing warranted roof system, stating that existing roof warranty has not been affected by work performed under this Section.

H. Test reports.

I. Evaluation Service Reports: From ICC or similar that is acceptable under the requirements of DSA IR A-5. Show compliance with specified requirements.

J. Manufacturer's installation instructions, including preparation of existing roof to receive new materials.

K. Field Quality Control Reports: As specified in Part 3 of this Section.

L. Qualification Statement: For installer.
   1. Include certificate that installer is approved by warrantor of existing roofing system.

M. Warranty.

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Installer: Approved by warrantor of existing roofing system to work on existing roofing.

B. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
   1. Convene minimum 2 weeks before starting work of this Section.
   2. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   3. Review methods and procedures related to Work of this Section, including, but not limited to, the following:
      a. Work preparation, including roofing system manufacturer's written instructions.
      b. Temporary protection requirements for existing roofing system components that are to remain.
      c. Existing roof drains and roof drainage during each stage of Work, and roof-drain plugging and plug removal.
      d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
      e. Existing roof deck conditions requiring Architect notification.
      f. Condition and acceptance of existing roof substrate for reuse.
      g. Structural loading limitations of roof substrate during reroofing.
      h. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect Work.
      i. HVAC shutdown and sealing of air intakes.
      j. Governing regulations and requirements for insurance and certificates if applicable.
      k. Existing conditions that may require Architect notification before proceeding.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 FIELD CONDITIONS

A. Weather Limitations: Proceed with Work of this Section only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
   1. Remove only as much roofing in one day as can be made watertight in the same day.

B. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
   2. Hazardous materials will be removed by Owner under a separate contract.

C. Owner will occupy portions of building immediately below reroofing area.
   1. Conduct reroofing so Owner's operations are not disrupted.
   2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
   3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.

D. Protect building, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from Work of this Section.

1.08 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during Work of this Section, by methods and with materials so as not to void existing roofing system warranty.
   1. Notify warrantor before proceeding with the Work.
   2. Notify warrantor of existing roofing system on completion of Work, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect.
      a. Submit documentation at Project closeout.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

D. Sustainable Wood: Products in this Section to meet sustainable wood requirements specified in Section 01 60 00.

E. Regional Content: Products in this Section to meet regional requirements specified in Section 01 60 00.

F. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 TEMPORARY PROTECTION MATERIALS

A. EPS Insulation: ASTM C578.

B. Plywood: DOC PS 1, Grade CD, Exposure 1.

C. OSB: DOC PS 2, Exposure 1.

2.03 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

2.04 NEW ROOFING MATERIALS

A. Use roofing materials matching existing roofing assembly, unless otherwise indicated and approved by existing roofing material manufacturer.

B. New low-slope roofing materials may include:
   1. Vapor barrier.
   2. Insulation.
   3. Cover board.
   4. Membrane.
   5. Liquid membrane.
   6. Prefabricated components.
   7. Sheet metal flashing.

2.05 AUXILIARY ROOFING MATERIALS

A. General: Use auxiliary materials recommended by roofing system manufacturer for intended use and compatible with components of existing roofing system.

PART 3 EXECUTION

3.01 EXAMINATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Before commencement of work of this Section, take photographs of areas of Work, and areas adjacent. See Section 01 7000 for additional information.

C. Check for evidence of ponding within areas of Work. Discuss with Owner and Architect and modify new roofing material installation design to promote positive drainage.

3.02 PREPARATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Protection of In-Place Conditions:
   1. Protect existing roofing system that is to remain.
      a. Loosely lay 1-inch- minimum thick, EPS insulation over existing roofing adjacent to areas of Work.
      b. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.
   2. Limit traffic and material storage to areas of existing roofing that have been protected.
   3. Maintain temporary protection and leave in place until roofing operations have been completed. Remove temporary protection on completion.
   4. Comply with requirements of existing roof system manufacturer's warranty requirements.

5. If necessary, shut off rooftop utilities and service piping before beginning the Work.
6. If necessary, coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.
7. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
    a. Prevent debris from entering or blocking roof drains and conductors.
        1) Use roof-drain plugs specifically designed for this purpose.
        2) Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
    b. If roof drains are temporarily blocked or unserviceable due to Work of this Section, provide alternative drainage method to remove water and eliminate ponding.

3.03 DEMOLITION

A. Notify Owner prior to demolition operations.

B. Removing existing roofing down to roof structure and immediately check for presence of moisture.
    1. Notify Owner and Architect if:
        a. Presence of wet or damp materials below existing roofing.
        b. Deterioration and damage to structure.
        c. Broken or loose fasteners that secure deck panels to one another or to structure.
        d. Deck appears or feels inadequately attached.
        e. Deck surface is unsuitable for receiving new Work.
        f. Structural integrity of deck is suspect.

3.04 TEMPORARY ROOFING INSTALLATION

A. Install approved temporary roofing if necessary.

B. Remove temporary roofing before installing new roofing or roof components.

3.05 NEW ROOFING INSTALLATION

A. Install new roofing materials and tie into existing roofing materials for complete watertight assembly, in accordance with manufacturer's written instructions and approved shop drawings.
    1. Extend new roofing materials onto existing roofing materials minimum 6 inches.

B. Do not exceed pot life of material as documented in writing by manufacturer.

3.06 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
    1. New roofing materials will be considered defective if they do not pass tests and inspections.
    2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
    3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
    4. Submit field quality control reports to Architect.

C. Tests:
    1. Low-Slope Roofing Electronic Leak Detection Testing.
        a. Testing agency to create a conductive electronic field over the entire installed membrane and determine locations of discontinuities or leaks, if any. Include abutting or overlapping smaller areas as necessary to cover entire installed membrane.

D. Inspections:
   1. Final Inspection: At completion of new roofing installation, review installed components with installer and manufacturer’s representative of new roof membrane.

E. Manufacturer's Representative to provide site monitoring and inspection services as specified in Section 01 4000.
   1. Manufacturer's representative to prepare site review and inspection reports and deliver to Contractor.
   2. Submit field quality control reports to Architect.

3.07 PROTECTION

A. See Section 01 66 00 - Product Delivery, Storage, and Handling, for additional requirements.

B. Protect new roof components from subsequent construction operations.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermal insulation.

1.02 RELATED REQUIREMENTS

A. Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP).

B. Section 09 81 00 - Acoustic Insulation.

1.03 DEFINITIONS

A. Mineral Fiber Material Composition: Insulation referred to as mineral fiber block, board, and blanket insulation is composed of fibers from mineral based substances such as rock, slag, or glass and processed from the molten state into fibrous form.

1. Based on type of insulation substance, the material will be referred to as a mineral fiber when having a rock or slag base, and glass fiber with a glass or silica sand base, also considered a mineral.
2. Insulation blankets are flexible units consisting of felted, bonded, or unbonded fibers formed into rolls or flat cut pieces referred to as batts; rolls are simply longer versions of batts.
3. For additional information about mineral fiber and the various classification types, refer to the following reference standards; ASTM C553, ASTM C612, ASTM C665, and ASTM C726.

1.04 REFERENCE STANDARDS

A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.

D. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2017.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

F. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

G. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Global Warming Potential (GWP): Environmental product declaration (EPD) to identify GWP less than or equal to maximum allowable value. See 014113.11 - Regulatory Requirements - Global Warming Potential (GWP) for additional information.

C. Product Data: For each item to be installed. Provide data on product characteristics, performance criteria, and product limitations.

D. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. CAL (CDPH SM) compliance data.
   2. Life cycle data.
   3. Recycled content data.
   4. VOC content restrictions data.

E. Samples for Verification: Submit three samples 6 by 6 inches in size illustrating insulation.

F. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.06 COORDINATION

A. Fire-Rated Assemblies: Confirm insulation products within fire-rated assemblies meet fire-rated assembly requirements.
   1. Substitutions will not be permitted when proprietary products are required to meet fire-rating requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.09 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 016000.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 016000.

F. All XPS insulation types to be manufactured without the use of CFCs, HCFCs, and HFC-134a blowing agent.

2.02 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Products to be identified with appropriate markings of applicable testing agency.

B. Fire-Test-Response Characteristics: Provide foam plastic continuous insulation assemblies with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

1. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed wall assembly of which foam plastic continuous insulation is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall assemblies.

2.03 REGULATORY REQUIREMENTS

A. Light- and Heavy-Density Mineral Wool Board Insulation: Global Warming Potential (GWP) less than or equal to maximum allowable value. See Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP), for additional information.

2.04 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board, 40 psi minimum.

B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board, 25 psi minimum.

C. Insulation Over Metal Stud Framed Walls, Continuous: Mineral fiber board.

D. Insulation on Inside of Concrete and Masonry Exterior Walls: Mineral fiber board.

E. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

F. Insulation in curtain wall and glazed framing systems: Foil-faced semi-rigid mineral-wool board.

G. Roof Insulation:

H. Interior Partition Acoustic Insulation: See Section 09 81 00 - Acoustic Insulation.

2.05 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
3. Thermal Resistance: R-value of 4.3 minimum at 1 inch thickness.
4. Products:
   a. Johns Manville; Mineral Wool TempControl Batts: www.jm.com/#sle.
   b. ROCKWOOL; COMFORTBATT: www.rockwool.com/#sle.

c. Thermafiber, Inc; SAFB FF: www.thermafiber.com/#sle.
d. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.06 ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
1. Application: Sealing of interior circular penetrations, such as pipes or cables.
2. Width: Are required for application.
3. Temperature Resistance: Range of minus 40 to 212 degrees F.

B. Protection Board for Below Grade Insulation: , thick.

C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.02 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.03 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Install boards horizontally on foundation perimeter.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.05 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.06 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.07 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Restrictions: Additional requirements for sealants and primers.

B. Section 08 80 00 - Glazing: Sealants installed as part of glazing assemblies.

C. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 DEFINITIONS

A. Refer to ASTM C920 for additional information.
   1. Type S: Single-component.
   2. Type M: Multi-component.
   3. Grade P: Pourable or self-leveling, for horizontal applications.
   4. Grade NS: Non-sag or gunnable, for vertical applications.
   5. Class 100/50: Accepts at least 100 percent increase and 50 percent decrease of joint width.
   6. Class 50: Accepts at least 50 percent increase and decrease of joint width.
   7. Class 35: Accepts at least 35 percent increase and decrease of joint width.
   8. Class 25: Accepts at least 25 percent increase and decrease of joint width.
   9. Class 12-1/2: Accepts at least 12-1/2 percent increase and decrease of joint width.
   10. Use T1: Designed for pedestrian and vehicular traffic areas, with a high durometer (hardness).
   11. Use T2: Designed for pedestrian and vehicular traffic areas, with a lower durometer (hardness).
   12. Use NT: Designed for non-traffic areas.
   13. Use I: Designed to be continuously submerged in liquid (immersion service).
   14. Use M: Designed for use with mortar.
   15. Use G: Designed for use with glass. See Section 08 80 00 - Glazing.
   16. Use A: Designed for use with aluminum.
   17. Use O: Designed for use on non-standard (other) substrates.

1.04 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).

C. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

H. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2025).

K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

L. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Substrates for which laboratory adhesion and/or compatibility testing is required.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. CAL (CDPH SM) compliance data.
   2. VOC content restrictions data.

D. Installation instructions, including precautions, limitations, and recommended backing materials and tools.

E. Sample product warranty.

F. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

G. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

H. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

I. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

J. Installation Plan: Submit at least four weeks prior to start of installation.

K. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

L. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

M. Installation Log: Submit filled-out log for each length or instance of sealant installed.

N. Executed warranty.

1.06 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
   2. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

B. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
   1. Convene minimum 2 weeks before starting work of this Section.

C. Mock-ups: See Section 01 45 00 - Quality Control.
   1. Build mockups to verify selections made under sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   2. Approved mock-ups may remain as part of the completed Work if undisturbed at time of Substantial Completion.

D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. See Section Section 01 45 00 - Quality Control, for additional information.
   2. Adhesion Testing: In accordance with ASTM C794.
   3. Compatibility Testing: In accordance with ASTM C1087.
   4. Stain Testing: In accordance with ASTM C1248; required for stone and masonry substrates.
   5. Allow sufficient time for testing to avoid delaying the work.
   6. Deliver sufficient samples to manufacturer for testing.
   7. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   8. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

E. Installation Plan: Include schedule of sealed joints, including the following:
   1. Joint width indicated in Contract Documents.
   2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
   3. Approximate date of installation, for evaluation of thermal movement influence.
   4. Installation Log Form: Include the following data fields, with known information filled out.
      a. Location on project.
      b. Substrates.
      c. Sealant used.
      d. Stated movement capability of sealant.
      e. Primer to be used, or indicate no primer is used.
      f. Size and actual backing material used.
      g. Date of installation.
      h. Name of installer.
      i. Actual joint width; provide space to indicate maximum and minimum width.
      j. Actual joint depth to face of backing material at centerline of joint.
      k. Air temperature.

F. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
   1. Identification of testing agency.
   2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
      a. Test date.
      b. Copy of test method documents.
      c. Age of sealant upon date of testing.
      d. Test results, modeled after the sample form in the test method document.
      e. Indicate use of photographic record of test.

G. Field Adhesion Test Procedures:
   1. Allow sealants to fully cure as recommended by manufacturer before testing.
   2. Have a copy of the test method document available during tests.
   3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
   4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer, or are below 40 degrees F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

2.02 JOINT SEALANTS - GENERAL

A. Color of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

B. Source Limitations: Obtain each type of joint sealant from single source from single manufacturer.

2.03 NONSAG JOINT SEALANTS

A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.
   2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   5. Products:
      a. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
      b. Dow; DOWSIL 791 Silicone Weatherproofing Sealant: www.dow.com/#sle.
      c. Dow; DOWSIL 795 Silicone Building Sealant: www.dow.com/#sle.
      d. Momentive Performance Materials, Inc/GE Silicones; SCS9000 SilPruf NB - Non-Staining Silicone Weatherproofing Sealant: www.siliconeforbuilding.com/#sle.
      e. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): www.pecora.com/#sle.
      f. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
      g. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   6. Locations:
      a. Joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints in dimension stone cladding.
      d. Joints in exterior insulation and finish systems.
      e. Joints between metal panels.
      f. Joints between different materials listed above.
      g. Permiter joints between materials listed above and frames of doors, windows, aluminum storefront and curtain wall, and louvers.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant, acid-curing; not expected to withstand continuous water immersion or traffic.
   1. Color: White.
   2. Products:
      a. Dowsil; 786 Mildew Resistant.
      b. GE Advanced Materials - Silicones; Sanitary SCS1700.
      c. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
      d. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
      e. Tremco; Tremsil 200 Sanitary.
      f. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   3. Locations:
      a. Interior sealant joints between plumbing fixtures and adjoining walls, floors, and counters.
      b. Interior sealant joints subject to moisture.

C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
   1. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
   2. Products:
      a. Bostik; Siliconized Acrylic Caulk.
      b. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
      c. Sherwin-Williams Company; 850A Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
      d. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

D. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
   1. Hardness Range: 10 to 30, Shore A, when tested in accordance with ASTM C661.
   2. Service Temperature Range: Minus 13 to 180 degrees F.
   3. Products:
      a. Pecora Corporation; Pecora BC-158 Butyl Rubber Sealant: www.pecora.com/#sle.
      b. Sherwin-Williams Company; Storm Blaster All Season Sealant: www.sherwin-williams.com/#sle.
      c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   4. Locations:
      a. Roof panel rib sealant.
      b. Termination bars.

E. Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.
   1. Products:
      a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.
      b. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: www.tremcosealants.com/#sle.
      c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.04 SELF-LEVELING JOINT SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
   3. Service Temperature Range: Minus 40 to 180 degrees F.
   4. Products:
      a. Master Builders Solutions; MasterSeal SL 2.
      b. Sherwin-Williams Company; Stampede 2SL Polyurethane Sealant: www.sherwin-williams.com/#sle.
      c. Sika Corporation; Sikaflex-2c SL: www.usa.sika.com/#sle.
      d. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   5. Locations:
      a. Control and expansion joints in brick pavers.
      b. Isolation and control joints in cast-in-place concrete slabs.
      c. Joints in stone paving units.
      d. Tile control and expansion joints.
      e. Joints between materials listed above.

B. Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
   3. Service Temperature Range: Minus 40 to 180 degrees F.
   4. Products:
      a. Sika Corporation; Sikaflex-2c SL: www.usa.sika.com/#sle.
      b. W. R. Meadows, Inc; POURTHANE SL: www.wrmeadows.com/#sle.
      c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

C. Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids, UV-resistant; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Durometer Hardness, Type A: 85, minimum, after seven days when tested in accordance with ASTM D2240.
   2. Joint Depth: Provide product suitable for joints from 1/8 inch to 1 inch in depth excluding space for backer rod.
   3. Products:
      a. ARDEX Engineered Cements; ARDEX ARDISEAL RAPID PLUS: www.ardexamericas.com/#sle.
      b. Euclid Chemical Company; EUCO QWIKjoint UVR: www.euclidchemical.com/#sle.
      c. Metzger McGuire; Edge-Pro.
      d. SASE; FlexJoint 85.
      e. VersaFlex; SL/85.
      f. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   4. Locations:
      a. Exposed sawcuts and non-moving control joints in concrete slabs subject to heavy loads.

2.05 ACOUSTICAL JOINT SEALANTS

A. See Section 09 21 16 - Gypsum Board Assemblies.

2.06 ACCESSORIES

A. Sealant Backing, General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
   1. Sealant Backing Manufacturers:
      a. Adfast.
      b. Alcot Plastics.
      c. Nomaco.
      d. W.R. Meadows.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions

B. Sealant Backing Rod, Closed-Cell Type:
   1. Cylindrical flexible sealant backings complying with ASTM C1330 Type C.
   2. Size: 25 to 50 percent larger in diameter than joint width.

C. Preformed Extruded Silicone Joint Seal: Pre-cured low-modulus silicone extrusion, in sizes to fit applications indicated on drawings, combined with a neutral-curing liquid silicone sealant for bonding joint seal to substrates.
   1. Size: As recommended by manufacturer for Project conditions.
   2. Thickness: 0.78 inch, with ridges along outside bottom edges for bonding area.
   3. Color: As selected by Architect.
   4. Products:
      a. Tremco Commercial Sealants & Waterproofing; Spectrem Simple Seal: www.tremcosealants.com/#sle.
      b. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

D. Preformed Extruded Polyurethane Joint Seal: Medium-modulus, preformed polyurethane extrusion used to bridge joints under elastomeric wall coatings, in sizes to fit applications indicated on drawings, combined with polyurethane sealant for bonding joint seal to substrates.
   1. Size: As recommended by manufacturer for Project conditions.
   2. Thickness: 0.051 inch, with ridges along outside bottom edges for bonding area.
   3. Color: As selected by Architect.
   4. Products:
      a. Dayton Superior.
      b. Emseal (Sika).
      c. Tremco.
      d. Willseal.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

E. Backing (Bond-Breaker) Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
   1. Manufacturers:
      a. 3M.
      b. Berry Plastics Corporation.
      c. C.R. Laurence.
      d. Scapa Tapes North America.
      e. Valley Industrial Products.

F. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

G. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

H. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Do not exceed pot life of material as documented in writing by manufacturer.

C. Provide joint sealant installations complying with ASTM C1193.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Joint sealants will be considered defective if they do not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.

C. Tests:
   1. Field Adhesion Testing: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.
      a. Perform 10 tests for the first 1,000 linear feet of joint, for each kind of sealant and joint substrate.

b. Perform 1 test for each 1,000 linear feet of joint thereafter, or one test per each floor per elevation.

D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

E. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 PROTECTION

A. See Section 01 66 00 - Product Delivery, Storage, and Handling, for additional requirements.

B. Protect joint sealants during and after curing period from contact with contaminating substances or damage from subsequent construction activities.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hollow metal doors and frames.
   1. Refer to the Architectural drawings for door hardware schedule.

1.02 RELATED REQUIREMENTS

A. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.

C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.

I. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. ITS (DIR) - Directory of Listed Products; Current Edition.

L. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.

M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

N. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

O. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Recycled content data.

D. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

E. Samples: Submit two samples of metal, 2 by 2 inches in size, showing factory finishes, colors, and surface texture.

F. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.
   2. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: https://steeldoor.org/sdi-certified/#sle.
   3. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

C. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

D. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 MANUFACTURERS

A. Hollow Metal Doors and Frames:
1. Ceco Door (Assa A
2. Curries (Assa Abloy).
3. DCI Hollow Metal Frames.
4. Deansteel.
5. DKS Doors.
6. Krieger Specialty Products.
7. Republic Doors and Frames (Allegion).
8. Steelcraft (Allegion).
9. Stiles Custom Metal.
10. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.03 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.04 HOLLOW METAL DOORS

A. Door Finish: Factory-primed and shop-finished.

B. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
a. Level 2 - Heavy-duty.
b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
c. Model 1 - Full Flush.
d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inches, nominal.

4. Door Face Sheets: Flush.
5. Weatherstripping: Refer to Section 08 71 00 - Door Hardware.

C. Interior Doors, Non-Fire-Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
a. Level 1 - Standard-duty.
b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
c. Model 1 - Full Flush.
d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inches, nominal.
4. Door Face Sheets: Flush.

2.05 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and shop finished.

C. Exterior Door Frames: Face welded type.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
3. Weatherstripping: Separate, see Section 08 71 00.

D. Interior Door Frames, Non-Fire Rated: Knock-down type.
1. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.

E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

F. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high or as otherwise necessary to fill opening without cutting masonry units.

G. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.06 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Exterior Doors Paint Finish: See Section 09 91 13 - Exterior Painting.

C. Interior Doors Paint Finish: See Section 09 91 23 - Interior Painting.

2.07 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
2. Style: Standard straight slat blade.

B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
1. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.

C. Glazing: As specified in Section 08 80 00, shop-installed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08 71 00.
   1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

D. Comply with glazing installation requirements of Section 08 80 00.

E. Touch up damaged factory finishes.

3.03 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Adjust sound control doors so that seals are fully engaged when door is closed.

C. Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.
B. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.
B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.
E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
G. WI (CCP) - Certified Compliance Program (CCP); Current Edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.
B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
    1. VOC content restrictions data.
    2. CAL (CDPH SM) compliance data.
    3. Life cycle data.
    4. Sustainable wood data.
    5. Recycled content data.
D. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
    1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
E. Samples: Submit two samples of door veneer, 4 by 4 inches in size illustrating wood grain, stain color, and sheen.
F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Installer's qualification statement.

I. Field Quality Control Reports: As specified in Part 3 of this Section.

J. Warranty, executed in Owner's name.

1.05 FIELD CONDITIONS

A. Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Package, deliver and store doors in accordance with specified quality standard.

C. Accept doors on site in manufacturer's packaging, and inspect for damage.

D. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.

1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Sustainable Wood: Products in this Section to meet sustainable wood requirements specified in Section 01 60 00.

F. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 PERFORMANCE REQUIREMENTS

A. Woodwork Quality Assurance Program:

1. Comply with AWI (QCP) or WI (CCP) woodwork association quality assurance service / program in accordance with requirements for work specified in this section.
2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

3. Provide designated labels on shop drawings as required by quality assurance program.
4. Provide designated labels on installed products as required by quality assurance program.
5. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

2.03 MANUFACTURERS

A. Flush Wood Doors:
   1. Eggers Industries.
   2. Haley Brothers.
   3. Masonite Architectural.
   4. Oregon Door.
   5. Vancouver Door Company.
   6. VT Industries.
   7. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.04 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
      a. Extra Heavy Duty:
         1) Classrooms.
         2) Public bathrooms.
         3) Janitor's closets.
         4) Assembly spaces.
         5) Exits.
         6) Patient rooms.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
   3. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.

2.05 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.06 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Same species as face veneer.

B. Veneer Facing for Opaque Finish: Medium density overlay (MDO), in compliance with indicated quality standard, or any closed-grain hardwood of mill option.

2.07 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge for hardware reinforcement.

2. Provide solid blocking for other throughbolted hardware.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with the quality standard specified.

2.08 FINISH - WOOD VENEER DOORS

A. Quality Standard Grade: Match door construction.

B. Stain: Match Architect's sample.

C. Finish System:
1. System 11: Catelyzed polyurethane.

D. Sheen: Satin.

2.09 FINISH - OPAQUE DOORS

A. Quality Standard Grade: Match door construction.

B. Paint Finish for Exterior Wood Doors: See 09 91 13 - Exterior Painting.

C. Paint Finish for Interior Wood Doors: See 09 91 23 - Interior Painting.

D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

2.10 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 11 13 - Hollow Metal Doors and Frames.

B. Metal Louvers:
1. Material and Finish: Roll formed steel; pre-painted finish to color as selected.

C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
1. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.

D. Glazing: See Section 08 80 00 - Glazing.

E. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
C. Use machine tools to cut or drill for hardware.
D. Coordinate installation of doors with installation of frames and hardware.
E. Coordinate installation of glazing.
F. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.
B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.
B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Flush wood doors will be considered defective if they do not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.
C. Inspections:
   1. Provide inspection of installed Work through AWI's Quality Certification Program or WI's Certified Compliance Program, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMAC/WI (AWS) for the specified grade.
   2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
   3. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

3.05 ADJUSTING

A. Adjust doors for smooth and balanced door movement.
B. Adjust closers for full closure.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 2 PRODUCTS

1.01 ACCESS DOORS AND PANELS ASSEMBLIES

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 2 PRODUCTS

1.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.

1.02 FINISHES

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazing units.

B. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP).

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C1036 - Standard Specification for Flat Glass; 2021.

F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

H. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2023.

I. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

J. BS EN 14179-1 - Glass in Building - Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass - Part 1: Definition and Description; 2016.

K. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

L. GANA (GM) - GANA Glazing Manual; 2022.

M. GANA (SM) - GANA Sealant Manual; 2008.

N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting minimum 2 weeks before starting work of this section; require attendance by each of the affected installers.
   1. See Section Section 01 31 19 - Project Meetings, for additional

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Global Warming Potential (GWP): Environmental product declaration (EPD) to identify GWP less than or equal to maximum allowable value. See 014113.11 - Regulatory Requirements - Global Warming Potential (GWP), for additional information.

C. Product Data: For each item to be installed.

D. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. CAL (CDPH SM) compliance data.
   2. Recycled content data.
   3. VOC content restrictions data.

E. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

F. Samples: Submit two samples 6 by 6 inch in size, or manufacturer's standard sample size, of glass units.

G. Samples: Submit 6 inch long bead of glazing sealant, color as selected.

H. Certificate: Certify that products of this section meet or exceed specified requirements.

I. Manufacturer's qualification statement.

J. Installer's qualification statement.

K. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

B. Qualifications: See Section 01 45 00 - Quality Control.
   1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
      a. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
      b. Insulating Glass Certification Council (IGCC).
      c. Safety Glazing Certification Council (SGCC).
   2. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years documented experience.
      a. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

D. Heat Soaked Tempered Glass: Provide a ten (10) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 REGULATORY REQUIREMENTS

A. Flat Glass: Global Warming Potential (GWP) less than or equal to maximum allowable value. See Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP), for additional information.

2.03 MANUFACTURERS

A. Glass Manufacturers:
   1. Cardinal Glass Industries.
   2. Gardner Glass.
   3. Guardian Glass.
   4. Ornilux.
   5. Pilkington North America.
   6. Saint Gobain.
   7. Schott.
   8. Vitro Architectural Glass.
   9. Walker Glass.
   10. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Glass Fabricators:
   1. General Glass International (GGI).
   2. Glasswerks.
   3. Standard Bent Glass.

4. Tecnoglass.
5. Thompson Innovative Glass.
6. Trulite Glass & Aluminum Solutions.
7. Viracon.
8. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.04 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
   2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
   5. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with BS EN 14179-1.
   6. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
   7. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
   2. Interlayers: Refer to Laminated Glass Interlayers article below.

2.05 GLAZING UNITS

A. Monolithic Interior Vision Glazing:
   1. Applications: Interior glazing unless otherwise indicated.
   2. Glass Type: Annealed float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

B. Monolithic Safety Glazing: Non-fire-rated.
   1. Applications:
      a. Glazed lites in doors, except fire doors.
      b. Glazed sidelights to doors, except in fire-rated walls and partitions.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on drawings.
   2. Glass Type: Fully tempered safety glass as specified.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

2.06 GLAZING COMPOUNDS

A. Definitions: See Section 07 92 00 - Joint Sealants.

B. Color, General: As selected by Architect from manufacturer's full range.

C. Manufacturers:
   1. Bostik.

2. Dow Corning / Dowsil.
3. GE Silicones.
4. Momentive Performance Materials.
5. Pecora.
6. Tremco.
7. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

D. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

E. Polysulfide Sealant: Two component; chemical curing, nonsagging type; ASTM C920 Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

F. Silicone Sealant: Neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining, ASTM C920 Type S, Grade NS, Class 50, Use NT.
   1. Products:
      a. Dowsil; 795 Silicone Building Sealant.
      b. GE Silicones; SCS2000 SilPruf.
      c. Pecora; 895NST Silicone.
      d. Tremco; Spectrum 2.
   2. Locations:
      a. Typical use.
      b. Perimeter at smooth substrates, including glass, metals, and coated metals.
      c. Wet sealing of glass components within frames.
      d. Non-structural internal components of window system, including end dams and internal seals.

G. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining, ASTM C920 Type S or M, Grade NS, Class 25, Use NT.
   1. Products:
      a. Dowsil; 983 Structural Glazing Sealant Base and Curing Agent.
      b. GE Silicones; SSG4000 UltraGlaze.
      c. Pecora; AVB Silicone.
      d. Tremco; Tremsil 600.
   2. Locations:
      a. Non-structural internal components of window system, including end dams and internal seals.

H. Structural Glazing Sealants: ASTM C1184, high-modulus, neutral-cure silicone formulation that is specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in opening system indicated, for 2-and 4-sided structural glazing. Product to be compatible with system components with which it comes in contact.
   1. Shop-Applied Products:
      a. Dowsil; 983 Structural Glazing Sealant.
      b. GE Silicones; SSG4650
      c. Pecora; 985 Silicone.
      d. Tremco; Proglaze II.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   2. Field-Applied Products:
      a. Dowsil; 795 Silicone Building Sealant, 995 Silicone Structural Sealant.
      b. GE Silicones; SSG4000AC UltraGlaze.
      c. Pecora; 895 NST Silicone.
      d. Tremco; Proglaze SSG.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.07 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry immediately before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

F. Carefully trim protruding tape with knife.

3.06 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

E. Place glazing tape on free perimeter of glazing in same manner described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Carefully trim protruding tape with knife.

3.07 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Place setting blocks at 1/4 points and install glazing pane or unit.

C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.

D. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.

E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.08 INSTALLATION - PRESSURE GLAZED SYSTEMS

A. Application - Exterior Glazed: Set glazing infills from exterior side of building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.

E. Install cover plate.

3.09 INSTALLATION - STRUCTURAL SILICONE GLAZING

A. Application - Factory (Shop) Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
   1. Two-Sided Structural: Glass structurally adhered to vertical mullions with horizontal sides captured in glazing pockets.
   2. Four-Sided Structural: Glass with four sides structurally adhered to horizontal and vertical metal back-up mullion.

B. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.

C. Provide only structural silicone sealant, tested and manufactured for structural glazing.

3.10 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

C. Monitor and report installation procedures and unacceptable conditions.

3.11 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

C. Remove nonpermanent labels immediately after glazing installation is complete.

D. Clean glass and adjacent surfaces after sealants are fully cured.

E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.12 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Gypsum sheathing for exterior walls and soffits.
C. Cementitious backing board.
D. Gypsum wallboard.
E. Backing board.
F. Joint treatment and accessories.
G. Sound barrier mullion trim cap.

1.02 RELATED REQUIREMENTS

A. Section 07 27 00 - Air Barriers: Air- and water-resistive barrier over sheathing.
B. Section 09 22 16 - Non-Structural Metal Framing.
C. Section 09 81 00 - Acoustic Insulation.

1.03 REFERENCE STANDARDS

A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.
B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.
C. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings and Other Structures; 2022.
D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
H. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
I. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
J. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
K. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018 (Reapproved 2023).

L. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022, with Editorial Revision (2023).

M. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

N. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.

O. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).

P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

Q. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

R. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

S. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.

T. GA-226 - Application of Gypsum Board to Form Curved Surfaces; 2025.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: For each item to be installed.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. CAL (CDPH SM) compliance data.
   2. Life cycle data.
   3. Recycled content data.
   4. VOC content restrictions data.

D. Shop Drawings: Coordinate requirements with Section 09 22 16 - Non-Structural Metal Framing. Indicate special details associated with fireproofing and acoustic seals.

E. Evaluation Service Reports: Show compliance with specified requirements, including grid suspension systems.

F. Qualification Statements: For Contractor's professional engineer, manufacturer, and installer.

1.06 COORDINATION

A. Confirm with panel manufacturers suitability of gypsum panel products at locations subject to water and water vapor.

1.07 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Contractor's Professional Engineer: Experienced in providing delegated design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which the project is located.
   2. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.

3. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

B. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
1. Convene minimum 2 weeks before starting work of this Section.
2. Require attendance by all affected installers.

C. Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, and shop drawings.

1.08 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

C. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

D. Store metal products to prevent corrosion.

1.09 WARRANTY

A. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 DELEGATED DESIGN

A. Delegated Design: See Section 01 33 00 - Submittals.

B. Engage a qualified professional engineer, as defined in Section 01 45 00 - Quality Control, to design metal stud wall assemblies and shaft wall assemblies. Coordinate with Section 09 22 16 - Non-Structural Metal Framing.

2.02 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 016000.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 016000.

2.03 GYPSUM BOARD ASSEMBLIES

A. See Section 09 22 16 - Non-Structural Metal Framing for metal studs, shaft studs, and accessories required for complete partition, ceiling, and soffit assemblies.

B. Provide completed assemblies complying with ASTM C840 and GA-216.
1. See PART 3 for finishing requirements.

C. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions in accordance with ASCE 7 for Seismic Design as shown on the Structural drawings and complying with the following:
1. Local authorities having jurisdiction.

2. ICC-ES Evaulation Report.

D. Grid Suspension Systems: Provide grid suspension systems in accordance with ASTM C840 and GA-216 complying with the following:
   1. ICC-ES Evaulation Report.

E. Fire-Resistance-Rated Assemblies: Provide completed assemblies as shown on the Architectural drawings

2.04 METAL FRAMING MATERIALS

A. See Section 09 22 16 - Non-Structural Metal Framing.

2.05 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum.
   2. CertainTeed.
   3. Georgia-Pacific.
   4. National Gypsum.
   5. Pabco.
   6. USG.
   7. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Interior Gypsum Wallboard: Paper- and glass-mat-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for interior vertical surfaces and ceilings, unless otherwise indicated.
      a. Use exterior gypsum sheathing board for exterior applications. Refer to products below.
   2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
   3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   5. Interior Paper-Faced Type X Products:
      a. Locations:
         1) Standard unless noted otherwise.
      b. American Gypsum Company; FireBloc Type X Gypsum Wallboard: www.americangypsum.com/#sle.
      c. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
      d. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gpgypsum.com/#sle.
      e. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Fire-Shield C 5/8" Gypsum Board: www.goldbondbuilding.com/#sle.
      f. Pabco; Flame Curb.
      g. USG Corporation; Sheetrock Brand EcoSmart Panels Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
      h. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   6. Interior Paper-Faced Type C Products:
      a. Locations:
         1) Where required to meet partition rating, as shown on the Architectural drawings.
      b. American Gypsum; Firebloc Type C.

c. CertainTeed.; ProRoc Type C.
d. Georgia-Pacific; Fireguard C.
e. National Gypsum; Gold Bond Fire-Shield C.
f. Pabco; Flame Curb Type Super C.
g. USG; Firecode C Core.

7. Interior Mold-Resistant, Paper-Faced Products:
   a. Locations:
      1) Drinking fountains.
      2) Adjacent to sinks in break rooms and similar.
      3) Where shown on the Architectural drawings.
   b. American Gypsum Company; M-Bloc Type X: www.americangypsum.com/#sle.
   c. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
   d. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com/#sle.
   e. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board: www.goldbondbuilding.com/#sle.
   f. Pabco; Mold Curb Plus.
   g. USG Corporation; Sheetrock Brand EcoSmart Panels Mold Tough Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
   h. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
8. Interior Glass Mat Faced Products:
   a. Locations:
      1) Building interior side of exterior wall assembly.
      2) Bathroom areas without tile.
      3) Where shown on the Architectural drawings.
   b. CertainTeed Corporation; 5/8" GlasRoc Interior Type X: www.certainteed.com/#sle.
   c. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
   d. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme Fire-Shield Gypsum Panel: www.goldbondbuilding.com/#sle.
   e. Pabco; Pabco Glass Interior.
   f. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
   g. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
9. Flexible Gypsum Board Products:
   a. CertainTeed; 1/4 Inch Flex Drywall.
   b. Georgia-Pacific; ToughRock Flexroc Gypsum Board.
   c. National Gypsum; Gold Bond High Flex Gypsum Board.
   d. Pabco; Pabco Flex.
   e. USG; Sheetrock Brand Flexible Gypsum Panels.

C. Interior Abuse Resistant Wallboard:
   1. Application: High-traffic areas indicated.
   2. Surface Abrasion: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   6. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
   7. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.

8. Type: Fire-resistance-rated Type X, UL or WH listed.
9. Thickness: 5/8 inch.
10. Edges: Tapered.
11. Paper-Faced Products:
    a. American Gypsum Company; M-Bloc AR Type X: www.americangypsum.com/#sle.
    b. CertainTeed Corporation; Extreme Abuse Resistant Drywall with M2Tech: www.certainteed.com/#sle.
    c. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold Guard Abuse-Resistant: www.gpgypsum.com/#sle.
    d. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Hi-Abuse Gypsum Board: www.goldbondbuilding.com/#sle.
    e. Pabco; Abuse Curb.
    f. USG Corporation; Sheetrock Brand AR Firecode X Panels 5/8 in.. (15.9 mm): www.usg.com/#sle.
    g. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
12. Glass Mat Faced Products:
    a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme AR Gypsum Panel: www.goldbondbuilding.com/#sle.
    b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough AR Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
    c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

D. Interior Impact Resistant Wallboard:
1. Application: High-traffic areas indicated.
2. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
7. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
8. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
9. Type: Fire-resistance-rated Type X, UL or WH listed.
10. Thickness: 5/8 inch.
11. Edges: Tapered.
12. Paper-Faced Products:
    a. American Gypsum Company; M-Bloc IR Type X: www.americangypsum.com/#sle.
    b. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech: www.certainteed.com/#sle.
    c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Hi-Impact Gypsum Board: www.goldbondbuilding.com/#sle.
    d. USG Corporation; Sheetrock Brand Mold Tough VHI Firecode X Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
    e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

13. Glass Mat Faced Products: Noncombustible, moisture-resistant gypsum core encased in a fiberglass face and back that shed water. Provide minimum 20-gauge (0.0296 inch) (0.752 mm) steel studs, as defined by the Steel Stud Manufacturers Association (SSMA). Non intended for exterior applications or constant exposure to water. Protect from immersion in water and the eroding effects of cascading water. Product is not suitable for use as a substrate for tile in wet areas such as tubs, showers, gang shower and other areas subject to direct water exposure. Refer to Gypsum Association's GA-216 reference guide, or ASTM C840 reference standard for additional installation requirements.
    a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel: www.goldbondbuilding.com/#sle.
    b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
    c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

E. Backing Board For Wet Areas:
1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    a. Thickness: 5/8 inch.
    b. Products:
        1) Custom Building Products; Wonderboard: www.custombuildingproducts.com/#sle.
        2) PermaBASE Building Products, LLC provided by National Gypsum Company; PermaBase Cement Board: www.goldbondbuilding.com/#sle.
        3) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
        4) Substitutions: See Section 01 25 13 - Product Options and Substitutions.
3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
    a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
    b. Products:
        1) CertainTeed Corporation; 5/8" GlasRoc Tile Backer Type X: www.certainteed.com/#sle.
        2) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
        3) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Tile Backer: www.goldbondbuilding.com/#sle.
        4) USG Corporation; Durock Brand Glass-Mat Tile Backerboard 5/8 in. (15.9 mm): www.usg.com/#sle.
        5) Substitutions: See Section 01 25 13 - Product Options and Substitutions.

F. Exterior Gypsum Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
6. Type X Thickness: 5/8 inch.
7. Edges: Square.
8. Glass Mat Faced Products:

a. American Gypsum Company; M-Glass Exterior Sheathing Type X: www.americangypsum.com/#sle.
b. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com/#sle.
c. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing: www.gpgypsum.com/#sle.
d. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Sheathing: www.goldbondbuilding.com/#sle.
e. Pabco; Pabco Glass Type X Sheathing.
f. USG Corporation; Securock Brand UltraLight Glass-Mat Sheathing Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
g. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.06 ACOUSTIC INSULATION

A. See Section 09 81 00 - Acoustic Insulation.

2.07 GYPSUM BOARD ACCESSORIES

A. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
   1. Products:
      a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
      b. Franklin International, Inc; Titebond Acoustical Smoke & Sound Sealant: www.titebond.com/#sle.
      c. Grabber Construction Products; Acoustical Sealant GSC.
      d. Pecora Corporation; AC-20 FTR.
      e. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
      f. USG; Sheetrock Acoustical Sealant.
      g. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Sound Barrier Mullion Trim Cap: Extruded aluminum trim for maintaining sound barriers at intersections between gypsum walls and glazing assemblies.
   1. STC: 55.
   2. Finish: Match glazing assembly framing finish.
   3. Products:
      a. Balco; BQSWA (SilentSeal).
      b. Emseal (Sika); QuietJoint.
      c. Gordon Incorporated; Mullion Mate, Series 30.
      d. Mull-It-Over Products, Inc; Mull-It-Over 55 - Classic: mullitoverproducts.com/#sle.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

C. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
   1. Manufacturers:
      a. Amico.
      b. Flannery.
      c. Fry Reglet.
      d. Gordon.
      e. Phillips Manufacturing.
      f. Pittcon.
      g. Stockton Products.
      h. USG.

i. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2. Types: As detailed or required for finished appearance.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Joint Compound: Drying type, vinyl-based, ready-mixed.
4. Joint Compound: Setting type, field-mixed.

E. Finishing Compound: Surface coat and primer, takes the place of skim coating.

F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. See Section 09 22 16 - Non-Structural Metal Framing.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

C. Sound Barrier Mullion Trim Cap Installation: Install in accordance with manufacturer's instructions for installation of fire-rated mullion trim caps.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

C. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

E. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

F. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

E. Moisture Guard Trim: Install on bottom edge of gypsum board throughout building.

3.06 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 4: Typical walls and ceilings, unless otherwise indicated.
   3. Level 3: Walls to receive textured wall finish.
   4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   5. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.08 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

3.09 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical panels.

B. Metal suspension systems.

1.02 DEFINITIONS

A. Refer to ASTM E1264 for additional information for the following:
   1. LR: Light Reflectance, the measurement of the luminous reflectance factor of acoustical materials for use in predicting the levels of room illumination, indicated as a percentage from 0.00 to 1.00, per ASTM E1477.
   2. NRC: Noise Reduction Coefficient, is the sound absorption performance of a material, indicated as a percentage from 0.00 to 1.00, per ASTM C423.
   3. CAC: Ceiling Attenuation Class, measures the reduction of sound reflectance through a material and over a partition through a shared plenum, per ASTM E1414/E1414M. The CAC number is equivalent to the noise level reduction, in decibels (dB). For example, a CAC of 30 will reduce transmitted sound by 30 dB.
   4. AC: Articulation Class, used for products in open-plan layouts, in lieu of NRC. It measures the reduction of sound reflected over a partition into adjoining workstations through a shared plenum, per ASTM E1110. AC is indicated as a range from 100 (low) to 250 (high).

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings and Other Structures; 2022.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.

D. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

E. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

G. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.

H. ASTM E1110 - Standard Classification for Determination of Articulation Class; 2019.

I. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

J. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2021a.

K. ASTM E1477 - Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers; 1998a (Reapproved 2022).

L. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

M. ASCE 7 - Minimum Design Loads for buildings and Other Structures; 2010.

N. CBC Section 1705 - California Building Code Section 1705A; Statement of Special Inspections.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Product Data: Provide data on each item to be installed.

D. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Recycled content data.

E. Samples: Submit two samples 4 by 4 inches in size, or manufacturer's standard sample size, illustrating material and finish of acoustical units.

F. Samples: Submit two samples each, 10 inches long, of suspension system main runner, cross runner, and perimeter molding.

G. Evaluation Service Reports: From ICC or similar. Show compliance with specified requirements.

H. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

I. Manufacturers' qualification statement.

J. Field Quality Control Reports: As specified in Part 3 of this Section.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

D. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
   1. Convene minimum 2 weeks before starting work of this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.08 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 REGULATORY REQUIREMENTS

A. California:
   1. Acoustical ceiling systems to comply with CBC Section 808 - Acoustic Ceiling Systems.

2.03 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong.
   2. CertainTeed.
   3. Rockfon.
   4. USG.
   5. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.04 PERFORMANCE REQUIREMENTS

A. Products and installations to meet requirements of DSA IR 25-2: Suspended Lay-In Panel Ceiling.

B. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and complying with the following:
   1. Local authorities having jurisdiction.

C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.05 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panel Types: See Finish Schedule on the Architectural drawings.
   1. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.06 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.
   1. Materials:
      a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.

B. Exposed Suspension System, Type SS-: Hot-dipped galvanized steel grid with steel cap.
   1. Applications: Seismic.
   2. Structural Classification: Heavy-duty, when tested in accordance with ASTM C635/C635M.
   3. Profile: Tee; 15/16 inch face width.
   4. Finish: Baked enamel.
   5. Color: White.
   6. Products:
      a. Certainteed Architectural; 15/16" EZ Stab Classic System: www.certainteed.com/ceilings-and-walls/#sle.
      b. USG Corporation; Donn Brand ZXLA 15/16 inch Acoustical Suspension System: www.usg.com/#sle.
      c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.07 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Hold-Down Clips: Manufacturer's standard clips to suit application.

D. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.

E. Seismic Bracing: Manufacturer's standard perimeter stabilizer bars, compression struts, and seismic ceiling panel clips designed to accommodate seismic forces.

F. Perimeter Moldings: Same metal and finish as grid.
   1. Size: As required for installation conditions and specified Seismic Design Category.
   2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.

G. Gypsum Board: Fire rated type; 5/8 inch thick, ends and edges square, paper faced.

H. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION, GENERAL

A. Install acoustical ceiling assemblies according to manufacturer's written instructions and approved shop drawings.

3.04 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.

1. Use longest practical lengths.

E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Seismic Suspension System, Seismic Design Category C: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Maintain a 3/8 inch clearance between grid ends and wall.

G. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch clearance between grid ends and wall.

H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

J. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

K. Do not eccentrically load system or induce rotation of runners.

L. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.05 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

F. Where round obstructions occur, provide preformed closures to match perimeter molding.

G. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

H. Install hold-down clips on panels within 20 ft of an exterior door.

3.06 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.07 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified special inspector to perform tests and inspections.
   1. Acoustical ceiling systems will be considered defective if they do not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.

C. Tests and Inspections: Completed installations of acoustical panel ceiling hangers and anchors and fasteners; in successive stages; do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
   1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
      a. Hanging Wire Tests: Select 1 of every 10 wire/anchor assemblies using power-actuated fasteners or postinstalled anchors to attach hangers to concrete; a test for 200 lbf (800 N) of tension.
      b. Bracing Wire Tests: Select 1 of every 2 wire/anchor assemblies using postinstalled anchors to attach bracing wires to concrete; test for 400 lbf (1957 N) of tension along the axis of the bracing wire.
   2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Inspections:
   1. Suspended ceiling system.

3.08 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean surfaces.

C. Replace damaged or abraded components.

END OF SECTION

SECTION 09 51 53
DIRECT-APPLIED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustic units.

B. Perimeter trim.

1.02 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustic units after interior wet work is dry.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: For each item to be installed.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Recycled content data.

D. Shop Drawings: Indicate tile layout and related junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.

E. Samples: Submit two samples, 6 by 6 inches or manufacturer's standard size, illustrating material and finish of acoustic units.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Manufacturer's Qualification Statement.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See , for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after installation.

1.08 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 MANUFACTURERS

A. Direct-Applied Mineral Fiber Acoustical Tiles:
   1. Armstrong.
   2. USG.
   3. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.03 DIRECT-APPLIED ACOUSTICAL TILES

A. Direct-Applied Mineral Fiber Acoustic Tiles: ASTM E1264.
   1. Products: See Finish Schedule on the Architectural drawings.

2. Size: 12 by 12 inches.
3. Thickness: 1/2 inch.
4. Light Reflectance: 0.82.
5. Noise Reduction Coefficient (NRC) (ASTM C423): 0.55.
6. Edge: Beveled.
7. Edge: Tongue-and-groove.
8. Surface Color: White.

B. Adhesive: Waterproof, gun grade; type recommended by tile manufacturer.

C. Perimeter Moldings: Rolled steel profile, white color.

D. Acoustic Sealant for Perimeter Moldings: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

E. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate flatness before starting work.

B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION

A. Install system in accordance with manufacturer's instructions and approved shop drawings.

B. Perimeter Molding:
1. Install concealed edge molding at intersection of ceiling and vertical surfaces with continuous gasket.
2. Miter corners.
3. Provide concealed molding at junctions with other interruptions.

C. Center tile on room axis leaving equal border units.

D. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

E. Install acoustic units level in uniform plane.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.
B. Resilient base.
C. Installation accessories.

1.02 REFERENCE STANDARDS

A. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2021.
B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.
E. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.
F. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.
G. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.
H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.
I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.
J. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
    1. VOC content restrictions data.
    2. CAL (CDPH SM) compliance data.
    3. Life cycle data.
D. Shop Drawings: Indicate seaming plans and floor patterns.
E. Manufacturer's installation instructions.

F. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

G. Verification Samples: Submit two samples, 6 by 6 inch in size, or manufacturer's standard sample size, illustrating color and pattern for each resilient flooring product specified.

H. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

I. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.

J. Manufacturer's Qualification Statement.

K. Installer's Qualification Statement.

L. Field Quality Control Reports: As specified in Part 3 of this Section.

M. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.04 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

B. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum five years documented experience.

C. Installer Qualifications: Company specializing in installing specified flooring with minimum years experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

D. Store all materials off of the floor in an acclimatized, weather-tight space.

E. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

F. Protect roll materials from damage by storing on end.

G. Do not double stack pallets.

H. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.06 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

B. Ambient Conditions: Maintain ambient temperature and humidity as required by manufacturer for each product to be installed, before and after installation.

1.07 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

2.02 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction (DCOF): Resilient floors to be minimum 0.42, in accordance with ANSI A326.3.

B. Fire-Test-Response Characteristics: For resilient flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.03 REGULATORY REQUIREMENTS

A. Resilient flooring shall be stable, firm, and slip resistant. CBC Section 11B-302.1.

2.04 MANUFACTURERS

A. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.

2.05 TILE FLOORING

A. PVC-Free Resilient Tile: Mineral and thermoplastic polymer construction; ionomer-impregnated wear surface.
   1. Products: See Finish Schedule on the Architectural drawings.
   2. Thickness: 0.080 inch nominal.
   3. Color: To be selected by Architect from manufacturer's full range.

2.06 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic.
   1. Manufacturers:
      a. Flexco.
      b. Johnsonite (Tarkett).
      c. Mannington Commercial.
      d. Roppe.
      e. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
   2. Products: See Finish Schedule on the Architectural drawings.
   3. Height: 4 inches.
   4. Thickness: 0.125 inch.
   5. Finish: Satin.
   6. Color: To be selected by Architect from manufacturer's full range.
   7. Accessories: Premolded external corners and internal corners.

2.07 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

B. Adhesive: As recommended by manufacturer for flooring type, location, and conditions.

C. Floor Polish for Static Control Flooring: Fluid-applied polish, intended to protect electrical properties of flooring, as recommended by static control flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Concrete Substrate Verification: Substrate moisture content and alkalinity to be confirmed by testing. See Section 09 05 61 - Common Work Results for Flooring Preparation, for additional information.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

E. Apply primer as recommended by flooring manufacturer.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions and approved shop drawings.

C. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
   2. Resilient Strips: Attach to substrate using adhesive.

E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.06 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Resilient flooring will be considered defective if they do not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.

C. Tests:
   1. Slip-Resistance.
      a. Confirm the dynamic coefficient of friction (DCOF) meets or exceeds the value in Performance Requirements article above. Test to ANSI A326.3.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.08 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 67 00
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring, including:
   1. Epoxy.

1.02 REFERENCE STANDARDS

A. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2021.
B. ASTM C811 - Standard Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacings; 2021.
C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
D. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
E. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.
F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.03 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.
B. Product Data: For each item to be installed. Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
D. Shop Drawings:
   1. Show location, extents, and transitions for each fluid-applied flooring type. Show base, as applies.
E. Samples: Submit two samples, 6 by 6 inches in size, or manufacturer's standard size, illustrating color and pattern for each floor material for each color specified.
F. Certificates: Products to meet or exceed specified requirements.
G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.
H. Manufacturer's Qualification Statement.
I. Applicator's Qualification Statement.
J. Preinstallation Testing Reports: As specified in Part 3 of this Section.
K. Field Quality Control Reports: As specified in Part 3 of this Section.

L. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.04 COORDINATION

A. Confirm with manufacturer that products are appropriate to Project scope and conditions.

B. Verify required concrete surface profile with manufacturer.

C. Confirm with manufacturer minimum required concrete cure duration prior to installation.

D. Confirm accceptable concrete moisture content with manufacturer.

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.
   1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years documented experience.
   2. Applicator Qualifications: Company specializing in performing the work of this section.
      a. Minimum 3 years of documented experience.
      b. Approved by manufacturer.

B. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
   1. Convene minimum 2 weeks before starting work of this Section.

1.06 MOCK-UPS

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Build mockups to verify selections made under sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Locate where directed.
   2. Minimum Size: 48 inches by 48 inches.

C. Approved mock-up may remain as part of the work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Store materials for three days prior to installation in area of installation to achieve temperature stability.

E. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

F. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Ambient Conditions: Maintain ambient temperature and humidity as required by manufacturer for each product to be installed, before and after installation.

1.09 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM).

2.02 PERFORMANCE REQUIREMENTS

A. Flooring systems to be UV-stable.

B. Dynamic Coefficient of Friction (DCOF): Fluid-applied floors to be minimum 0.42, in accordance with ANSI A326.3.

C. Fire-Test-Response Characteristics: For fluid-applied flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

D. Flammability: Self-extinguishing according to ASTM D635

2.03 MANUFACTURERS

A. Fluid-Applied Flooring:
   1. APF Polymer Surfaces.
   2. Dex-O-Tex (Crossfield Products).
   3. Dudick.
   4. Koster.
   5. Laticrete.
   6. PPG.
   7. Protective Industrial Polymers.
   8. Sherwin Williams.
   9. Sika.
   10. Stonhard.
   11. Techniquex.
   12. Tnemec.
   13. Westcoat.
   14. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Source Limitations:
   1. Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer.
   2. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended in writing by manufacturer of primary materials.

2.04 EPOXY RESINOUS FLOORING SYSTEMS

A. Epoxy Resinous Flooring System:

1. Aggregate: Silica sand.
2. System Thickness: 15 mils, nominal, dry film thickness (DFT).
3. Texture: Smooth.
4. Sheen: Matte.
5. Color: As selected by Architect.
6. Products: See Finish Schedule on the Architectural drawings.
    a. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

3.02 PREINSTALLATION TESTING

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
    1. Concrete substrate will be considered defective if it does not pass tests and inspections.
    2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
    3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
    4. Submit preinstallation testing reports to Architect.

C. Tests:
    1. Concrete Substrate Moisture and Alkalinity: Substrate moisture content and alkalinity to be confirmed by testing. See Section 09 05 61 - Common Work Results for Flooring Preparation, for additional information.

3.03 PREPARATION

A. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
    1. Roughen concrete substrates as follows:
        a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
        b. Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.
    2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

C. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

D. Vacuum clean substrate.

E. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

F. Apply primer to surfaces required by flooring manufacturer.

3.04 INSTALLATION, GENERAL

A. Install fluid-applied floor systems and accessories according to manufacturer's written instructions and approved shop drawings.

B. Do not exceed pot life of material as documented in writing by manufacturer.

3.05 INSTALLATION - ACCESSORIES

A. Install fillet strips at base of walls where flooring is to be extended up wall as base.

3.06 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness required by manufacturer.

C. Finish to smooth level surface.

3.07 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Fluid-applied flooring systems will be considered defective if they do not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.

C. Tests:
   1. Slip-Resistance:
      a. Confirm the dynamic coefficient of friction (DCOF) meets or exceeds the value in Performance Requirements article above. Test to ANSI A326.3.

D. Manufacturer's Representative to provide site monitoring and inspection services as specified in Section 01 4000.
   1. Manufacturer's representative to prepare site review and inspection reports and deliver to ContractorContractor.
   2. Submit field quality control reports to Architect.

3.08 PROTECTION

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Prohibit traffic on floor finish after installation, until acceptable to manufacturer in writing.

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile carpeting.

1.02 REFERENCE STANDARDS

A. ASTM D2646 - Standard Guide for Backing Fabric Characteristics of Pile Yarn Floor Coverings; 2018.

B. ASTM D7330 - Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales; 2015.

C. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.

D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

E. CBC Section 1124B; Ground and Floor Surfaces.

F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each item to be installed. Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Recycled content data.

D. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.

E. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

F. Manufacturer's Installation Instructions: Indicate special procedures.

G. Preinstallation Testing Reports: As specified in Part 3 of this Section.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

K. Sample warranty.

L. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.04 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

B. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum five years documented experience.

C. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.06 FIELD CONDITIONS

A. Ambient Conditions: Maintain ambient temperature and humidity as required by manufacturer for each product to be installed, before and after installation.

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

1.07 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

F. Green Label Plus: Provide CRI Green Label Plus certified product; in lieu of labeling, independent test report showing compliance is acceptable.

2.02 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For tile carpet flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification:
      a. Class 1: Not less than 0.45 W/sq. cm.
      b. Class 2: Not less than 0.22 W/sq. cm.

B. Appearance Retention Rating: Moderate traffic, 2.5 minimum according to ASTM D7330.

C. Dry Breaking Strength: Not less than 100 lbf according to ASTM D2646.

2.03 REGULATORY REQUIREMENTS

A. See Section 01 41 00 - Regulatory Requirements, for additional requirements.

B. California:
   1. Carpet / Carpet Tile Flooring: CBC Section 11B-302.2
      a. Carpet shall be securely attached and shall have a firm cushion, pad, or backing or no cushion or pad. It shall have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. Pile height shall be 1/2 inch maximum.
      b. Exposed edges shall be fastened to floor surfaces and shall have trim on the entire length. Carpet edges shall comply with CBC Section 11B-303.
   2. Accessibility: Comply with the requirements of CBC section 1124B for carpet tile thickness limits, attachment requirements, backings and edge treatments.

2.04 CARPET TILE

A. Carpet Tile Types: See Finish Schedule on the Architectural drawings.
   1. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.05 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: Embossed aluminum, color as selected by Architect.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREINSTALLATION TESTING

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Concrete substrates will be considered defective if they do not pass tests and inspections.

2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
4. Submit preinstallation testing reports to Architect.

C. Tests:
1. Concrete Substrate Moisture and Alkalinity: Substrate moisture content and alkalinity to be confirmed by testing. See Section 09 05 61 - Common Work Results for Flooring Preparation, for additional information.

3.03 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
B. Vacuum clean substrate.

3.04 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.
B. Install carpet tile in accordance with manufacturer's instructions and approved shop drawings.
C. Blend carpet from different cartons to ensure minimal variation in color match.
D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
F. Trim carpet tile neatly at walls and around interruptions.
G. Complete installation of edge strips, concealing exposed edges.

3.05 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
B. Remove excess adhesive without damage, from floor, base, and wall surfaces.
C. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 81 00
ACOUSTIC INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustic insulation for concealed locations, including
   1. Acoustic batt insulation.
   2. Sprayed acoustic insulation for miscellaneous voids.

1.02 RELATED REQUIREMENTS

A. Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP).

B. Section 07 21 00 - Thermal Insulation.

1.03 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals.

B. Product Data: For each item to be installed.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Recycled content data.

D. Manufacturer's installation instructions.

E. Samples: For exposed and semi-exposed insulation types, in color to be installed. Refer to Part 2 for additional information.

F. Warranty.

1.05 COORDINATION

A. Fire-Rated Assemblies: Confirm insulation products within fire-rated assemblies meet fire-rated assembly requirements.
   1. Substitutions will not be permitted when proprietary products are required to meet fire-rating requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

C. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.08 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for installed products.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM).

D. Life Cycle: Products in this section to have LCA as specified in Section 016000.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 016000.

2.02 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Refer to Architectural drawings for minimum STC values to be achieved at interior assemblies.

2.03 REGULATORY REQUIREMENTS

A. California:
   1. Light- and Heavy-Density Mineral Wool Board Insulation: Global Warming Potential (GWP) less than or equal to maximum allowable value. See Section 014113.11 - Regulatory Requirements - Global Warming Potential (GWP), for additional information.

2.04 ACOUSTIC BATT INSULATION

A. Mineral Wool Unfaced Acoustic Batts: ASTM C665, Type I (batts without membrane facing) produced by combining thermosetting resins free of added urea, phenol, and urea-extended phenol formaldehyde, and with mineral fibers manufactured from rock wool.
   1. Products:
      a. Rockwool; AFB Sound Attenuation Batts.

b. Thermafiber (Owens Corning); Thermafiber SAFB (Sound Attenuation Fire Blanket).
c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2. Physical Properties:
   a. Thickness:
      1) Partitions: As required to fill cavity.
      2) Above suspended ceilings: 6 inches minimum.
3. Location:
   a. Concealed applications.
   b. Where required to meet requirements of fire-rated partitions.
   c. Where shown on the drawings.

B. Glass-Fiber Unfaced Acoustic Batts: ASTM C665, Type I (batts without membrane facing) produced by combining thermosetting resins free of added urea, phenol, and urea-extended phenol formaldehyde, and with mineral fibers manufactured from glass.
1. Products:
   a. CertainTeed; NoiseReducer.
   b. Johns Manville; Unfaced Fiberglass.
   c. Owens Corning; Ecotouch Sound Attenuation Batts (SAB).
   d. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
2. Physical Properties:
   a. Thickness:
      1) Partitions: As required to fill cavity.
      2) Above suspended ceilings: 6 inches minimum.
3. Location:
   a. Concealed applications.
   b. Where shown on the drawings.

2.05 SPRAYED ACOUSTIC INSULATION FOR MISCELLANEOUS VOIDS

A. Sprayed Polyurethane Foam Acoustic Insulation: Low-density, low-pressure, 2-component open-cell.
1. Products:
   a. ICP Building Solutions; HandiFoam Low Density.
   b. RHH Foam Systems; Versi-Foam System 31.
   c. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
2. Location:
   a. Concealed applications.

2.06 ACOUSTIC ACCESSORIES

A. Acoustic Joint Sealants: See Section 09 21 16 - Gypsum Board Assemblies.

B. Impaling Pin Adhesives: Type recommended by manufacturer to suit substrate conditions indicated.

C. Acoustic Putty Pads:
1. Products:
   a. Pabco; QuietPutty.
   b. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
2. Physical Properties:
   a. Size: 7-1/4 inch x 7-1/4 inch.
   b. Tensile Strength (ASTM D412): 135 psi.
   c. Weight: 7 ounces.
3. Location:

a. Outlet boxes and similar penetrations in STC-rated gypsum panels.
b. Where shown on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.03 BATT INSULATION INSTALLATION

A. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

B. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

D. Maintain 3 inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

3.04 SPRAY-APPLIED INSULATION INSTALLATION

A. Install according to manufacturer's written installation instructions and approved shop drawings.

B. Spray insulation to envelop entire area to be insulated and fill voids.

C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

3.05 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior painting.

1.02 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

F. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

G. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each item to be installed. Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.

D. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.

1. Where sheen is specified, submit samples in only that sheen.
2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

2.02 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:

1. Benjamin Moore.
2. Dunn-Edwards.
3. PPG.
4. Sherwin-Williams.
5. Tnemec.
6. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.03 PAINTS AND FINISHES - GENERAL

A. Paint Colors:
   1. Products: See Finish Schedule on the Architectural drawings.

B. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

2.04 PAINT SYSTEMS - EXTERIOR

A. Paint WE-OP-3A - Wood, Opaque, Alkyd, 3 Coat:
   1. One coat of alkyd primer sealer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

B. Paint CE-OP-3A - Concrete/Masonry, Opaque, Alkyd, 3 Coat:
   1. One coat of block filler.
   2. Semi-gloss: Two coats of alkyd enamel.
   3. Flat: Two coats of alkyd enamel.

C. Paint GE-OP-3L - Exterior Plaster, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Flat: Two coats of latex.

D. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

E. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

F. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

G. Paint MaE-OP-3A - Aluminum, Unprimed, Alkyd, 3 Coat:
   1. One coat etching primer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

2.05 PRIMERS

A. Provide primer as recommended by manufacturer for substrate and conditions.

2.06 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Exterior Plaster and Stucco: 12 percent.
   2. Fiber Cement Siding: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
   5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and in accordance with SSPC-SP 13/NACE No.6.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

I. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

J. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

L. Copper: Remove contamination by steam, high pressure water, or solvent washing.

M. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

N. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

O. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

P. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

Q. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior painting.

1.02 RELATED REQUIREMENTS

A. Section 09 91 13 - Exterior Painting.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

F. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

G. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system products to be used in project; include description of each system.
   4. Manufacturer's installation instructions.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.

D. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.

1. Where sheen is specified, submit samples in only that sheen.
2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gal of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

2.02 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore.
   2. Dunn-Edwards.
   3. PPG.
   4. Sherwin-Williams.
   5. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.03 PAINTS AND FINISHES - GENERAL

A. Paint Colors:
   1. Products: See Finish Schedule on the Architectural drawings.

B. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Gloss: Two coats of latex enamel.
   3. Semi-gloss: Two coats of latex enamel.
   4. Eggshell: Two coats of latex enamel.
   5. Flat: Two coats of latex enamel.

B. Paint CI-OP-3A - Concrete/Masonry, Opaque, Alkyd, 3 Coat:
   1. One coat of block filler.
   2. Semi-gloss: Two coats of alkyd enamel.
   3. Flat: Two coats of alkyd enamel.

C. Paint MI-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

D. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with alkyd primer.
   2. Gloss: Two coats of alkyd enamel.
   3. Semi-gloss: Two coats of alkyd enamel.

E. Paint MgI-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.

2. Gloss: Two coats of alkyd enamel.
3. Semi-gloss: Two coats of alkyd enamel.

F. Paint MaI-OP-3A - Aluminum, Unprimed, Alkyd, 3 Coat:
1. One coat etching primer.
2. Gloss: Two coats of alkyd enamel.
3. Semi-gloss: Two coats of alkyd enamel.

G. Paint CI-OP-3Af - Concrete/Masonry, Alkyd Floor Enamel, 3 Coat:
1. One coat of alkali-resistant primer.
2. Gloss: Two coats of alkyd floor enamel.

H. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
1. One coat of alkyd primer sealer.
2. Gloss: Two coats of latex enamel.
3. Semi-gloss: Two coats of latex enamel.
4. Eggshell: Two coats of latex enamel.
5. Flat: Two coats of latex enamel.

2.05 PRIMERS

A. Provide primer as recommended by manufacturer for substrate and conditions.

2.06 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Plaster and Stucco: 12 percent.
3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and in accordance with SSPC-SP 13/NACE No.6.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

J. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high-alkali surfaces.

K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

L. Copper: Remove contamination by steam, high-pressure water, or solvent washing.

M. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

N. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

O. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

P. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

Q. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

R. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Sand wood and metal surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 96 20
PERMANENT NON-SACRIFICIAL ANTI-GRAFFITI COATING

PART 1 - GENERAL

1.01 **SECTION INCLUDES**

A. Anti-graffiti coating systems vertical surfaces for cast stone, brick masonry, concrete unit masonry (painted and unpainted), cast-in-place building concrete, cast-in-place site concrete, and architectural site concrete..

B. Surface preparation

C. field application

1.02 RELATED SECTIONS INCLUDE THE FOLLOWING:

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 033000 - Cast-in-Place Concrete; Bulidng concrete

C. Section 079005 - Joint Sealers; Joint sealants.

D. Section 323353 - Architectural Site Concrete

1.03 REGULATORY REQUIREMENTS

A. California Air Resources Board, Volatile Organic Compound (VOC) Limitation: Provide anti-graffiti coating materials, including primers, undercoats, and finish-coat materials, that have a VOC content of 100 g/l or less, consistent with Southern California Air Quality Management District (SCAQMD) Rule 1113 for architectural flat coatings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating coating materials .

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Data: Include cleaning procedures and repair and patching techniques.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon of each type and color.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 QUALITY ASSURANCE

A. Maintain one copy of each referenced document that applies to application on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.06 MOCK-UP

A. Apply Sealer and Anti-graffiti coating to approved Architectural Site Concrete Mock-ups for review and approval by Architect and client prior to beginning work.

B. Locate where directed.

C. Mock-up may not remain as part of the Work.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within one year period after Date of Substantial Completion.

C. Warranty: Include coverage for bond to substrate.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Products: The design for each non-sacrificial anti-graffiti coating system is based on the products indicated.

B. Type 2, Silane/Siloxane-Based Systems:
   1. Rainguard International Inc., VandlGuardTEN non-sacrificial Anti-Graffiti System.
      a. Sealer; Product Micro-Seal Water Repellant.
      b. Non-Sacrificial Coating; Product VandlGuardTEN
      c. Finish Coat; Product VandlGuard Finish Coat.

2.02 PERFORMANCE REQUIREMENTS

A. General: Non-sacrificial anti-graffiti coating system with the following properties:
   1. Superior protection against, and easy removal of, unwanted graffiti.
   2. Minimum alteration of appearance of treated surface when compared to untreated surface, including gloss and color.
   3. Minimum alteration of water vapor transmission rate through complete wall system.
      a. Coating system shall have a minimum water vapor transmission rate of 95 percent when tested per ASTM D1653.

B. Completed coating system performance shall comply with ASTM D 6578 “Standard Practice for Determination of Graffiti Resistance,” and the following:
   1. Cleanability Level 3: Achieve Level 3 cleaning performance, removing all test graffiti items using citrus-based cleaners or milder solvents.

C. Apply to all exposed surfaces of site architectural concrete vertical surfaces.
   1. Cast in place concrete.
   2. Concrete masonry units.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which anti-graffiti coatings will be applied, for compliance with coating application requirements.

B. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.

3.02 PREPARATION

A. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item; provide surface-applied protection before surface preparation and coating.
   1. After completing coating operations, reinstall items that were removed, using workers skilled in the trades involved.

B. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
   1. Prepare concrete to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
   2. Surfaces to receive sealer shall be cleaned of dirt, oil, graffiti, grease, laitance, and other contaminants.
   3. Mid-pressure water (1500 psi) washing is the minimum cleaning that will be accepted, other methods, such as abrasive blasting and power may be submitted for review.
   4. Schedule cleaning and coating application so dust and other contaminates from cleaning process will not fall on wet, newly coated surfaces.

C. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.
   1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
   2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application.
   3. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
   4. Use only the type of thinners approved by manufacturer and only within recommended limits.

D. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of coating system components. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of components being deposited on surfaces. Cover live plants and grass.

E. Coordination with Sealants: Do not apply anti-graffiti coatings until sealants for joints adjacent to surfaces receiving coatings have been installed and cured.
   1. Anti-graffiti coating work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, anti-graffiti coatings, and sealant materials identical to those used in the work.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 APPLICATION

A. General: Apply anti-graffiti coatings according to manufacturer's written instructions.
   1. Use applicators and techniques best suited for the material being applied.
   2. Do not apply anti-graffiti coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
   3. Coating surface treatments and finishes are indicated in the coating system descriptions.
   4. Provide finish coats compatible with primers used.
   5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, drinking fountains, grilles, covers for electrical equipment, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

B. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.

1. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

C. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

D. The number of coats and film thickness required is the same regardless of application method.
1. Micro-Seal- one (1) coat
2. VandlGuard TEN- two (2) coats
3. VandlGuard Finish Coat- one (1) coat

E. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. Allow sufficient time between successive coats to permit proper drying.

F. Give special attention to edges, corners, crevices, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.

G. Application Procedures: Apply coatings according to manufacturer's written instructions.
1. Spray Equipment: Use spray equipment with pressure and orifice size recommended by manufacturer for material and texture required.

H. Minimum Coating Thickness: Apply each material no thinner than manufacturers recommended spreading rate.
1. Provide total dry film thickness of the entire system as recommended by manufacturer.

I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.

J. Recoat primed and sealed substrates immediately if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn -through or other defects caused by insufficient sealing.

K. Completed Work: Match accepted mockups for shade and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

3.04 FIELD QUALITY CONTROL

A. Provide the services of the manufacturer's authorized field representative to verify that installed products comply with manufacturer's requirements and with the standard established by the Architect approved mockup/test panels.

B. Remove and replace work where test results indicate that it does not comply with specified requirements.

3.05 CLEANING

A. Immediately clean anti-graffiti coatings from adjoining surfaces and surfaces soiled or damaged by application as work progresses. Repair damage caused by application. Comply with manufacturer's written cleaning instructions.

B. Clean up debris and unused material and remove from site.

3.06 PROTECTION

A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION

SECTION 10 14 23
PANEL SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Panel signage.

1.02 REFERENCE STANDARDS

A. ABA Standards - ABA Accessibility Standards; 2004, with Amendments (2015).
B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers; 2017.
D. CBC - California Building Code, Chapter 11B-216 and 11B-703; 2022.
E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.
B. Product Data: For each item to be installed. Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
    1. VOC content restrictions data.
    2. CAL (CDPH SM) compliance data.
    3. Life cycle data.
    4. Recycled content data.
D. Shop Drawings:
    1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.
F. Verification Samples: Submit samples showing colors, materials, and finishes specified.
G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
H. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.
B. Package signs as required to prevent damage before installation.

C. Store under cover and elevated above grade.

D. Store tape adhesive at normal room temperature.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.06 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Deterioration of finishes beyond normal weathering.
      b. Deterioration of embedded graphic image.
      c. Separation or delamination of sheet materials and components.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 REGULATORY REQUIREMENTS

A. See Section 01 41 00 - Regulatory Requirements.

B. Accessibility: Comply with applicable provisions in the ADA Standards, ABA Standards, and CBC Chapter 11B.

2.03 MANUFACTURERS

A. Panel Signage Manufacturers:
   1. Accent Signage Systems.
   2. ADA Sign Depot.
   3. Apco Signs.
   4. Best Sign Systems.
   5. FastSigns.
   6. Inpro.
   7. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.04 PANEL SIGNAGE

A. Panel Signage:
   1. Application: Room and door signs.
   2. Configuration and Materials: Refer to Architectural drawings.
   3. Description: Flat signs with engraved panel media, tactile characters.

4. Sign Size: As indicated on drawings.
5. Tactile Letters: Raised 1/32 inch minimum.
6. Braille: Grade II, ADA-compliant.

2.05 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Tape Adhesive: Double-sided tape, permanent adhesive.

2.06 FINISH

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings.

B. Install with horizontal edges level.

C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and CBC 11B-703.

3.03 PROTECTION

A. See Section 01 66 00 - Product Delivery, Storage, and Handling, for additional requirements.

B. Provide barrier or other delineation to prevent damage to installed Work from subsequent construction activities.

END OF SECTION

SECTION 10 21 13.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

1.02 REFERENCE STANDARDS

A. ABA Standards - ABA Accessibility Standards; 2004, with Amendments (2015).

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2023a.

D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

E. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application; 2021.

F. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

J. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

K. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers; 2017.

L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

M. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate work with placement of support framing and anchors in walls and ceilings.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals for submittal procedures.

B. Product Data: For each item to be installed.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.

2. CAL (CDPH SM) compliance data.
3. Life cycle data.
4. Recycled content data.

D. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, and door swings.

E. Samples: Submit two samples of partition panels, 6 by 6 inches or otherwise in manufacturer's size, illustrating panel finish, color, and sheen.

F. Manufacturer's installation instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling for packaging waste requirements.

B. Deliver, store, and handle materials and products in accordance with manufacturer's instructions and recommendations and industry standards.

C. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at minimum of 60 degrees F.

D. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect products from damage.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.06 FIELD CONDITIONS

A. Ambient Conditions: Maintain environmental conditions, such as temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Verify actual dimensions by field measurement before fabrication. Show recorded measurements on shop drawings.

1.07 WARRANTY

A. See Section 01 78 36 - Warranties for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

1.08 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.09 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 PERFORMANCE REQUIREMENTS

A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.

B. Surface Burning Characteristics: Flame spread index of 26 to 75 and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

C. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
   1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf. applied at any direction and at any point, without deformation of panel.

2.03 REGULATORY REQUIREMENTS

A. Accessibility: Comply with applicable provisions in the ADA Standards, ABA Standards, and ICC A117.1.

B. California:
   1. Accessible Toilet Compartments: CBC Section 11B-604.
   2. Wheelchair accessible compartment shall comply with CBC Section 11B-604.8.1.
      a. Toe clearance for at least one side partition of a wheelchair accessible compartment shall comply with CBC Section and Figure 11B-604.8.1.4. It shall be 9 inches high minimum above the finish floor and 6 inches deep minimum beyond the compartment side face of the partition, exclusive of partition support members. It shall be 12 inches high minimum above the finish floor for children's use. Partition components at toe clearances shall be smooth without sharp edges or abrasive surfaces. Toe clearances at the side partition is not required in a compartment greater than 66 inches wide.
      b. An ambulatory accessible compartment shall be provided where there are six or more toilet compartments, or where the combination of urinals and water closets totals six or more per CBC Section 11B-213.3.1. Such compartment shall comply with CBC Section 11B-604.8.2.
      c. Door and door hardware for accessible compartments shall be self-closing and shall comply with CBC Section 11B-404 except that pull-side clearance for ambulatory accessible compartments shall be a minimum of 44 inches clear, rather than 60 inches. CBC Figure 11B-604.8.2.

d. A door pulll complying with CBC Seection 11B-404.2.7 shall be placed on both sides of the door near the latch.
e. Doors shall not swing into clear floor space or clearance requied for any fixtures.
f. Install coat hook at 48 inches maximum above finished floor.

2.04 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
1. ASI Accurate.
2. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.05 SOLID PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286 and graffiti-resistant.
1. Basis of Design Product:
a. See Restroom Accessories Schedule on the Architectural drawings.
b. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
2. Basis of Design Product:
a. ASI Global Partitions, Solid Plastic (HDPE).
b. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
3. Color: As selected by Architect.

B. Mounting and Configuration: As shown on the Architectural drawings.

C. Privacy: Gap-free doors and stiles.

D. Doors:
1. Thickness: 1 inch.
2. Accessible Width: 36 inch, out-swinging.

E. Panels:
1. Thickness: 1 inch.

F. Pilasters:
1. Thickness: 1 inch.
2. Width: As required to fit space; minimum 3 inches.

2.06 FABRICATION

A. Fabricate toilet compartment components to sizes indicated in shop drawings.

B. Coordinate requirements and provide cutouts for through-partition toilet accessories.

C. Provide shoes and caps at pilasters and posts to conceal anchorage, supports, and leveling mechanisms.

D. Provide manufacturer's standard corrosion-resistant supports, leveling mechanisms, anchors, and anchoring assemblies for pilasters and posts.

E. Floor-Anchored, Overhead-Braced Units: Provide supports, leveling mechanisms, and anchors at pilasters to suit floor conditions.

F. Ceiling-Hung Units:
1. Provide anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural steel support, with two adjustable hanging studs above finished ceiling.
2. Provide assemblies that support pilasters from structural steel without transmitting load to finished ceiling.

G. Floor-and-Ceiling-Anchored Units: Provide anchoring assemblies with leveling adjustment at tops and bottoms of pilasters.

2.07 MATERIALS

A. Aluminum Castings: ASTM B26/B26M.

B. Aluminum Extrusions: ASTM B221 (ASTM B221M).

C. Stainless Steel Sheet, Plate, and Bar: ASTM A240/A240M or ASTM A666/A666M, Type 304, stretcher-leveled standard of flatness.

D. Stainless Steel Castings: ASTM A743/A743M.

2.08 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.

C. H channel for full-height divider panels, where shown on the Architectural drawings.

D. Attachments, Screws, and Bolts: Stainless steel, tamper-proof type.

E. Hinges:
   1. Continuous-type hinge, self-closing.

F. Door Hardware:
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
   3. Provide door pull for outswinging doors.
   4. Coat Hook with Rubber Bumper: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify spacing of and between plumbing fixtures.

C. Verify location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's written instructions and approved shop drawing.

B. Maintain 3/8-to-1/2-inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate headrail joints at pilaster center lines.

E. Replace damaged or scratched materials with new materials. Do not touch up scratches or damaged finish in field.

3.03 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation from Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partially open position when unlatched. Return outswinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Under-lavatory pipe supply covers.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2025.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

G. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.

H. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.

I. ASTM D4802 - Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet; 2016.

J. ASTM D5047 - Standard Specification for Polyethylene Terephthalate Film and Sheeting; 2017 (Reapproved 2023).

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

L. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

M. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

N. CBC 1118B - Space Alowance and Reach Ranges; California Building Code.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each item to be installed. Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

D. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

E. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.06 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. California:
1. Sanitary Facility Elements: CBC Section 11B-602 through 11B-612
2. Elements of sanitary facilities shall be mounted at locations in compliance with CBC Sections 11B-602 through 11B-612.
3. Grab bars on toilet facilities and bathing facilities shall comply with CBC Section 11B-609. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges. The space around the grab bars shall be as follows:
   a. 1-1/2 inches between the grab bar and the wall.
   b. 1-1/2 inches minimum between the grab bar and projecting objects below and at the ends.
   c. 12 inches minimum between the grab bar and projecting objects above.
4. Toilet paper dispensers shall be continuous flow type.

2.02 MANUFACTURERS

A. Commercial Toilet Accessories:
1. AJW.
2. American Specialties, Inc. (ASI).
3. Bobrick.
4. Bradley.
5. Georgia-Pacific Professional.
6. Seachrome.

7. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Under-Lavatory Pipe Supply Covers:
   1. Plumberex Specialty Products, Inc.
   2. Truebro (IPS Corporation).
   3. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

C. Provide products of each category type by single manufacturer.

2.03 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Zinc Alloy: Die cast, ASTM B86.

G. Acrylic Plastic Sheet: ASTM D4802.

H. PETG Plastic Sheet: ASTM D5047.

I. Adhesive: Two component epoxy type, waterproof.

J. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

K. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.04 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

C. Back paint components where contact is made with building finishes to prevent electrolysis.

2.05 COMMERCIAL TOILET ACCESSORIES

A. Products: See Restroom Accessories Schedule on the Architectural drawings.

2.06 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:
   1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
   2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
   3. Construction: 1/8 inch flexible PVC.
      a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
      b. Comply with ASTM C1822, type indicated.
      c. Comply with ASME A112.18.9.
      d. Comply with ICC A117.1.

e. Microbial and Fungal Resistance: Comply with ASTM G21.

4. Color: White.
5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As shown on the Architectural drawings.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 11 68 13
PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Playground equipment.

B. Location of each item of playground equipment is indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Shaping subgrade to specified grade levels.

B. Section 32 13 13 - Concrete Paving: Footings for playground equipment.

C. Section 32 18 16.13 - Playground Protective Surfacing: Protective surfacing in playground area.

D. Section 321815-Synthetic turf: Protective surfacing in playground area.

1.03 DEFINITIONS

A. Play Event: A piece of playground equipment that supports one or more play activities.

B. Use Zone: Area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.

C. Fall Height: Vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing, specified in Section 32 1816.13. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.

E. Subgrade: Surface of the ground on which the synturf is installed.

1.04 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe; 2021.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

D. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2020a.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2026.

G. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment; 2022.

H. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2021.

I. CPSC Pub. No. 325 - Public Playground Safety Handbook; 2015.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
   1. Require attendance by personnel responsible for grading and installers of playground equipment, synthetic turf, footings, and adjacent work.
   2. Include representatives of Contractor.
   3. Notify Architect at least 2 weeks prior to meeting.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.

C. Shop Drawings: Detailed scale drawings showing play event layout, use zone perimeters, and fall height for each play event.
   1. Show locations and dimensions of footings and anchorage points.
   2. Show locations of underground utilities, storm drainage system and irrigation system.

D. Manufacturer's qualification statement.

E. Installer's qualification statement.

F. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.

G. Executed warranty.

1.07 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Safety performance specifications for play component shall comply with **ASTM F 1487-01.**

C. Playground equipment shall comply with **11B-1008.**

D. Manufacturer Qualifications: Company regularly engaged in manufacturing materials and products specified in this section, with at least three years of experience.
   1. Provide documentation showing that playground equipment similar to that specified has been installed in at least sites and in successful service for at least years; provide addresses.
   2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.

E. Installer Qualifications: Company certified by manufacturer for training and experience installing play events and equipment.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide minimum 10 year warranty for playground equipment. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Playground Equipment:
   1. GameTime, Inc; _____: www.gametime.com/#sle.

2.02 PLAYGROUND EQUIPMENT - GENERAL

A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
   1. Playground has been designed for children ages 5 through 12.
   2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

B. Mount equipment on concrete footings, unless otherwise indicated.
   1. Provide supports as required to mount equipment at proper height above finish and sub-grades to allow installation of sufficient depth of synthetic turf; portion of support below top of surfacing must comply with specified requirements for equipment.
   2. Paint portion of support that is intended to be installed below top surface of synthetic turf a different color, or mark in other permanent way, so that installers and maintainers of synturf can easily determine whether sufficient depth has been installed.

C. Provide permanent label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

2.03 PLAYGROUND EQUIPMENT

A. Comply with ASTM F1487 and CPSC Pub. No. 325; provide equipment complying with specified requirements for relevant age group(s).
   1. Provide components having factory-drilled holes; do not use components with extra holes that will not be filled by hardware or covered by other components.

2.04 MATERIALS

A. Steel Pipe and Tube: Comply with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M; hot-dipped galvanized and free of excess weld and spatter.
   1. Tensile Strength: 45,000 psi, minimum.
   2. Yield Point: 33,000 psi, minimum.
   3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A123/A123M; remove tailings and sharp protrusions and burnish edges.

B. Extruded Aluminum: ASTM B221 or ASTM B221M, Alloy 6061, 6062, or 6063.
   1. Tensile Strength: 38,000 psi, minimum.
   2. Yield Point: 35,000 psi, minimum.

C. Hardware: Provide without hazardous protrusions, corners, or finishes, and that require tools for removal after installation; countersunk fasteners are preferred.
   1. Use stainless steel for metal-to-metal connections; select type to minimize galvanic corrosion of materials connected by hardware.

2. Use stainless steel for wood-to-wood and wood-to-metal connections.
3. Use stainless steel with plastic components.
4. Bearings: Self lubricating.
5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches, less than the thickness of a dime.
6. Rails, Loops, and Hand Bars: Same metal as item is mounted on or aluminum; with powder coating.
7. Anchors: In accordance with manufacturer's recommendations.

D. Boards and Timbers: Free of holes, cracks, and loose knots; do not use wood or wood coatings that contain pesticides; do not utilize used lumber.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that playground equipment footings have been installed in proper locations and at proper elevations.

B. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor's expense.

3.02 PREPARATION

A. Stake location of playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.

B. Stake layout of entire Use Zone perimeter before starting any work.
1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
2. Verify that Use Zones are free of obstructions that would extend into protective surfacing.
3. If conflicts or obstructions exist, notify Architect.
4. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

3.03 INSTALLATION

A. Coordinate work with preparation for and installation of synthetic turf after playground equipment installation.

B. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

C. Anchor equipment securely below bottom elevation of resilient surfacing layer.

D. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.

E. Do not modify play events on site without written approval of manufacturer.

F. Install required signage if not factory-installed.

3.04 FIELD QUALITY CONTROL

A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.

B. Owner or Owner's representative will inspect playground equipment after installation to verify that playground meets specified design safety and accessibility requirements.

C. Repair or replace rejected work until compliance is achieved.

3.05 CLEANING

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

3.06 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 12 24 00
WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roller window shades.

1.02 REFERENCE STANDARDS

A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

B. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene minimum 2 weeks prior to commencing work related to products of this section; require attendance of affected installers.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: For each item to be installed. Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.

D. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.

E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.

F. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

H. Qualification Statements: For manufacturer and installer.

I. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.

J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

K. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum 3 years of documented experience with shading systems of similar size and type.
   1. Manufacturer's authorized representative.
   2. Factory training and demonstrated experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

C. Handle and store shades in accordance with manufacturer's recommendations.

D. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

1.07 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade Hardware: One year.
   2. Fabric: One year.
   3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

2.02 REGULATORY REQUIREMENTS

A. Operable parts to comply with 11B-309.4 and be within reach ranges per 11B-308.

2.03 ROLLER WINDOW SHADE ASSEMBLIES

A. Roller Window Shade Assembly 1:
   1. Basis of Design Product:

a. Westport, Newton Dual Wand - Manual Roller Shades.
b. Substitutions: See Section 01 25 13 - Product Options and Substitutions.
2. Location: Wall.
3. Operation: Manual, wand.
4. Roller 1: Light-filtering fabric.
a. Openness Factor: 5 percent.
b. Color: As selected by Architect from manufacturer's full range.

2.04 ROLLER SHADES

A. General:
1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Roller Shades:
1. Description - Interior Roller Shades: Fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
a. Drop Position: Regular roll.
b. Roll Direction: Roll down, closed position is at window sill.
c. Size: As indicated on drawings.
2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
3. Roller Tubes: As required for type of shade operation.
4. Hembars: Designed to maintain bottom of shade straight and flat.

2.05 SHADE FABRIC

A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
1. Performance Requirements:
a. Flammability: Pass NFPA 701 large and small tests.
b. Fungal Resistance: No growth when tested in accordance with ASTM G21.

2.06 ROLLER SHADE FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
1. Vertical Dimensions: Fill openings from head to sill with 1/4 inch space between bottom bar and window stool.
2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.

C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 SYSTEM STARTUP

A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

C. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

D. Training: Train Owner's personnel on operation and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide training by manufacturer's authorized personnel at location designated by the Owner.

3.07 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops, including:
   1. Plastic laminate.

1.02 RELATED REQUIREMENTS

A. Section 09 30 00 - Tiling: Tile for countertops.

1.03 DEFINITIONS

1.04 REFERENCE STANDARDS

A. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.

B. ANSI A208.1 - American National Standard for Particleboard; 2022.

C. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.

D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

G. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

H. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.

I. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

J. PS 1 - Structural Plywood; 2023.

K. SEFA 2 - Installations; 2010.

L. SEFA 3 - Laboratory Work Surfaces; 2020.

M. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2024.

N. WI (CSIP) - Certified Seismic Installation Program (CSIP); Current Edition.

O. WI (MCP) - Monitored Compliance Program (MCP); Current Edition.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.

3. Specimen warranty.

C. Sustainable Product Data: See Section 01 66 00 - Product Delivery, Storage, and Handling and Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
   1. VOC content restrictions data.
   2. CAL (CDPH SM) compliance data.
   3. Life cycle data.
   4. Sustainable wood data.
   5. Regional product data.
   6. Recycled content data.

D. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

G. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

H. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

I. Installer's qualification statement.

J. Installation Instructions: Manufacturer's installation instructions and recommendations.

K. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.06 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. Quality Certification:
   1. Comply with AWI or WI woodwork association quality certification service / program in accordance with work specified in this Section.
   2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
   3. Provide designated labels on shop drawings as required by certification program.
   4. Provide designated labels on installed products as required by certification program.
   5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. See Section 01 50 13 - Construction Waste Management and Disposal, for packaging waste requirements.

E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide manufacturer's standard warranty for each product.

PART 2 PRODUCTS

2.01 SUSTAINABLE PRODUCT REQUIREMENTS

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. VOC Content Restrictions: Products in this section to not exceed VOC content limits specified in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. CDPH: Products to comply with CAL (CDPH SM) .

D. Life Cycle: Products in this section to have LCA as specified in Section 01 60 00.

E. Sustainable Wood: Products in this Section to meet sustainable wood requirements specified in Section 01 60 00.

F. Recycled Content: Products in this Section to meet minimum recycled content thresholds specified in Section 01 60 00.

2.02 COUNTERTOPS, GENERAL

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Quality Standard: SEFA 3 for laboratory worksurfaces.

2.03 PLASTIC LAMINATE COUNTERTOPS

A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
      a. Products: See Finish Schedule on the Architectural drawings.
         1) Substitutions: See Section 01 25 13 - Product Options and Substitutions.
      b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
      d. Finish: Matte or suede, gloss rating of 5 to 20.
   2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
   3. Back and End Splashes: Same material, same construction.

2.04 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.

B. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.

C. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.

D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

E. Sealants: See 07 92 00 - Joint Sealants.

F. Joint Sealant: Mildew-resistant silicone sealant, white.

2.05 ACCESSORIES

A. Surface-Mounted Countertop Support Brackets: Vertical leg of bracket is visible.
   1. Material: Steel.
   2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
   3. Color: As selected by Architect from manufacturer's full range.
   4. Products:
      a. A&M Hardware; Hybrid Workstation Brackets.
      b. Centerline Brackets; Front Mounting Countertop Support: www.countertopbracket.com/#sle.
      c. Rakks; Series EH.
      d. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

B. Concealed-Mounted Countertop Support Brackets: Verticle leg of bracket is concealed within wall cavity.
   1. Finish: Manufacturer's standard, factory-applied, textured powder coat.
   2. Color: As selected by Architect from manufacturer's full range.
   3. Products:
      a. A&M Hardware; Concealed Workstation Brackets.
      b. Centerline Brackets; Floating Wall Mount Support.
      c. Rakks; Concealed Series EH-FM.
      d. Substitutions: See Section 01 25 13 - Product Options and Substitutions.

2.06 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
      a. Rout a 1/8 inch drip groove at underside of exposed overlapping edges, set back 1/2 inch from face of edge.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches, unless otherwise indicated.

C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install laboratory worksurface countertops in compliance with requirements of SEFA 2.

B. Install vanities in accordance with manufacturer’s instructions and approved shop drawings

C. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

D. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

E. Attach wood countertops using screws with minimum penetration into substrate board of 5/8 inch.

F. Install porcelain slab countertops and grout in accordance with applicable requirements of ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.

G. Tile and porcelain slab installation, see Section 09 30 00 - Tiling.

H. Apply polyester protective film in accordance with manufacturer’s instructions.

I. Seal joint between back/end splashes and vertical surfaces.

3.04 CLEANING

A. Clean countertops surfaces thoroughly.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 22 01 30
COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Piping tube and fitting materials.
   2. Pipe joining materials.
   3. Transition fittings.
   4. Dielectric fittings.
   5. Mechanical sleeve seals.
   6. Sleeves.
   7. Escutcheons.
   8. Grout.
   9. Demolition.
   10. Equipment installation requirements common to equipment sections.
   11. Supports and anchorages.

1.02 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. PE: Polyethylene plastic.
   4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. EPDM: Ethylene-propylene-diene terpolymer rubber.
   2. NBR: Acrylonitrile-butadiene rubber.

1.03 SUBMITTALS

A. Product Data: For the following:
   1. Transition fittings.
   2. Dielectric fittings.

3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.04 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.06 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 PIPE, TUBE, AND FITTINGS MATERIALS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.02 PIPE JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.03 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
1. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
2. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
3. Aboveground Pressure Piping: Pipe fitting.

B. Plastic-to-Metal Transition Fittings: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.04 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

D. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.05 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.06 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

2.07 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw. Polished chrome-plated and rough brass.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw. Polished chrome-plated and rough brass.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.08 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi 28-day compressive strength, unless otherwise indicated in the structural drawings.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
1. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

2. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
3. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
4. Install piping to permit valve servicing.
5. Install piping at indicated slopes.
6. Install piping free of sags and bends.
7. Install fittings for changes in direction and branch connections.
8. Install piping to allow application of insulation.

C. Select system components with pressure rating equal to or greater than system operating pressure.

3.02 ESCUTCHEONS

A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
1. New Piping:
a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

3.03 PENETRATIONS AND SLEEVES

A. Sleeves are not required for core-drilled holes.

B. Permanent sleeves are not required for holes formed by removable PE sleeves.

C. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
d. Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

D. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

E. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

F. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

G. Verify final equipment locations for roughing-in.

H. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.04 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.05 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:
   1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
   2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
   3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
   4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.06 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Grease fittings shall be installed in accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.08 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Grout Installation:
   1. Clean surfaces that will come into contact with grout.
   2. Provide forms as required for placement of grout.
   3. Avoid air entrapment during placement of grout.
   4. Place grout, completely filling equipment bases.
   5. Place grout on concrete bases and provide smooth bearing surface for equipment.
   6. Place grout around anchors.
   7. Cure placed grout.

3.09 **PLUMBING DEMOLITION**

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
   1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Equipment to Be Removed: Disconnect and cap services and remove equipment.

C. Owner shall have first right-of refusal for salvage of all items to be removed. All items accepted for salvage by the Owner shall be protected from damage and delivered to the Owner's Representative. All items refused by Owner shall be properly dispose of by the Contractor.

D. For piping to remain, Contractor shall submit samples of existing piping to remain from locations as determined by the Engineer. Based on the results of destructive testing replacement of piping may be considered.

E. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

F. If suspected asbestos, lead or other toxic materials are discovered during the demolition process, work shall be halted and the owner's representative shall be notified.

END OF SECTION 230130

SECTION 22 05 16
EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flexible pipe connectors.
B. Expansion joints and compensators.
C. Pipe loops, offsets, and swing joints.

1.02 RELATED REQUIREMENTS

A. Section 22 10 05 - Plumbing Piping.

1.03 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; Current Edition.
B. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data:
   1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
   2. Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.
C. Maintenance Data: Include adjustment instructions.
D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Packing for Packed Expansion Joints: One set for each joint.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Comply with UL (DIR) requirements.

2.02 FLEXIBLE PIPE CONNECTORS - STEEL PIPING

A. Manufacturers:
   1. Flex-Weld, Inc: www.kelcoind.com/#sle.
   2. Mercer Rubber Company: www.mercer-rubber.com/#sle.
   3. The Metraflex Company: www.metraflex.com/#sle.
   4. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.
B. Inner Hose: Stainless steel.
C. Exterior Sleeve: Single braided, stainless steel.

D. Pressure Rating: 125 psi up to 12 inch.
E. Maximum Service Temperature: 250 degrees F.
F. End Connections: As specified for pipe joints.
G. Size: Use pipe sized units.
H. Maximum offset: 3/4 inch on each side of installed center line.

2.03 FLEXIBLE PIPE CONNECTORS - COPPER PIPING

A. Manufacturers:
1. Flex-Weld, Inc: www.kelcoind.com/#sle.
2. Mercer Rubber Company: www.mercer-rubber.com/#sle.
3. The Metraflex Company: www.metraflex.com/#sle.
4. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.
B. Inner Hose: Bronze.
C. Exterior Sleeve: Braided bronze.
D. Pressure Rating: 125 psi up to 2 inch.
E. Maximum Service Temperature: 250 degrees F.
F. End Connections: As specified for pipe joints.
G. Size: Use pipe sized units.
H. Maximum offset: 3/4 inch on each side of installed center line.
I. Application: Copper piping.

2.04 EXPANSION JOINTS - STAINLESS STEEL BELLOWS TYPE

A. Manufacturers:
1. Flex-Weld, Inc: www.kelcoind.com/#sle.
2. Mercer Rubber Company: www.mercer-rubber.com/#sle.
B. Pressure Rating: 125 psi and 400 degrees F.
C. Maximum Compression: 1-3/4 inches.
D. Maximum Extension: 1/4 inch.
E. Joint Type: Externally pressurized with flanged ends.
F. Size: Use pipe sized units.
G. Application: Steel piping 4 inches and under.

2.05 EXPANSION JOINTS - EXTERNAL RING CONTROLLED STAINLESS STEEL BELLOWS TYPE

A. Manufacturers:
1. Mercer Rubber Company: www.mercer-rubber.com/#sle.
B. Pressure Rating: 125 psi and 400 degrees F.
C. Maximum Compression: 15/16 inch.
D. Maximum Extension: 5/16 inch.
E. Maximum Offset: 1/8 inch.
F. End Connections: Flanged.
G. Size: Use pipe sized units.
H. Application: Steel piping over 2 inches.

2.06 EXPANSION JOINTS - SINGLE SPHERE, FLEXIBLE CONNECTOR

A. Manufacturers:
   1. Mercer Rubber Company: www.mercer-rubber.com/#sle.
   2. The Metraflex Company: www.metraflex.com/#sle.
   3. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.
B. Body Construction: Nylon-reinforced rubber tube.
C. End Connections: Carbon steel flanges.
D. Cover and Tube Elastomer: EPDM and EPDM.
E. Maximum Compression: 1/2 inch.
F. Maximum Elongation: 3/8 inch.
G. Maximum Offset: 3/8 inch.
H. Maximum Angular Movement: 15 degrees.
I. Accessories: Control rods.
J. Service Rating: Up to 35 psi at 220 degrees F.

2.07 EXPANSION JOINTS - TWO-PLY BRONZE BELLOWS TYPE

A. Manufacturers:
   1. Mercer Rubber Company: www.mercer-rubber.com/#sle.
B. Construction: Bronze with anti-torque device, limit stops, internal guides.
C. Pressure Rating: 125 psi and 400 degrees F.
D. Maximum Compression: 1-3/4 inches.
E. Maximum Extension: 1/4 inch.
F. Joint: As specified for pipe joints.
G. Size: Use pipe sized units.
H. Application: Copper piping.

2.08 EXPANSION JOINTS - COMPENSATORS

A. Manufacturers:
   1. Mercer Rubber Company: www.mercer-rubber.com/#sle.
   2. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.
B. Type: Two-ply 304 stainless steel bellows with carbon steel shroud.
C. Maximum Working Pressure: 200 psi.
D. Maximum Working Temperature: 400 degrees F.
E. Maximum Compression: 1/2 inch.
F. Maximum Extension: 5/32 inch.
G. End Connections: Female copper sweat.
H. Application: Copper piping up to 3 inches in size or steel piping up to 4 inches in size.

2.09 EXPANSION LOOPS - HOSE AND BRAID

A. Manufacturers:
   1. Flex-Weld, Inc: www.kelcoind.com/#sle.
   2. The Metraflex Company: www.metraflex.com/#sle.
   3. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.

B. Provide flexible loops with two flexible sections of hose and braid, two 90 degree elbows, and 180 degree return with support brackets and plugged drain port for steam service.

C. Maximum Allowable Motion: 2 inch in the x, y, and z planes with no thrust loads to the building structure.

D. Maximum Working Pressure: 150 psi at 800 degrees F.

E. Construction: Class 150, schedule 40, stainless steel hose and braid assembly with carbon steel fittings, including elbows and flanged end connections sized to match pipe segment.
   1. Selected Product to Accommodate:
      a. Angular Rotation: 15 degrees.
      b. Force developed by 1.5 times specified maximum allowable operating pressure.
   2. Provide necessary accessories including, but not limited to, swivel joints.

2.10 EXPANSION JOINTS - EXTERNALLY PRESSURIZED

A. Manufacturers:
   1. Flex-Weld, Inc: www.kelcoind.com/#sle.
   2. The Metraflex Company: www.metraflex.com/#sle.
   3. Unisource Manufacturing, Inc: www.unisource-mfg.com/#sle.

B. Bellows Type: Two-ply, single bellows constructed of 304 stainless steel.

C. Internal Liner: Carbon steel with internal and external guides.

D. Specialty: Carbon steel anchor base, lifting lugs, and drain port with tapered plug.

E. End Connections: Class 150, carbon steel, welded flange.

F. Maximum Axial Compression: 4 inches.

G. Maximum Working Pressure: 150 psi at 700 degrees F.

H. Application: Steel piping 2 inches and over.

2.11 ACCESSORIES

A. Pipe Alignment Guides:
   1. Manufacturers:
      a. Flex-Weld, Inc: www.kelcoind.com/#sle.
      b. The Metraflex Company: www.metraflex.com/#sle.
   2. Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for minimum 1 inch thick insulation, minimum 3 inches travel.

B. Swivel Joints:
   1. Fabricated steel body, double ball bearing race, field lubricated, with rubber (Buna-N) o-ring seals.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

C. Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.

D. Anchor pipe to building structure where indicated. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connections or apparatus.

E. Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.

END OF SECTION

SECTION 22 05 17
SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe sleeves.

B. Pipe sleeve-seals.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 09 91 13 - Exterior Painting: Preparation and painting of exterior piping systems.

C. Section 09 91 23 - Interior Painting: Preparation and painting of interior piping systems.

D. Section 22 07 19 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2024.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.

C. FM (AG) - FM Approval Guide; Current Edition.

D. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Valve Stem Packings: Two for each type and size of valve.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified this section.
   1. Minimum three years experience.

C. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PIPE SLEEVES

A. Manufacturers:
   1. Flexicraft Industries: www.flexicraft.com.

B. Vertical Piping:
   1. Sleeve Length: 1 inch above finished floor.
   2. Provide sealant for watertight joint.
   3. Blocked Out Floor Openings: Provide 1-1/2 inch angle set in silicon adhesive around opening.
   4. Drilled Penetrations: Provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.

C. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.

D. Pipe Passing Through Below Grade Exterior Walls:
   1. Zinc coated or cast iron pipe.
   2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.

E. Pipe Passing Through Concrete Beam Flanges, except where Brass Pipe Sleeves are Specified:
   1. Galvanized steel pipe or black iron pipe with asphalt coating.
   2. Connect sleeve with floor plate except in mechanical rooms.

F. Clearances:
   1. Provide allowance for insulated piping.
   2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
   3. All Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.

2.02 PIPE-SLEEVE SEALS

A. Manufacturers:
   1. Advance Products & Systems, LLC: www.apsonline.com/#sle.
   2. American Polywater Corporation: www.polywater-haufftechnik.com/#sle.
   3. Flexicraft Industries: www.flexicraft.com/#sle.

B. Modular Mechanical Sleeve-Seal:
   1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
   2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
   3. Size and select seal component materials in accordance with service requirements.
   4. Service Requirements:
      a. Corrosion resistant.
      b. Oil, fuel, gas, and solvent resistant.

c. Underground, buried, and wet conditions.
d. Fire Resistant: 1 hour, UL (DIR) approved.

5. Glass-reinforced plastic pressure end plates.

C. Sealing Compounds:
1. Provide packing and sealing compound to fill pipe to sleeve thickness.
2. Combined packing and sealing compounding to match partition fire-resistance hourly rating.

D. Pipe Sleeve Material:
1. Bearing Walls: Steel, cast iron, or terra-cotta pipe.
2. Masonry Structures: Sheet metal or fiber.

E. Wall Sleeve: PVC material with waterstop collar, and nailer end-caps.

F. Sleeve-Forming Disk: Non-conductive plastic-based material, 3 inch thick.

G. Pipeline-Casing Seals:
1. End Seals: 1/8 inch, pull-on type, rubber or synthetic rubber based.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

3.02 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

B. Install piping to conserve building space, to not interfere with use of space and other work.

C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Inserts:
1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

E. Structural Considerations: Do not penetrate building structural members unless indicated.

F. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
1. Underground Piping: Caulk pipe sleeve watertight with lead and oakum or mechanically expandable chloroprene inserts with bitumen sealed metal components.
2. Aboveground Piping:
a. Pack solid using mineral fiber complying with ASTM C592.
b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
3. All Rated Openings: Caulk tight with fire stopping material complying with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.

4. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.

G. Manufactured Sleeve-Seal Systems:
1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
3. Locate piping in center of sleeve or penetration.
4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
5. Tighten bolting for a water-tight seal.
6. Install in accordance with manufacturer's recommendations.

H. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.03 CLEANING

A. Upon completion of work, clean all parts of the installation.

B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

END OF SECTION

SECTION 22 05 19
METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water meters.
B. Pressure gauges.
C. Thermometers.
D. Pressure-temperature test plugs.

1.02 REFERENCE STANDARDS

A. AGA/ANSI B109 Set - INCLUDES ANSI B109.1, ANSI B109.2, ANSI B109.3, ANSI B109.4; 2000.
B. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2026).
C. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
D. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).
E. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
F. AWWA C700 - Cold-Water Meters -- Displacement Type, Metal Alloy Main Case; 2020.
G. AWWA C701 - Cold-Water Meters -- Turbine Type, for Customer Service; 2019.
H. AWWA C702 - Cold-Water Meters -- Compound Type; 2019.
I. AWWA C703 - Cold-Water Meters -- Fire-Service Type; 2019.
J. AWWA C704 - Propeller-Type Meters for Waterworks Applications; 2019.
K. AWWA C707 - Encoder-Type Remote-Registration Systems for Cold-Water Meters; 2022.
L. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2012, with Addendum (2018).
M. FM (AG) - FM Approval Guide; Current Edition.
N. IEEE 802.3 - IEEE Standard for Ethernet; 2022, with Amendments (2023).
O. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
P. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
Q. NSF 372 - Drinking Water System Components - Lead Content; 2022.
R. UL (DIR) - Online Certifications Directory; Current Edition.
S. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Utility Service Metering: Coordinate and apply Utility Service Provider requirements in terms of meter type, size, physical location, pipe size, upstream/downstream pipe lengths required, and other installation details.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide red-marked product data sheets for each furnished item with associated components and accessories.

C. Project Record Documents: Record actual locations of components and instrumentation.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements. for additional provisions.

PART 2 PRODUCTS

2.01 WATER METERS

A. Disc Water Meters:
   1. Maximum Unidirectional Water Flow Capacity: As indicated on drawings.
   2. Remote Monitoring: Magnetic register with built-in AMR pulse output.
   3. Lead-free bronze alloy case and cap with hermetically-sealed mechanical register.
   4. Pressure and Temperature: Up to 150 psi and 100 degrees F.
   5. AWWA C700, with lead content below 0.25 percent when using non-lead-free materials on wetted surfaces according to NSF 61 and NSF 372.

B. Detector-check Water Meters:
   1. Maximum Flow Rate Capacity: As indicated on drawings.
   2. Remote Monitoring: AWWA C707 digital-register with wired AMI interface.
   3. Ductile iron case with polymer-based cap, integral test port, and hermetically sealed tamper-proof register with low flow indicator.
   4. Pressure and Temperature: Up to 175 psi and 150 degrees F.
   5. FM (AG) listed, UL (DIR), and AWWA C703 Class II compliant meter with lead content below 0.25 percent when using non-lead-free materials on wetted surfaces according to NSF 61 and NSF 372.

C. Propeller Water Meters:
   1. Utility Connection Size: 24 inch flanged with upstream strainer.
   2. Maximum Unidirectional Water Flow Capacity: As indicated on drawings.
   3. Remote Monitoring: Reed switch adapter for AMR pulse (binary) output.
   4. Cast bronze case, polymer-based cap, and hermetically sealed register.
   5. Pressure and Temperature: Up to 150 psi and 100 degrees F.
   6. AWWA C704, with lead content below 0.25 percent when using non-lead-free materials on wetted surfaces according to NSF 61 and NSF 372.

2.02 FLOWMETERS

A. In-Line Monitor:
   1. Accuracy: Plus or minus five percent full scale.
   2. Flow: Water, flow-range as indicated on drawings.

3. Connection Size: 1 inch NPT female.
4. Maximum Service Pressure: 200 psi.
5. Range marks to bear metric and English (dual) scale with gpm units.

B. Flow Sensing Element.
1. In-Line Averaging Measuring Station: Type 316 stainless steel pitot type flow element inserted through welded threaded couplet, with safety shut-off valves and quick coupling connections, and permanent metal tag indicating design flow rate, reading for design flow rate, metered fluid, line size, station or location number.
a. Pressure rating: 275 psi.
b. Maximum temperature: 400 degrees F.
c. Accuracy: Plus 0.55 percent to minus 2.30 percent.

2.03 PRESSURE GAUGES

A. Bourdon Tube for Liquids and Gases:
1. Dial Size and Cover: 4-1/2 inch diameter scale with polycarbonate window.
2. Dial Text and Markings: Black color on white background with scaled kPa and psi units.
3. Accuracy: ASME B40.100, adjustable commercial grade (D) with 5 percent of span.
4. Process Connection: Lower-back, 1/4 inch NPT male except where noted.

B. Diaphragm Actuated for Gases:
1. Dial Size and Cover: 3-1/2 inch diameter scale with polycarbonate window.
2. Dial Text and Markings: Black color on white background with scaled cm (cm wg) and inch (in wg) units.
3. Accuracy: ASME B40.100, adjustable commercial grade (B) with 2 percent at mid-range of span.
4. Process Connection: Lower-back, 1/4 inch NPT male except where noted.

2.04 THERMOMETERS

A. General:
1. Product Compliance: ASTM E1.
2. Lens: Clear glass, except where stated.
3. Accuracy: One percent, when tested in accordance with ASTM E77, except where stated.
4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.

B. Thermometers - Straight: 5 inch v-shape lead-free brass case with clear glass window scale, 2 inch NPT stem, 3-1/4 inch NPT thermowell, and red or blue non-toxic organic liquid filled glass tube.

C. Thermometers - Adjustable Angle: 7 inch v-shape aluminum case with clear glass window scale, 6 inch NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.

D. Thermometers - Dial Type:
1. Fixed: 5 inch diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch NPT stem.
2. Adjustable Angle: 5 inch diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch NPT stem.
3. Vapor (Gas) Actuated: 4-1/2 inch glass-reinforced phenolic case, aluminum dial with black pointer, recalibrating screw, 2 inch brass thermowell, adjustable joint with positive locking device allowing 180 degrees in vertical plane adjustment and capillary.

2.05 PRESSURE-TEMPERATURE TEST PLUGS:

A. Size: 500 psi capacity; 1/2 inch MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch pressure gauge or temperature probe.

B. Wetted Materials per Temperature Range:
   1. Up to 200 degrees F: Brass probe with neoprene core.

C. Test Kit: Internally padded carrying case fitted with two 2-1/2 inch diameter pressure gauges, adapters, two 1/8 inch probes, and 1 inch dual-scale dial thermometers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify Utility Service Provider piping readiness to receive meter.

B. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports, and test plugs.

3.02 INSTALLATION

A. Install metering products in accordance with manufacturer's instructions for intended fluid type and service.

B. Install pressure gauges as follows:
   1. At Pumps: Place single gauge before strainer, suction side and discharge side.
   2. Include gauge cock to isolate each gauge and extend nipples for insulation clearance.
   3. Adjust gauges to selected viewing angle, clean thoroughly, and calibrate to zero.

END OF SECTION

SECTION 22 05 23
GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Angle valves.
B. Ball valves.
C. Butterfly valves.
D. Check valves.
E. Gate valves.
F. Globe valves.

1.02 RELATED REQUIREMENTS

A. Section 08 31 00 - Access Doors and Panels.
B. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
C. Section 22 07 19 - Plumbing Piping Insulation.
D. Section 22 10 05 - Plumbing Piping.
E. Section 22 15 00 - General-Service Compressed-Air Systems.

1.03 ABBREVIATIONS AND ACRONYMS

A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. NRS: Non-rising stem.
E. PTFE: Polytetrafluoroethylene.
F. WOG: Water, oil, and gas.
G. WSP: Working steam pressure.

1.04 REFERENCE STANDARDS

A. API STD 594 - Check Valves: Flanged, Lug, Wafer, and Butt-Welding; 2022.
B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2026.
D. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard; 2020.
E. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves; 2022, with Errata (2023).
F. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
G. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2025.
H. ASME B31.9 - Building Services Piping; 2020.

I. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.

J. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.

K. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings; 2004 (Reapproved 2023).

L. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service; 2021.

M. ASTM A351/A351M - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts; 2018, with Editorial Revision (2019).

N. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984, with Editorial Revision (2019).

O. ASTM B61 - Standard Specification for Steam or Valve Bronze Castings; 2015 (Reapproved 2021).

P. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017.

Q. MSS SP-45 - Drain and Bypass Connections; 2020.

R. MSS SP-67 - Butterfly Valves; 2022.

S. MSS SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends; 2011.

T. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends; 2018.

U. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service; 2010a.

V. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends; 2011.

W. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves; 2019.

X. MSS SP-85 - Gray Iron Globe and Angle Valves, Flanged and Threaded Ends; 2011.

Y. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

Z. MSS SP-125 - Check Valves: Gray Iron and Ductile Iron, In-Line, Spring-Loaded, Center-Guided; 2018.

AA. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.

BB. NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

D. Maintenance Materials: Furnish Owner with one wrench for every five plug valves, in each size of square plug valve head.
   1. See Section 01 60 00 - Product Requirements for additional provisions.

1.06 QUALITY ASSURANCE

A. Manufacturer:
   1. Obtain valves for each valve type from single manufacturer.
   2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
   1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
   2. Protect valve parts exposed to piped medium against rust and corrosion.
   3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
   4. Adjust globe, gate, and angle valves to the closed position to avoid clattering.
   5. Secure check valves in either the closed position or open position.
   6. Adjust butterfly valves to closed or partially closed position.

B. Use the following precautions during storage:
   1. Maintain valve end protection and protect flanges and specialties from dirt.
      a. Provide temporary inlet and outlet caps.
      b. Maintain caps in place until installation.
   2. Store valves in shipping containers and maintain in place until installation.
      a. Store valves indoors in dry environment.
      b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

1.08 EXERCISE THE FOLLOWING PRECAUTIONS FOR HANDLING:

A. Handle large valves with sling, modified to avoid damage to exposed parts.

B. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. See drawings for specific valve locations.

B. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).

C. Provide the following valves for the applications if not indicated on drawings:
   1. Shutoff: Ball, butterfly, gate or plug.
   2. Throttling: Provide globe, ball, or butterfly.
   3. Swing Check (Pump Outlet):
      a. 2 inch and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
      b. 2-1/2 inch and Larger for Domestic Water: Iron swing check valves with closure control, metal or resilient seat check valves.

D. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.

E. Required Valve End Connections for Non-Wafer Types:
   1. Steel Pipe:
      a. 2 inch and Smaller: Threaded ends.
      b. 2-1/2 inch to 4 inch: Grooved or flanged ends except where threaded valve-end option is indicated in valve schedules below.
   2. Copper Tube:
      a. 2 inch and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
      b. 2-1/2 inch to 4 inch: Grooved or flanged ends except where threaded valve-end option is indicated in valve schedules below.

F. Domestic, Hot and Cold Water Valves:
   1. 2 inch and Smaller:

a. Bronze: Provide with threaded or Viega ProPress ends.
b. Bronze Angle: Class 125, bronze disc.
c. Ball: Two piece, full port, brass with brass trim.
d. Bronze Swing Check: Class 125, bronze disc.
e. Bronze Gate: Class 125, NRS.
f. Bronze Globe: Class 125, bronze disc.

2. 2-1/2 inch and Larger:
a. Iron, 2-1/2 inch to 4 inch: Provide with threaded or flanged ends.
b. Iron Ball: Class 150.
c. Iron Single-Flange Butterfly: 200 CWP, EPDM seat, aluminum-bronze disc.
d. Iron Swing Check: Class 125, metal seats.
e. Iron Swing Check with Closure Control: Class 125, lever and spring.
f. Iron Center-Guided Check: Class 125, compact-wafer, metal seat.
g. Iron Plate-Type Check: Class 125; single plate; metal seat.
h. Iron Gate: Class 125, NRS.

2.02 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

B. Valve Sizes: Match upstream piping unless otherwise indicated.

C. Valve Actuator Types:
1. Gear Actuator: Quarter-turn valves 8 inch and larger.
2. Handwheel: Valves other than quarter-turn types.
3. Hand Lever: Quarter-turn valves 2 inch and smaller except plug valves.

D. Insulated Piping Valves: With 2 inch stem extensions and the following features:
1. Gate Valves: Rising stem.
2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: Extended neck.
4. Memory Stops: Fully adjustable after insulation is installed.

E. Valve-End Connections:
1. Threaded End Valves: ASME B1.20.1.
2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
3. Pipe Flanges and Flanged Fittings 1/2 inch through 24 inch: ASME B16.5.
4. Solder Joint Connections: ASME B16.18.

F. General ASME Compliance:
1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
2. Solder-joint Connections: ASME B16.18.
3. Building Services Piping Valves: ASME B31.9.

G. Potable Water Use:
1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.

H. Source Limitations: Obtain each valve type from a single manufacturer.

2.03 BRONZE, ANGLE VALVES

A. Class 125; CWP Rating: 200 psi:

1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. End Connections: Pipe thread.
4. Stem: Bronze.
5. Disc: Bronze.
6. Packing: Asbestos free.
7. Handwheel: Bronze or aluminum.

2.04 BRASS, BALL VALVES

A. One Piece, Full Port with Brass Trim and Press or Threaded Connections:
   1. Comply with MSS SP-110.
   2. CWP Rating: 200 psi.
   3. Body: Forged brass.
   4. Seats: PTFE.
   5. Stem: Brass.
   6. Ball: Chrome-plated brass.
   7. Operator: Handle.

B. Two Piece, Full Port with Brass Trim and Female Thread Connections:
   1. Comply with MSS SP-110.
   2. WSP Rating: 150 psi.
   3. WOG Rating: 600 psi.
   4. Body: Forged brass.
   5. Seats: PTFE.
   6. Ball: Chrome-plated brass.
   7. Operator: Lockable handle and memory stop.

C. Two Piece, Full Port with Press Connections:
   1. WOG Rating: 250 psi.
   2. Body: Forged brass.
   3. Seats: EPDM.
   4. Ball: Chrome-plated brass.
   5. Blow-out Proof Stem: Forged brass.
   6. Operator: Provide lockable handle.
   7. Maximum Service Temperature: 250 degrees F.

D. Three Piece, Full Port with Stainless Steel Trim:
   1. Comply with MSS SP-110.
   2. WSP Rating: 150 psi.
   3. CWP Rating: 600 psi.
   4. Body: Forged brass.
   5. End Connections: Pipe thread.
   6. Seats: PTFE.

2.05 BRONZE, BALL VALVES

A. General:
   1. Fabricate from dezincification resistant material.
   2. Copper alloys containing more than 15 percent zinc are not permitted.

B. One Piece, Reduced Port with Bronze Trim:
   1. Comply with MSS SP-110.
   2. WSP Rating: 400 psi.

3. CWP Rating: 600 psi.
4. Body: Bronze.
5. End Connections: Pipe press.
6. Seats: PTFE.
7. Stem: Bronze.
8. Ball: Chrome plated brass.
9. Operator: Provide lockable handle.

C. Two Piece, Full Port with Bronze Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. WOG Rating: 600 psi.
4. Body: Forged bronze or dezincified-brass alloy.
5. Ends Connections: Pipe thread or solder.
6. Seats: PTFE.
7. Stem: Bronze, blowout proof.
8. Ball: Chrome plated brass.
9. Operator: Provide lockable handle and stem extension.

D. Three Piece, Full Port with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. CWP Rating: 600 psi.
4. Body: Bronze.
5. End Connections: Pipe thread or press.
6. Seats: PTFE.
7. Stem: Stainless steel.
8. Ball: Stainless steel, vented.
9. Operator: Provide lockable handle.

2.06 CARBON STEEL, BALL VALVES

A. One Piece, Standard Port, Fire Safe, Class 150, Flanged with Stainless Steel Trim:
1. WSP Rating: 150 psi, fire safe.
2. Seats: TFM.
3. Stem: Stainless steel, blowout proof.
4. Ball: Stainless steel, vented.
5. Operator: Lockable handle with actuator-mounting pad.
6. Pressure and Temperature Rating: ASME B16.34.

B. Two Piece, Full Port with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. CWP Rating: 2,000 psi.
4. Seats: TFM.
5. Stem: Stainless steel, blowout proof.
6. Ball: Stainless steel, vented.
7. End Connections: Threaded.
8. Operator: Lockable handle.
9. Pressure and Temperature Rating: ASME B16.34.

C. Two Piece, Full Port, Fire Safe, Class 150, Flanged with Stainless Steel Trim:
1. WSP Rating: 150 psi.
2. Seats: TFM.

3. Stem: Stainless steel, blowout proof.
4. Ball: Stainless steel, vented.
5. Operator: Lockable handle with actuator-mounting pad.
6. Pressure and Temperature Rating: ASME B16.34.

D. Three Piece, Full Port with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 250 psi.
3. CWP Rating: 2,000 psi.
4. Seats: TFM.
5. Stem: Stainless steel, blowout proof.
6. Ball: Stainless steel, vented.
7. Bolts: Stainless steel.
8. End Connections: Threaded or socket weld.
9. Operator: Lockable handle.
10. Pressure and Temperature Rating: ASME B16.34.

2.07 STAINLESS STEEL, BALL VALVES

A. One Piece, Standard Port with Stainless-Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. CWP Rating: 1,000 psi.
4. Seats: PTFE.
5. Stem: Stainless steel, blowout proof.
6. Ball: Stainless steel.
7. End Connections: Threaded.
8. Operator: Lockable handle.

B. One Piece, Standard Port, Class 150, Flanged with Stainless Steel Trim:
1. WSP Rating: 150 psi.
2. Seats: TFM.
3. Stem: Stainless steel, blowout proof.
4. Ball: Stainless steel.
5. Operator: Lockable handle with actuator-mounting pad.
6. Pressure and Temperature Rating: ASME B16.34.

C. Two Piece, Full Port with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. CWP Rating: 2,000 psi.
4. Seats: PFTE.
5. Stem: Stainless steel, blowout proof.
6. Ball: Stainless steel, vented.
7. End Connections: Threaded.
8. Operator: Lockable handle.

D. Two Piece, Full Port, Fire Safe, Class 150, Flanged with Stainless Steel Trim:
1. WSP Rating: 150 psi.
2. Seats: TFM.
3. Stem: Stainless steel, blowout proof.
4. Ball: Stainless steel, vented.
5. Operator: Lockable handle with actuator-mounting pad.
6. Pressure and Temperature Rating: ASME B16.34.

E. Three Piece, Full Port with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. WSP Rating: 150 psi.
3. WOG Rating: 2,000 psi.
4. Vacuum Rating: 26.9 in-Hg.
5. Seats: PFTE.
6. Stem: Stainless steel, blowout proof.
7. Ball: Stainless steel, vented.
8. Bolts: Stainless steel.
9. End Connections: Threaded, press, or socket weld.
10. Operator: Lockable handle.
11. Comply with ASME B16.34 for pressure-temperature range.
12. Extended Working Temperature: Minus 4 to 392 degrees F.

2.08 IRON, BALL VALVES

A. Class 125, Full Port, Stainless Steel Trim:
1. Comply with MSS SP-72.
2. CWP Rating: 200 psi.
3. Body: ASTM A536 Grade 65-45-12, ductile iron.
4. End Connections: Flanged.
5. Seats: PTFE.
6. Operator: Lever with locking handle.

2.09 IRON, SINGLE FLANGE BUTTERFLY VALVES

A. Lug Style; Bi-directional dead-end service without use of downstream flange:
1. Class 125 or Class 150 flanges.
2. Comply with MSS SP-67, Type I.
3. Lug Style, Service Pressure Ratings:
a. 100 psi for sizes 14 to 24 inch.
b. 150 psi for sizes 2 to 12 inch.
c. Vacuum down to 29.9 in-Hg.
4. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
5. Stem: One or two-piece stainless steel.
6. Seat: EPDM.
7. Disc: Stainless steel.
8. Finish: Epoxy coated.
9. Operator: Gear operator with handwheel over direct-mount actuator base.

2.10 IRON, GROOVED-END BUTTERFLY VALVES

A. CWP Rating: 175 psi.
1. Comply with MSS SP-67, Type I.
2. Body: Coated ductile iron.
3. Stem: Two-piece stainless steel.
4. Disc: Coated ductile iron.
5. Disc Seal: EPDM.

2.11 BRONZE, LIFT CHECK VALVES

A. General:

1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

B. Class 125:
1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
2. CWP Rating: 200 psi.
3. Design: Vertical flow.
4. Body: Comply with ASTM B61 or ASTM B62, bronze.
5. End Connections: Threaded.
6. Disc (Type 1): Bronze.

2.12 BRASS, INLINE CHECK VALVES

A. Class 150:
1. Maximum Service Temperature: 250 degrees F.
2. Body: Forged brass.
3. Disc: Forged brass.
4. Seal: PTFE, bubble-tight.
5. End Connections: Press.

2.13 BRASS, HORIZONTAL SWING CHECK VALVES

A. Class 125, Threaded End Connections:
1. WOG Rating: 200 psi.
2. Body: Forged brass.
3. Disc: Forged brass.
4. Hinge-Pin, Screw, and Cap: Forged brass.

B. Class 125, Press End Connections:
1. WOG Rating: 200 psi.
2. Body: Forged brass.
3. Disc: Forged brass.
4. Hinge-Pin, Screw, and Cap: Forged brass.

2.14 BRONZE, SWING CHECK VALVES

A. General:
1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

B. Class 125:
1. Pressure and Temperature Rating: MSS SP-80, Type 3.
2. Design: Y-pattern, horizontal or vertical flow.
3. WOG Rating: 200 psi.
4. Body: Bronze, ASTM B62.
5. End Connections: Threaded.
6. Disc: Bronze.

2.15 IRON, HORIZONTAL SWING CHECK VALVES

A. Class 125:
1. Pressure and Temperature Rating: MSS SP-71, Type I.
2. Design: T-body style for clear or full waterways.
3. WOG Rating: 200 psi.

4. Body: ASTM A126, gray cast iron with bolted bonnet.
5. End Connections: Flanged.
6. Trim: Composition.
7. Seat Ring and Disc Holder: Bronze.
8. Disc: PTFE.
9. Gasket: Asbestos free.

2.16 IRON, SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125 with Lever and Spring-Closure Control.
   1. Comply with MSS SP-71, Type I.
   2. Description:
      a. CWP Rating: 200 psi.
      b. Design: Clear or full waterway.
      c. Body: ASTM A126, gray iron with bolted bonnet.
      d. Ends: Flanged as indicated.
      e. Trim: Bronze.
      f. Gasket: Asbestos free.
      g. Closer Control: Factory installed, exterior lever, and weight.

2.17 CARBON STEEL, SWING CHECK VALVES

A. Class 150:
   1. Design: T-pattern, horizontal or vertical flow.
   2. Body and Disc: ASTM A216/A216M.
   3. CWP Rating: 150 psi.
   4. End Connections: Flanged.
   5. Pressure and Temperature Rating: ASME B16.34.

2.18 STAINLESS STEEL, SWING CHECK VALVES

A. Class 150:
   1. Body and Disc: ASTM A351/A351M-CF8M.
   2. Design: T-pattern, horizontal or vertical flow.
   3. CWP Rating: 150 psi.
   4. Connection Ends: Flanged.
   5. Pressure and Temperature Rating: ASME B16.34.

2.19 FLOW LIMITING VALVES

A. Size: As indicated on drawings, female threaded.
B. Flow Accuracy: Plus or minus 5 percent.
C. Body and Cap: Lead-free brass.
D. Cap and Plug: Lead-free brass.
E. Cartridge: Stainless steel with replaceable EPDM seal.
F. Maximum Service Pressure: 600 psi, WOG.
G. Maximum Service Temperature: 250 degrees F.

2.20 BRONZE, GATE VALVES

A. General:

1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

B. Rising Stem or OS&Y:
1. Pressure-Temperature Range: MSS SP-80, Type I.
2. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
3. End Connections: Threaded.
4. Stem: Bronze.
5. Disc: Solid wedge; bronze.
6. Packing: Asbestos free.
7. Handwheel Operator: Malleable iron.

C. Non-Rising Stem or NRS
1. Pressure-Temperature Range: MSS SP-80, Type I.
2. Class 125:
3. Class 150: CWP Rating; 300 psi.
4. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
5. Ends Connections: Threaded.
6. Stem: Bronze.
7. Disc: Solid wedge; bronze.
8. Packing: Asbestos free.
9. Handwheel Operator: Malleable iron.

2.21 IRON, GATE VALVES

A. Bolted Bonnet: OS&Y; Rising Stem:
1. Pressure and Temperature Rating: MSS SP-70, Type I.
2. Class 125: WOG Rating; 200 psi.
3. Body: ASTM A126, gray iron with bolted bonnet.
4. End Connections: Flanged.
5. Trim: Bronze.
6. Disc: Solid wedge.
7. Packing and Gasket: Asbestos free.

2.22 BRONZE, GLOBE VALVES

A. General:
1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

B. Class 125 and Class 250:
1. Class 125:
   a. WOG Rating: 200 psi.
   b. WSP Rating: 125 psi, saturated.
2. Class 250: WOG Rating; 300 psi.
3. Comply with MSS SP-80, Type 1.
4. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
5. End Connections: Threaded or solder.
6. Bonnet: NRS; Non-rising Stem.
7. Non-Rising Stem: Bronze.
8. Disc: PTFE.
9. Packing: Asbestos free.
10. Handwheel Operator: Malleable iron.

PART 3 EXECUTION

3.01 EXAMINATION

A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.

B. Verify valve parts to be fully operational in all positions from closed to fully open.

C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

D. Should valve is determined to be defective, replace with new valve.

3.02 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

END OF SECTION

SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefabricated trapeze-framed systems.
B. Strut systems for pipe or equipment support.
C. Beam clamps.
D. Pipe hangers.
E. Pipe rollers and roller supports.
F. Pipe supports, guides, shields, and saddles.
G. Seismic bracing hardware.
H. Nonpenetrating rooftop supports for low-slope roofs.
I. Anchors and fasteners.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.
B. Section 05 50 00 - Metal Fabrications.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
B. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
E. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2023.
F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).
H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

K. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

M. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

N. FM (AG) - FM Approval Guide; Current Edition.

O. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

P. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

Q. UL (DIR) - Online Certifications Directory; Current Edition.

R. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.

1.06 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide required hardware to hang or support piping, equipment, or fixtures with related accessories as necessary to complete installation of plumbing work.

B. Provide hardware products listed, classified, and labeled as suitable for intended purpose.

C. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.

D. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

E. Fire Resistance: Provide hardware rated for 60 minutes resistance unless specifically indicated by the authority having jurisdiction.

F. Materials for Metal Fabricated Supports: Comply with Section 05 50 00.
   1. Zinc-Plated Steel: Electroplated in accordance with ASTM B633 unless stated otherwise.
   2. Galvanized Steel: Hot-dip galvanized in accordance with ASTM A123/A123M or ASTM A153/A153M unless stated otherwise.

G. Corrosion Resistance: Use corrosion-resistant metal-based materials fully compatible with exposed piping materials and suitable for the environment where installed.
   1. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
   2. Outdoor, Damp, or Wet-Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.

2.02 PREFABRICATED TRAPEZE-FRAMED SYSTEMS

A. Prefabricated Trapeze-Framed Metal Strut Systems:
   1. Manufacturers:
      a. Anvil International, LLC: www.asc-es.com/#sle.
      b. Unistrut, a brand of Atkore International, Inc; _____: www.unistrut.com/#sle.
      c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Strut Channel or Bracket Material:
      a. Indoor Dry Locations: Use zinc-plated steel or galvanized steel.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
   3. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
   4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
   5. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.

B. Prefabricated Trapeze-Framed Fiberglass Strut Systems:
   1. Manufacturers:
      a. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 59, prefabricated continuous-slot fiberglass strut channel, associated fittings, and related accessories.
   3. Flammability: Fire retardant with NFPA 101, Class A flame spread index (maximum of 25) when tested in accordance with ASTM E84; self-extinguishing in accordance with ASTM D635.

2.03 STRUT SYSTEMS FOR PIPE OR EQUIPMENT SUPPORT

A. Strut Channels:
   1. Manufacturers:
      a. ABB Installation Products: electrification.us.abb.com/#sle.
      b. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
      c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
   3. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.

B. Hanger Rods:
   1. Threaded zinc-plated steel unless otherwise indicated.
   2. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Piping up to 1 inch: 1/4 inch diameter.
      c. Piping larger than 1 inch: 3/8 inch diameter.
      d. Trapeze Support for Multiple Pipes: 3/8 inch in length.

C. Channel Nuts:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. Unistrut, a brand of Atkore International, Inc: www.unistrut.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Provide carbon steel channel nut with epoxy copper or zinc finish and long, regular, or short spring as indicated on drawings.

2.04 BEAM CLAMPS

A. Manufacturers:
   1. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
   2. FNW: www.fnw.com/#sle.
   3. Unistrut, a brand of Atkore International, Inc: www.unistrut.com/#sle.
   4. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

B. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.

C. C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.

D. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).

E. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.

F. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.

G. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish.

H. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.

I. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

2.05 PIPE HANGERS

A. Band Hangers, Adjustable:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. Gripple, Inc: www.gripple.com/#sle.
      c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 7 or 9, zinc-plated ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.

B. J-Hangers, Adjustable:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. Unistrut, a brand of Atkore International, Inc: www.unistrut.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 5, zinc-plated ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
   3. Felt-Lined: Provide for uninsulated pipe to reduce noise and prevent static issues.

C. Swivel Ring Hangers, Adjustable:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 10, epoxy-painted, zinc-colored.
   3. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
   4. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
   5. Felt-Lined: Provide for uninsulated pipe to reduce noise and prevent static issues.

D. Clevis Hangers, Adjustable:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. nVent Caddy, a brand of nVent: www.erico.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Copper Tube: MSS SP-58 type 1, epoxy-plated copper.
   3. Felt-Lined: MSS SP-58 type 1, zinc-plated, silicone-free carbon steel.
   4. Light-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.
   5. Standard-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.
   6. UL (DIR) listed: Pipe sizes 2-1/2 to 8 inch.
   7. FM (AG) listed: Pipe sizes 2-1/2 to 8 inch.

2.06 PIPE CLAMPS

A. Riser Clamps:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.

c. nVent Caddy, a brand of nVent: www.erico.com/#sle.
d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

2. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
3. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
4. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
5. UL (DIR) listed: Pipe sizes 1/2 to 8 inch.

B. Extension Split Pipe Clamp:
1. Manufacturers:
a. B-Line, a brand of Eaton Corporation; _____: www.eaton.com/#sle.
b. FNW; 7001: www.fnw.com/#sle.
c. nVent Caddy, a brand of nVent; _____: www.erico.com/#sle.
d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. MSS SP-58 type 12, hinged split ring and yoke roller hanger with epoxy copper or plain finish.
3. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
4. Provide hanger rod and nuts of the same type and material for a given pipe run.
5. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.

C. Strut Clamps:
1. Manufacturers:
a. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.
3. Cushioned Pipe or Tubing Strut Clamp: Provide strut clamp with thermoplastic elastomer cushion having dielectric strength of 670 V/mil.
4. Service Temperature Range: Minus 65 to 275 degrees F.

D. Insulation Coupling:
1. Manufacturers:
a. FNW: www.fnw.com/#sle.
b. nVent Caddy, a brand of nVent: www.erico.com/#sle.
c. Unistrut, a brand of Atkore International, Inc: www.unistrut.com/#sle.
d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. Two bolt-type clamps designed for installation under insulation.
3. Material: Carbon steel with epoxy copper or zinc finish.

2.07 PIPE ROLLERS AND ROLLER SUPPORTS

A. Manufacturers:
1. ASC Engineered Solutions: www.asc-es.com/#sle.
2. FNW: www.fnw.com/#sle.
3. nVent Caddy, a brand of nVent: www.erico.com/#sle.
4. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

B. MSS SP-58 type 43 based on required load, nonconductive and corrosion resistant.

C. Material: Zinc plated ASTM A36/A36M carbon steel or ASTM A47/A47M malleable iron.

2.08 PIPE SUPPORTS, GUIDES, SHIELDS, AND SADDLES

A. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

B. Stanchions:
   1. Manufacturers:
      a. Anvil International: www.anvilintl.com/#sle.
      b. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      c. nVent Caddy, a brand of nVent: www.erico.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
   3. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
   4. For pipe runs, use stanchions of same type and material where vertical adjustment is required for stationary pipe.

C. U-Bolts:
   1. Manufacturers:
      a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. nVent Caddy, a brand of nVent: www.erico.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 24, carbon steel u-bolt for pipe support or anchoring.

D. Intermediate Anchors and Pipe Alignment Guides:
   1. Manufacturers:
      a. Anvil International, LLC: www.anvilintl.com/#sle.
      b. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      c. Gregory Industries, Inc: www.gregorycorp.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Pipe Sizes 6 inch and Smaller: Minimum clearance of 0.16 inch.
   3. Use pipe clamps with oversize pipe sleeve that provides clearance around pipe.

E. Pipe Alignment Guides, Galvanized steel:
   1. Manufacturers:
      a. Anvil International: www.anvilintl.com/#sle.
      b. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
      c. Gregory Industries, Inc: www.gregorycorp.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. Pipe Sizes 8 inch and Smaller: Spider or sleeve type.

F. Pipe Shields for Insulated Piping:
   1. Manufacturers:
      a. Anvil International: www.anvilintl.com/#sle.
      b. FNW: www.fnw.com/#sle.
      c. Gregory Industries, Inc: www.gregorycorp.com/#sle.
      d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
   2. MSS SP-58 type 40, ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.

3. General Construction and Requirements:
   a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
   b. Shields Material: UV-resistant polypropylene with glass fill.
   c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
   d. Service Temperature: Minus 40 to 178 degrees F.
   e. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

G. Pipe Supports:
1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. Liquid Temperatures Up to 122 degrees F:
   a. Overhead Support: MSS SP-58 types 1, 3 through 12 clamps.
   b. Support From Below: MSS SP-58 types 35 through 38.

H. Pipe Supports, Thermal Insulated:
1. Manufacturers:
   a. Buckaroos, Inc: www.buckaroos.com/#sle.
   b. KB Enterprises: www.snappitz.com/#sle.
2. General Requirements:
   a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
   b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
   c. Provide pipe supports for 1/2 to 30 inch iron pipes.
   d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by 360 degree, PVC jacketing.
3. PVC Jacket:
   a. Pipe insulation protection shields to be provided with ball bearing hinge and locking seam.
   b. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
   c. Minimum Thickness: 60 mil, 0.06 inch.

I. Copper Pipe Supports:
1. Manufacturers:
   a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
   b. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
   c. Source Limitations: Furnish supports, associated fittings, accessories, and hardware produced by single manufacturer.

J. Thermal Insulated, Surface-Mounted Pipe Supports:
1. Manufacturers:
   a. FNW: www.fnw.com/#sle.
   b. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
   c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. Material: Carbon steel with epoxy copper or zinc finish.
3. Weather and UV light resistant foam, plastic, or rubber material with built-in strut. Maximum Load: 50 lb for single pipe or multiple landed on top strut.

K. Overhead Pipe Supports:
1. Manufacturers:
   a. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.

b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

L. Plenum Pipe Supports:
1. Manufacturers:
a. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

2.09 SEISMIC BRACING HARDWARE

A. Cable Suspension Systems:
1. Manufacturers:
a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. Strut channel or bracket-fitted fitting with locking mechanism for pipe or equipment suspension using cable wires extended to surface-mounted end-fixing fittings.
3. Provide cable wire and end-fixing as required to hold minimum weight of 120 lb.

B. Cable Sway Bracing Systems:
1. Manufacturers:
a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
2. Cable wire hanger with fix and release spring mechanism enclosed using zinc housing with 302 stainless steel components for pipe or equipment suspension to surface-mounted end-fixing fittings.
3. Provide cable wire and end-fixing as required to hold minimum weight of 25 lb or design per 2022 CBC if higher loads required.

2.10 NONPENETRATING ROOFTOP SUPPORTS FOR LOW-SLOPE ROOFS

A. Manufacturers:
1. Anvil International: www.anvilintl.com/#sle.
2. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
3. MIFAB MFG: www.mifab.com.
4. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
5. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

B. Provide steel pedestals with thermoplastic or rubber base that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.

C. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.

D. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.

E. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.

2.11 ANCHORS AND FASTENERS

A. Manufacturers - Mechanical Anchors:
1. Hilti, Inc: www.us.hilti.com/#sle.

2. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
3. Powers Fasteners, Inc: www.powers.com/#sle.
4. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

B. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

C. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.

D. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

E. Hollow Masonry: Use toggle bolts.

F. Hollow Stud Walls: Use toggle bolts.

G. Steel: Use beam ceiling clamps, beam clamps, machine bolts, or welded threaded studs.

H. Beam Ceiling Flanges: ASTM A47/A47M Grade 32510, malleable iron or stainless steel with copper, plain, stainless steel, or zinc finish.

I. Sheet Metal: Use sheet metal screws.

J. Wood: Use wood screws.

K. Plastic and lead anchors are not permitted.

L. Powder-actuated fasteners are not permitted.

M. Hammer-driven anchors and fasteners are not permitted.

N. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

O. Preset Concrete Inserts: Continuous metal strut channel and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
1. Channel Material: Use galvanized steel.
2. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
3. Manufacturer: Same as manufacturer of metal strut channel framing system.

P. Concrete Inserts:
1. Manufacturers:
a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
b. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
c. nVent Caddy, a brand of nVent: www.erico.com/#sle.
d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.

H. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.

J. Secure fasteners according to manufacturer's recommended torque settings.

K. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 **RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 **SUMMARY**

A. SECTION INCLUDES
   1. Equipment Labels.
   2. Warning signs and labels.
   3. Pipe labels.
   4. Valve tags.
   5. Underground warning tape.
   6. Ceiling tacks.
   7. Warning tags.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: For each type of product indicated.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

D. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

E. Valve numbering scheme.

F. Valve Schedule: For each piping system to include in maintenance manuals.

1.04 **COORDINATION**

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.01 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A. Nameplates:
   1. Heat exchangers, water heaters, and other heat transfer products.
   2. Control panels, transducers, and other related control equipment products.
   3. Pumps, tanks, filters, water treatment devices, and other plumbing equipment products.

B. Tags:
   1. Piping: 3/4 inch diameter and smaller.
   2. Manual operated and automated control valves.
   3. Ceiling tacks placed on lay-in ceiling surface to reference plumbing components.

C. Pipe Markers: 3/4 inch diameter and higher.

2.02 EQUIPMENT LABELS

A. Metal Labels for Equipment:
   1. Material and Thickness: Brass, 0.032 inch (0.8 mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
   2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
   3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   4. Fasteners: Stainless steel rivets or self-tapping screws.
   5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:
   1. Material and Thickness Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
   2. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
   3. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
   4. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   5. Fasteners: Stainless steel rivets or self-tapping screws.
   6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's drawing designation or unique equipment number, drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: Fore each item of equipment to be labeled, on 8-1/2 by 11 inch (A4) bond paper. Tabulate equipment identification number and identify drawing numbers where equipment is indicated (plans, details, and schedules), plus Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.03 WARNING SIGNS AND LABELS

A. Material and Thickness Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

C. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

D. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

E. Fasteners: Stainless steel rivets or self-tapping screws.

F. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

G. Label Content: Include caution and warning information, plus emergency notification instructions.

2.04 **PIPE LABELS**

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference fo pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on drawings, pipe size, and an arrow indicating flow direction.
   1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
   2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.05 **VALVE TAGS**

A. Valve Tags: Stamped or engraved with 1/4 inch (6.4 mm) letters for piping system abbreviation and 1/2 inch (13 mm) numbers.
   1. Tag Material: Brass, 0.032 inch (0.8 mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
   2. Fasteners: Bras wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2 by 11 inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
   1. Valve tag schedule shall be included in operation and maintenance data.

2.06 **WARNING TAGS**

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
   1. Size: Approximately 4 by 7 inches (100 by 178 mm).
   2. Fasteners: Brass grommet and wire.
   3. Nomenclature: Large-size primary caption such as "DANGER", "CAUTION", or "DO NOT OPERATE".
   4. Color: Yellow background with black lettering.

2.07 NAMEPLATES

A. Manufacturers:
   1. Brimar Industries, Inc: www.pipemarker.com/#sle.
   2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   3. Seton Identification Products: www.seton.com/#sle.

B. Description: Laminated piece with up to three lines of text.
   1. Letter Color: White.
   2. Letter Height: 1/2 inch.
   3. Background Color: Black.

4. Nameplate Height: 3/4 inch.
5. Nameplate Material:
   a. Flexible: Vinyl with adhesive backing per ASTM D709.
   b. Metal: Brass with center-side holes for screw fastening.

2.08 TAGS

A. Manufacturers:
   1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
   2. Brady Corporation: www.bradycorp.com/#sle.
   3. Brimar Industries, Inc: www.pipemarker.com/#sle.
   4. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   5. Seton Identification Products: www.seton.com/#sle.

B. Metal: Brass, 19 gauge 1-1/2 inch in diameter with smooth edges, blank, smooth edges, and corrosion-resistant ball chain. Up to three lines of text.

C. Valve Tag Chart: Typewritten 12-point letter size list in anodized aluminum frame.

D. Piping: 3/4 inch diameter and smaller. Include corrosion resistant chain. Identify service, flow direction, and pressure.

2.09 PIPE MARKERS

A. Manufacturers:
   1. Brady Corporation: www.bradycorp.com/#sle.
   2. Brimar Industries, Inc: www.pipemarker.com/#sle.
   3. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   4. Seton Identification Products: www.seton.com/#sle.

B. Comply with ASME A13.1.

C. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.

D. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

E. Underground Flexible Marker: Bright-colored continuously printed ribbon tape, minimum 6 inches wide by 4 mil, 0.004 inch thick, manufactured for direct burial service.

F. Identification Scheme, ASME A13.1:
   1. Primary: External Pipe Diameter, Uninsulated or Insulated.
      a. 3/4 to 1-1/4 inches: Use 8 inch field-length with 1/2 inch text height.
      b. 1-1/2 to 2 inches: Use 8 inch field-length with 3/4 inch text height.
      c. 2-1/2 to 6 inches: Use 12 inch field-length with 1-1/4 inch text height.
   2. Tertiary: Other Details.
      a. Directional flow arrow.

2.10 UNDERGROUND WARNING TAPE

A. Manufacturers:
   1. Brady Corporation: www.bradyid.com/#sle.
   2. Brimar Industries, Inc: www.brimar.com/#sle.
   3. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   4. Seton Identification Products: www.seton.com/#sle.

B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil, 0.004 inch.

D. Legend: Type of service, continuously repeated over full length of tape.

2.11 CEILING TACKS

A. Manufacturers:
   1. Craftmark: www.craftmarkid.com/#sle.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:
   1. Plumbing Equipment: Yellow.
   2. Plumbing Valves: Green.
   3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

B. Degrease and clean surfaces to receive identification products.

3.02 **EQUIPMENT LABEL INSTALLATION**

A. Install or permanently fasten labels on each major item of mechanical equiment.

B. Locate equipment labels where accessible and visible.

3.03 **PIPE LABEL INSTALLATION**

A. Piping Color-Coding: Painting of piping is specified in other sections.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces, machine rooms, accessible maintenance spaces such as shafts, tunnels, and plenums, and exterior exposed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
   4. At access doors, manholes, and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 50 feet (15m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings. Omit intermediately space labels.

3.04 **VALVE-TAG INSTALLATION**

A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similiar rough-in connections on end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similiar to those indicated in the following subparagraphs:
   1. Valve-Tag Size and Shape:
      a. Cold Water: 2 inches (50 mm) round.
      b. Hot Water: 2 inches (50 mm) round.

3.05 **WARNING-TAG INSTALLATION**

A. Write required message on, and attach warning tags to equipment and other items where required.

3.06 INSTALLATION

A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags in clear view and align with axis of piping

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe marker around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

F. Apply ASME A13.1 Pipe Marking Rules:
   1. Place pipe marker adjacent to changes in direction.
   2. Place pipe marker adjacent each valve port and flange end.
   3. Place pipe marker at both sides of floor and wall penetrations.
   4. Place pipe marker every 25 to 50 feet interval of straight run.

G. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 **RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 **SUMMARY**

A. Section Includes:
   1. Insulation Materials:
   2. Cellular glass insulation.
   3. Cellular melamine insulation.
   4. Flexible elastomeric cellular insulation.
      a. Flexible elastomeric.
      b. Glass fiber insulation.
      c. Polyethylene insulation.
      d. Mineral fiber.
   5. Adhesives.
   6. Sealants.

1.03 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

1.04 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2025.

D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.

E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

F. ASTM C1410 - Standard Specification for Cellular Melamine Thermal and Sound-Absorbing Insulation; 2017 (Reapproved 2023).

G. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber; 2020.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

C. Qualification Data: For qualified installer.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.06 **QUALITY ASSURANCE**

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicted, as directed by Architect. Use materials indicted for the completed work.

1.07 **DELIVERY, STORAGE, AND HANDLING**

A. Packaging: Insulation material containers shall be marked by mnufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.08 **COORDINATION**

A. Coordinate clearance requirements with piping installer for piping insulation application and equipment installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.09 **SCHEDULING**

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have stisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.10 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 **INSULATION MATERIALS**

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Foam insulation materials shall not use CFC of HCFC blowing agents in the manufacturing process.

C. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

D. Flexible Elastomeric: Closed-cell, sponge or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Aeroflex USA Inc; Aerocel.
      b. Armacell LLC; AP Armaflex.
      c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

E. Mineral-Fiber, Preformed Pipe Insulation:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Fibrex Insulations Inc; Coreplus 1200.
      b. Johns Manville; Micro-Lok.
      c. Knauf Insulation; 1000 Pipe Insulation.
      d. Manson Insulation Inc; Alley-K
      e. Owens Corning; Fiberglass Pipe Insulation.

F. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Armacell LLC; Tubolit.
      b. Nomaco Inc; Imcolock, Imcosheet, Nomalock, and Nomaply.
      c. RBX Corporation; Therma-cell.

2.02 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric: Comply with MIL-A-24179A, Type II, Class 1.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Aeroflex USA Inc; Aerocel.
      b. Armacell LLC; 520 Adhesive.
      c. Foster Products Corporation, H.B. Fuller Company; 85-75.
      d. RBX Corporation; Rubatex Contact Adhesive.
   2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Products, Division of ITW; CP-82.

b. Foster Products Corporation, H.B. Fuller Company; 85-20.
c. ITW TACC, Division of Illinois Tool Works; S-90/80.
d. Marathon Industries, Inc; 225.
e. Mon-Eco Industries, Inc: 22025.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. PVC Jacket Adhesive: Compatible with PVC Jacket:
1. Products: Subject to compliance with requirements, provide one of the following:
a. Dow Chemical Company (The); 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc; Welding Adhesive.
d. Speedline Corporation; Speedine Vinyl Adhesive.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.03 SEALANTS

A. Joint Sealants:
1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
4. Color: White or gray.
5. For indoor applications, use sealants that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. FSK and Metal Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide one of the following:
a. Childers Products, Division of ITW; CP-76-8.
b. Foster Products Corporation, H.B. Fuller Company; 95-44.
c. Marathon Industries, Inc; 405.
d. Mon-Eco Industries, Inc; 44-05.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire and water resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, use sealants that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide one of the following:
a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire and water resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: White.
6. For indoor applications, use sealants that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.04 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.05 CELLULAR MELAMINE INSULATION

A. Manufacturers:
   1. TECHLITE; _____: www.techlite.com/#sle.

B. Insulation: Flexible preformed open-cell polymeric foam tubing, slit lengthwise for installation, complying with applicable requirements of ASTM C1410.
   1. Value: ASTM C177; .
   2. Minimum Service Temperature: Minus 40 degrees F.
   3. Maximum Service Temperature: 350 degrees F.
   4. Factory-Applied Jacketing Material: Paper/Foil/Scrim.
      a. Color: White.
   5. Jacketing material to be field-applied.

2.06 GLASS FIBER INSULATION

A. Manufacturers:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Knauf Insulation: www.knaufusa.com.
   4. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C547and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
   1. K Value: ASTM C177, 0.23 at 75 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.07 CELLULAR GLASS INSULATION

A. Manufacturers:
   1. Pittsburgh Corning Corporation; _____: www.foamglasinsulation.com/#sle.

B. Insulation: ASTM C552, Type II, Grade 6.
   1. Value: at .
   2. Service Temperature Range: From to .
   3. Water Vapor Permeability: 0.005 perm inch maximum per inch.
   4. Water Absorption: 0.5 percent by volume, maximum.

2.08 POLYETHYLENE INSULATION

A. Manufacturers:
   1. Armacell LLC: www.armacell.us.

B. Insulation: Flexible closed-cell polyethylene tubing, slit lengthwise for installation, complying with applicable requirements of ASTM D1056.
   1. Value: ASTM C177; .
   2. Maximum Service Temperature: 200 degrees F.
   3. Density: 2 pcf.

4. Maximum Moisture Absorption: 1.0 percent by volume.
5. Moisture Vapor Permeability: 0.05 perm inch, when tested in accordance with ASTM E96/E96M.
6. Connection: Contact adhesive.

2.09 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
   1. Aeroflex USA, Inc: www.aeroflexusa.com.
   2. Armacell LLC: www.armacell.us.
   3. K-Flex USA LLC: www.kflexusa.com.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.10 JACKETING AND ACCESSORIES

A. PVC Plastic Jacket:
   1. Manufacturers:
      a. Johns Manville Corporation: www.jm.com/#sle.

B. PVC Jacket: One piece molded type fitting covers and sheet material, off-white color.
   1. Minimum Service Temperature: 0 degrees F.
   2. Maximum Service Temperature: 150 degrees F.
   3. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
   4. Thickness: 10 mil, 0.010 inch.
   5. Connections: Brush on welding adhesive.
   6. Covering Adhesive Mastic: Compatible with insulation.

C. ABS Plastic Jacket:
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: Minus 40 degrees F.
      b. Maximum Service Temperature: 180 degrees F.
      c. Moisture Vapor Permeability: 0.012 perm inch, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 30 mil, 0.03 inch.
      e. Connections: Brush on welding adhesive.

D. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.
   1. Lagging Adhesive: Compatible with insulation.

E. Aluminum Jacket:
   1. Thickness: 0.016 inch sheet.
   2. Finish: Smooth.
   3. Joining: Longitudinal slip joints and 2 inch laps.
   4. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
   5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
   1. Verify that system and equipment to be insulated have been tested and are free of defects.
   2. Verify that surfaces to be insulated are clean and dry, with foreign material removed.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 **PREPARATION**

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation apprlication.

B. Surface Preparation: Clean and dry surfaces to receive insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
   1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils (0.127 mm) thick and an epoxy finish 5 mils (0.127 mm) thick if operating in a temperature range between 140 and 300 deg F (60 and 149 deg C). Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
   2. Carbon Steel: Coat carbon steel operating at a service temperature range between 32 and 300 deg F (0 and 149 deg C) with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.03 **GENERAL INSTALLATION REQUIREMENTS**

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces, free of voids throughout the legth of equipment and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thickness required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatiable with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with lonitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachments devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install sheilds over jacket, arranged to protectjcaket from tear or puncture by hanger, support, and shield.

K. Apply adhesive, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3 inch (75 mm) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) O.C.
3. Overlap jacket lonitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to recieve self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm) O.C.
4. For below ambient services, apply vapor-barrier mastic over staples.
5. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
6. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut instulation in a manner to avoid compressing insulation more than 75 percent of it's nominal thickness.

N. Finish installation with systems at operating conditions. Repair separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Name plates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.04 **PENETRATIONS**

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetration.
1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant,. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications thighly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applicaitons requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulations, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
   4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations for fire-rated walls and partitions.
   1. Comply with requirements for firestopping and fire-resistive joint sealers listed in other sections.

F. Insulation Installation at Floor Penetrations:
   1. Pipe: Install insulation continuously through floor penetrations.
   2. Seal penetrations through fire-rated assemblies. Comply with requirements for firestopping and fire-resistive joint sealers listed in other sections.
   3. General pipe insulation installation.

G. Requirements in this artical generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

H. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
   1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
   2. Insulated pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
   3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
   4. Insulate valves with preformed fitting insulation or sectional pipe insulation fo same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less that two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
   5. Insulate strainers with preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
   6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mech. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION". Match size and color of pipe lables.

I. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating ceement and finish with finishing cement, mastic, and flashing sealant.

J. Install removable insulation covers at locations indicted. Installation shall conform to the following:
1. Make removable flange and union insulation form sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of the flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removeable valveinsulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.05 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flange and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:
   1. Install preformed valve covers manufactured of same material as pipe insulation when available.
   2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
   3. Install insulation to flanges as specified for flange insulation application.
   4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to surface being insulated.

3.06 **MINERAL-FIBER INSULATION INSTALLATION**

A. Insulation Installation on Straight Pipes and Tubes:
   1. Secure each layer of performed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
   2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
   3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) O.C.
   4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:
   1. Install preformed pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circuference of flange insulation and outer circumference of adjacent straight piping segments with mineral-fiber blanket insulation.
   4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm) and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install performed sections fo same material as straight segments of pipe insulation when available.
   2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:
   1. Install preformed sections of same material as straight segments of pipe insulation when available.
   2. When performed sections are not available, install mitered sections of pipe insulation to valve body.
   3. Arrange insulation to permit access to packing and to allow valve operation without distrubing insulation.
   4. Install insulation to flanges as specified for flange insulation application.

3.07 POLYOLEFIN INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:
   1. Seal split-tube lonitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to sureface being installed.

B. Insulation Installation on Pipe Flanges:
   1. Install pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circuference of flange insulation and outer circumference of adjacent straight piping segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
   4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to sureface being installed.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install mitered sections of polyolefin pipe insulation.
   2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to sureface being installed.

D. Insulation Installation on Valves and Pipes Specialties:
   1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
   2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
   3. Install insulation to flanges as specified for flange insulation application.
   4. Secure insulation to valvees and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allows passage of air to sureface being installed.

3.08 **FINISHES**

A. Equipment and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
   1. Flat Acrylic Finish: Two finish coats over a primer that is compatiable with jacket material and finish coat paint. Add Fungicidal agent to render fabric mildew proof.
      a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.09 **FIELD QUALITY CONTROL**

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform test and inspections.

C. Tests and Inspections:
   1. Inspect field-insulated equipment, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
   2. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations fo threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Pipe Insulation Schedule, General" Article.

3.10 **PIPING INSULATION SCHEDULE, GENERAL**

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more that one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
   1. Drainage piping located in crawl spaces.
   2. Underground piping.
   3. Chrome-plated pipes and fittings unless there is a potential for personal injury.

3.11 **INDOOR PIPING INSULATION SCHEDULE**

A. Domestic Hot and Recirculated Hot Water:
   1. NPS 1/2" (DN 15) and NPS 3/4" (DN 20): Insulation shall be one of the following:
      a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch (25 mm) thick.
   2. NPS 1" (DN 25), NPS 1-1/4" (DN 32) and NPS 1-1/2" (DN 40): Insulation shall be one of the following:
      a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch (38 mm) thick.
   3. NPS 2" (DN 50) and larger: Insulation shall be one of the following:
      a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inch (51 mm) thick.

B. Condensate and Equipment Drain Waer below 60 Deg F (16 deg C):
   1. All Pipe Sizes: Insulation shall be one of the following:
      a. Flexible Elastomeric: 1 inch (25 mm) thick.

3.12 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

F. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

G. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

H. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert Location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 84 00.

J. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with aluminum jacket.

K. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.13 SCHEDULES

A. Plumbing Systems:
   1. Domestic Hot Water Supply:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: 1 inch and larger.
         2) Thickness: 1 inch.
   2. Domestic Hot Water Recirculation:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: All sizes.
         2) Thickness: 1 inch.

END OF SECTION

SECTION 22 10 05
PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet of building.
B. Sanitary waste piping, above grade.
C. Sanitary vent piping, above grade.
D. Domestic water piping, buried within 5 feet of building.
E. Domestic water piping, above grade.
F. Storm drainage piping, buried within 5 feet of building.
G. Storm drainage piping, above grade.
H. Pipe flanges, unions, and couplings.
I. Pipe hangers and supports.
J. Pipe sleeve-seal systems.
K. Ball valves.
L. Butterfly valves.
M. Balancing valves.
N. Pressure reducing valves.
O. Pressure relief valves.
P. Pressure-temperature valves.
    1. Strainers.
Q. Indirect and Condensate

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.
B. Section 08 31 00 - Access Doors and Panels.
C. Section 22 05 16 - Expansion Fittings and Loops for Plumbing Piping.
D. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment.
E. Section 22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
F. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
G. Section 22 07 19 - Plumbing Piping Insulation.
H. Section 31 23 16 - Excavation.

1.03 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems; 2015 (Reaffirmed 2025).
B. ANSI Z223.1 - National Fuel Gas Code; 2024.
C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
G. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings—DWV; 2022.
H. ASME B31.9 - Building Services Piping; 2020.
I. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
J. ASSE 1003 - Water Pressure Reducing Valves for Potable Water Distribution Systems; 2023.
K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
L. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2025.
M. ASTM B32 - Standard Specification for Solder Metal; 2020.
N. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2020.
O. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2026.
P. ASTM C1540 - Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.
Q. ASTM D2321- Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
R. ASTM D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings; 2026.
S. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020 (Reapproved 2024).
T. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2025.
U. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing; 2020.
V. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
W. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).
X. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
Y. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014 (Reapproved 2021).
Z. AWWA C550 - Protective Interior Coatings for Valves and Hydrants; 2017.
AA. AWWA C651 - Disinfecting Water Mains; 2023.
BB. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
CC. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.
DD. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).

EE. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).

FF. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).

GG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

HH. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.

II. NSF 372 - Drinking Water System Components - Lead Content; 2022.

JJ. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Product Origin: Each pipe and fitting shall be marked with the following: Manufacturer’s name or registered trademark, Country of Origin, date of manufacture (pipe materials only).

D. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Welding Materials and Procedures: Comply with ASME BPVC-IX.

D. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

F. Made in USA: All piping products shall be manufactured and fabricated in the United States and produced from materials that is made and melted in the United States.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.07 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.02 **SANITARY SEWER AND VENT PIPING, BURIED WITHIN 5 FEET OF BUILDING**

A. Hubless Cast Iron Pipe and Fittings:
   1. Pipe Fittings: ASTM A 888 or CISPI 301.
   2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.
   3. Shielded Couplings: ASTM C 1540 assembly of metal shield or housing, corrosion-resistant fasteners and rubber sleeve with integral, center pipe stop.
      a. Sanitary Sewer And Vent Piping - Heavy-Duty, 4-band shielded, stainless-steel couplings, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

B. DWV Copper Pipe And Fittings - Forced Main:
   1. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
   2. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

2.03 **SANITARY SEWER AND VENT PIPING, ABOVE GRADE**

A. Hubless Cast Iron Pipe and Fittings:
   1. Pipe Fittings: ASTM A 888 or CISPI 301.
   2. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners and rubber sleeve with integral, center pipe stop.
      a. Vent Piping - Standard, 2-band or 4-band shielded, stainless-steel couplings, CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
   3. Shielded Couplings: ASTM C 1540 assembly of metal shield or housing, corrosion-resistant fasteners and rubber sleeve with integral, center pipe stop.
      a. Sanitary Sewer Piping - Heavy-Duty, 4-band shielded, stainless-steel couplings, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

B. Copper Tube And Fittings - Forced Main:
   1. Hard Drawn Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
   2. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

2.04 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Tube and Fittings:
   1. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
   2. Wrought-Copper Solder-Joint Fittings: ASME B 16.22, wrought-copper pressure fittings.
   3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
   4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

B. Soft Copper Tube: ASTM B88, Type K water tube, annealed temper.

1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

2.05 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube and Fittings:
   1. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
   2. Wrought-Copper Solder-Joint Fittings: ASME B 16.22, wrought-copper pressure fittings.
   3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
   4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.06 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Hubless Cast Iron Pipe and Fittings:
   1. Pipe Fittings: ASTM A 888 or CISPI 301.
   2. Shielded Couplings: ASTM C 1540 assembly of metal shield or housing, corrosion-resistant fasteners and rubber sleeve with integral, center pipe stop.
      a. Heavy-Duty, 4-band shielded, stainless-steel couplings, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

2.07 STORM DRAINAGE PIPING, ABOVE GRADE

A. Hubless Cast Iron Pipe and Fittings:
   1. Pipe Fittings: ASTM A 888 or CISPI 301.
   2. Shielded Couplings: ASTM C 1540 assembly of metal shield or housing, corrosion-resistant fasteners and rubber sleeve with integral, center pipe stop.
      a. Heavy-Duty, 4-band shielded, stainless-steel couplings, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

2.08 **ENCASEMENT FOR UNDERGROUND PIPING**

A. High density cross laminated polyethylene film intended for encasement of underground piping for protection against corrosion.
   1. ASTM 1674 or AWWA C105
   2. Minimum thickness: 0.004-inch
   3. Form: Tube
   4. Color: Natural

2.09 PIPE FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 inch and Under:
   1. Ferrous pipe: ASME B16.39, Class 150 malleable iron threaded unions.
   2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Sizes Over 1 inch:
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

2.10 **CONDENSATE PIPING**

A. Copper Tube And Fittings:
   1. Hard Drawn Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

2. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

2.11 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.
   5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.

B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
   3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
   4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.
   5. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:
   1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
   3. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
   4. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
   5. Wall Support for Pipe Sizes Up to 3 inch: Cast iron hook.
   6. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.
   7. Wall Support for Hot Pipe Sizes 6 inch and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
   8. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   9. Floor Support for Hot Pipe Sizes to 4 inch: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
   10. Floor Support for Hot Pipe Sizes 6 inch and Larger: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
   11. Copper Pipe Support: Carbon steel ring, adjustable, copper plated, plastic-coated, or felt-lined for non-insulated copper pipe.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
   2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.
   3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
   4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
   5. Manufacturers:
      a. Powers Fasteners, Inc; _____: www.powers.com/#sle.

2.12 PIPE SLEEVE-SEAL SYSTEMS

A. Manufacturers:
   1. The Metraflex Company; MetraSeal: www.metraflex.com/#sle.

B. Modular Mechanical Seals:
   1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
   2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
   3. Size and select seal component materials in accordance to service requirements.
   4. Glass reinforced plastic pressure end plates.

2.13 **BRONZE GATE VALVES**

A. Bronze Gate Valve, General: MSS SP-80, with ferrous-alloy handwheel.

B. Type 2, Class 200, Bronze Gate Valves: Bronze body with rising stem and bronze solid wedge and union-ring bonnet.

2.14 **BRONZE GLOBE VALVES**

A. Bronze Globe Valve, General: MSS SP-80, with ferrous-alloy handwheel.

B. Type 1, Class 200, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.

C. Type 2, Class 200, Bronze Gate Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

2.15 BALL VALVES

A. General Duty: Copper-Alloy Ball Valves:
   1. Copper-Alloy Ball Valves, General: MSS SP-110
   2. Two-Piece, Copper-Alloy Ball Valves: Brass or bronze body with full-port, chrome-plated bronze ball, PTFE or TFE seats, and 600 psig (4140 kPa) minimum CWP rating and blowout-proof stem.
   3. Threaded end connection for NPS 2 inch and smaller.
   4. Flanged end connection for NPS 2-1/2 inch and larger.

B. General Duty: Ferrous-Alloy Ball Valves:
   1. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flange ends.
   2. Ferrous-Alloy Ball Valves: Class 300, full or regular port.
   3. Threaded end connection for NPS 2 inch and smaller.
   4. Flanged end connection for NPS 2-1/2 inch and larger.

2.16 PLUG VALVES

A. General Duty: Cast-Iron Plug Valves:
   1. Cast-Iron Plug Valves, General: MSS SP-78.
   2. Class 250 or 300, lubricated-type, cast-iron plug valves.
   3. Class 250, nonlubricated-type, cast-iron plug valves.

2.17 **FERROUS-ALLOY BUTTERFLY VALVES**

A. Ferrous-Alloy Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff, with disc adn lining suitable for potable water, unless otherwise indicated.

B. Flangeless, 250-psig (1725 kPa) CWP Rating, Ferrous-Alloy Butterfly Valve: Wafer type with one or two piece stem.

C. Single-Flange, 300-psig (2070 kPa) CWP Rating, Ferrous-Alloy Butterfly Valve: Wafer-lug type with one or two piece stem.

D. Flanged, 300-psig (2070 kPa) CWP Rating, Ferrous-Alloy Butterfly Valve: Flanged-end type with one or two piece stem

2.18 **SPRING LOADED, LIFT-DISC CHECK VALVES**

A. Lift-Disc Check Valves, General: FCI 74-1, with spring-loaded bronze or alloy disc and bronze or alloy seat.

B. Type II, Class 250, Compact Wafer, Lift-Disc Check Valves: Compact-wafer style with cast-iron shell with diameter made to fit within bolt circle.

C. Type III, Class 250, Globe Lift-Disc Check Valves: Globe Style with cast iron shell and flanged ends.

D. Type IV, Class 150, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

2.19 PRESSURE REDUCING VALVES

A. 2 inch and Smaller:
   1. ASSE 1003, bronze body, stainless steel, and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends.
   2. Pressure Reducing Pilot-Operator:
      a. Operating Range: 5 to 50 psi.
      b. Connected into brass or bronze pilot piping and fittings.
      c. Fixed flow restrictor, pressure gauges, and isolation valves.

B. 2 inch and Larger:
   1. ASSE 1003, cast iron body with interior lining complying with AWWA C550, bronze fitted, elastomeric diaphragm and seat disc, flanged.
   2. Pressure Reducing Pilot-Operator:
      a. Operating Range: 5 to 50 psi.
      b. Connected into brass or bronze pilot piping and fittings.
      c. Fixed flow restrictor, strainer, pressure gauges, and isolation valves.

2.20 PRESSURE RELIEF VALVES

A. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

2.21 PRESSURE-TEMPERATURE VALVES

A. ANSI Z21.22, AGA certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME BPVC-IV certified and labelled.

2.22 STRAINERS

A. Size 2 inch and Smaller:
   1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
   2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

B. Size 1-1/2 inch to 4 inch:

1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

C. Size 5 inch and Larger:
1. Class 125, flanged iron body, basket pattern with 1/8 inch stainless steel perforated screen.

2.23 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:
1. Pressure Rating: 125 psig (860 kPa) minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 inch and smaller. Cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating for NPS 2-1/2 inch and larger.
3. End Connections: Threaded for NPS 2 inch and smaller. Flanged for NPS 2-1/2 inch and larger.
4. Screen: Stainless steel with round perforations, unless otherwise noted.
5. Perforation Size:
a. Strainers NPS 2 inch and Smaller: 0.062 inch (157 mm)
b. Strainers NPS 2-1/2 inch to NPS 4 inch: 0.125 inch (3.18 mm).
c. Strainers NPS 5 inch and Larger: 0.25 inch (6.35 mm)
6. Drain: Factory-installed, hose-end drain valve.

2.24 BALANCING VALVES

A. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

B. Memory-Stop Balancing Valves:
1. Standard: MSS SP-110 for two-piece copper alloy ball valve or MSS SP-80 for bronze straight pattern globe valves.
2. Pressure Rating: 125 psig minimum CWP.
3. Size: NPS 2 inch or smaller.
4. Body: Copper Alloy or Brass.
5. Ports: Standard or full test ports for differential pressure measurement.
6. Seats and Seals: Replaceable.
7. End Connections: Threaded.
8. Handle: Vinyl-covered steel or heavy duty plastic with memory-setting device.

2.25 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:
1. Standard: ASSE 1001.
2. Size: NPS 1/4 to NPS 3 inch, as required to match connected piping.
3. Body: Bronze.
4. Inlet and Outlet Connections: Threaded.
5. Finish: Chrome Plated.

B. Pressure Vacuum Breakers:
1. Standard: ASSE 1020.
2. Operation: Continuous-pressure Applications.
3. Accessories:
a. Valves: Ball Type, on inlet and outlet.

2.26 PIPING SPECIALTIES

A. Appliance Flexible Connectors:
1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.

2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Operating-Pressure Rating: 0.5 psig.
5. End Fittings: Zinc-coated steel.
6. Threaded Ends: Comply with ASME B1.20.1.
7. Maximum Length: 72 inches

B. Y-Pattern Strainers:
1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig

C. Basket Strainers:
1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig

D. T-Pattern Strainers:
1. Body: Ductile or malleable iron with removable access coupling and end cap for strainer maintenance.
2. End Connections: Grooved ends.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 57 percent free area.
4. CWP Rating: 750 psig

E. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 **TRENCHING FOR UNDERGROUND PIPING**

A. Comply with requirements of Division 31.

B. Comply with recommendations of available geotechnical report

C. Installation and Construction: Trench excavation shall comply with AST D2321.

1. Fill material shall be free of roots, rocks, debris, and organic materials. Fill material shall swell less than 3% when compacted.
2. Sand bedding material shall be natural river or bank sand free of silt, clay, loam, friable or soluable materials, and organic materials. Graded in accordnace with ANSI/ASTM C136.
3. Trench backfill in layers.
4. Compact bedding before placing pipe.
5. Hand place fill material to six inches above top of pipe and compact fill without damaging piping.
6. Reaminder of fill may be placed in trench by gravity from height not exceeding 12-inches above trench.

3.04 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not exposed.

I. Establish elevations of buried piping outside the building to ensure not less than 2 ft of cover.

J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly;

K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.

L. Provide support for utility meters in accordance with requirements of utility companies.

M. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.

N. Excavate in accordance with Section 31 23 16.

O. Install bell and spigot pipe with bell end upstream.

P. Install valves with stems upright or horizontal, not inverted. See Section 22 05 23.

Q. Install water piping to ASME B31.9.

R. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

S. Sleeve pipes passing through partitions, walls, and floors.

T. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

U. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.

2. Support horizontal piping as indicated.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
10. Provide hangers adjacent to motor-driven equipment with vibration isolation; see Section 22 05 48.
11. Support cast iron drainage piping at every joint.

V. Pipe Sleeve-Seal Systems:
1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
3. Locate piping in center of sleeve or penetration.
4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
5. Tighten bolting for a watertight seal.
6. Install in accordance with manufacturer's recommendations.

3.05 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

D. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E. Install globe valves for throttling, bypass, or manual flow control services.

F. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.

G. Provide spring-loaded check valves on discharge of water pumps.

H. Provide flow controls in water recirculating systems where indicated.

3.06 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.07 FIELD TESTS AND INSPECTIONS

A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B. Domestic Water Systems:

1. Perform hydrostatic testing for leakage prior to system disinfection.
2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
3. General:
   a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.
4. Metal Piping Systems Subject to Freezing Conditions:
   a. Inject 40 psi of compressed air into piping to spot check for leaks with liquid soap. Document and repair leaks as necessary.
   b. Raise injected compressed air pressure to 1.5 times rated service pressure or minimum pressure of 100 psi for a duration of 2 hours and verify with a gauge that no perceptible pressure drop is measured.

C. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.08 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Disinfect water distribution system in accordance with Division 31.

B. Prior to starting work, verify system is complete, flushed, and clean.

C. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

D. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

F. Maintain disinfectant in system for 24 hours.

G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

I. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.09 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.
   1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
   2. Provide 18 gauge, 0.0478-inch galvanized sheet metal sleeve around service main to 6 inch above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing.

3.10 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe Size: 1/2 inch to 1-1/4 inch:
         1) Maximum Hanger Spacing: 6.5 ft.
         2) Hanger Rod Diameter: 3/8 inches.

b. Pipe Size: 1-1/2 inch to 2 inch:
   1) Maximum Hanger Spacing: 10 ft.
   2) Hanger Rod Diameter: 3/8 inch.
c. Pipe Size: 2-1/2 inch to 3 inch:
   1) Maximum Hanger Spacing: 10 ft.
   2) Hanger Rod Diameter: 1/2 inch.
d. Pipe Size: 4 inch to 6 inch:
   1) Maximum Hanger Spacing: 10 ft.
   2) Hanger Rod Diameter: 5/8 inch.
e. Pipe Size: 8 inch to 12 inch:
   1) Maximum hanger spacing: 14 ft.
   2) Hanger Rod Diameter: 7/8 inch.
f. Pipe Size: 14 inch and Over:
   1) Maximum Hanger Spacing: 20 ft.
   2) Hanger Rod Diameter: 1 inch.

2. Plastic Piping:
   a. All Sizes:
      1) Maximum Hanger Spacing: 6 ft.
      2) Hanger Rod Diameter: 3/8 inch.

END OF SECTION

SECTION 22 10 06
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Drains.
B. Cleanouts.
C. Hose bibbs.
D. Washing machine outlet boxes.
E. Ice maker outlet boxes.
F. Backflow preventers.
G. Double check valve assemblies.
H. Water hammer arrestors.
I. Mixing valves.

1.02 RELATED REQUIREMENTS

A. Section 22 10 05 - Plumbing Piping.
B. Section 22 40 00 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS

A. ASME A112.6.3 - Floor Drains; 2022.
B. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2022.
C. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2023.
D. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent; 2021.
E. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies; 2021.
F. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations; 2017 (Reaffirmed 2021).
G. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
H. NSF 372 - Drinking Water System Components - Lead Content; 2022.
I. PDI-WH 201 - Water Hammer Arresters; 2017.
J. NSF 61, "Drinking Water System Components."
K. California Health & Safety Code 116875 for lead free content.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

D. Operation Data: Indicate frequency of treatment required for interceptors.

E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

A. Manufacturers:
   1. J.R. Smilth: www.jrsmith.com/#sle
   2. Josam Company: www.josam.com/#sle
   3. Zurn Industries, LLC: www.zurn.com/#sle.

B. Roof and Overflow Drains:
   1. Assembly: ASME A112.6.4.
   2. Body: Lacquered cast iron with sump.
   3. Strainer: Removable cast iron dome with vandal proof screws.
   4. Accessories: Coordinate with roofing type.
      a. Membrane flange and membrane clamp with integral gravel stop.
      b. Adjustable under deck clamp.
      c. Roof sump receiver.
      d. Waterproofing flange.
      e. Controlled flow weir.
      f. Leveling frame.
      g. Adjustable extension sleeve for roof insulation.

C. Downspout Nozzles:
   1. Bronze round with straight bottom section.

D. Area Drains:
   1. Assembly: ASME A112.6.4.
   2. Body: Lacquered cast iron with sump.
   3. Strainer: Round nickel-bronze.
   4. Accessories: Membrane flange and membrane clamp with integral gravel stop, with adjustable under deck clamp.

E. Floor Drain:
   1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

F. Floor Sink:
   1. Lacquered cast iron body with dome strainer and seepage flange.

2.03 CLEANOUTS

A. Exposed Metal Cleanouts :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following.
   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. Watts Drainage Products Inc.
   c. Zurn Plumbing Products Group; Specification Drainage Operation
2. Standard: ASME A112.3.1 for stainless steel for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Metal Floor Cleanouts :
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. Watts Drainage Products Inc.
   c. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast-iron soil pipe with cast-iron ferrule cleanout.
3. Size: Same as connected branch.
4. Type: Cast-iron soil pipe with cast-iron ferrule.
5. Body or Ferrule:
6. Clamping Device: Required.
7. Outlet Connection: Inside calk.
8. Closure: Brass plug with tapered threads.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Stainless steel.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
14. Standard: ASME A112.3.1.
15. Size: Same as connected branch.
16. Housing: Stainless steel.
17. Closure: Stainless steel with seal.
18. Riser: Stainless-steel drainage pipe fitting to cleanout.

C. Cast-Iron Wall Cleanouts :
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. Watts Drainage Products Inc.
   c. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
8. Wall Access: Round, nickel-bronze, copper-alloy, or stainless-steel wall-installation frame and cover.

2.04 **VANDAL-PROOF VENT CAPS**

A. Description: Low-silhouette vandal-proof hooded vent cap for roof terminations of sanitary vent lines.
   1. Cast iron body.
   2. Vandal-proof securing device.

B. Provide vandal-proof vent caps at all roof vent terminations.

2.05 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:
   1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
   2. Size: Same as connected soil, waste, or vent stack.
   3. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
   4. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
   5. Special Coating: Corrosion resistant on interior of fittings

2.06 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Floor-Drain, Trap-Seal Primer Fittings :
   1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
   2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.

B. Air-Gap Fittings:
   1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
   2. Body: Bronze or cast iron.
   3. Inlet: Opening in top of body.
   4. Outlet: Larger than inlet.
   5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

C. Sleeve Flashing Device :
   1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches (51 mm) above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
   2. Size: As required for close fit to riser or stack piping.

D. Stack Flashing Fittings :
   1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
   2. Size: Same as connected stack vent or vent stack.

E. Vent Caps :
   1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
   2. Size: Same as connected stack vent or vent stack.

2.07 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
   1. General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
   2. Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
   3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

B. Fasteners: Metal compatible with material and substrate being fastened.

C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

D. Solder: ASTM B 32, lead-free alloy.

E. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic

2.08 HOSE BIBBS

A. Interior Hose Bibbs:
   1. Bronze or brass with mounting flange, replaceable seat, hose thread spout, and integral or add-on vacuum breaker complying with ASSE 1011.

2.09 WASHING MACHINE OUTLET BOXES

A. Description: Plastic preformed rough-in box with brass quarter-turn ball valves or single lever-handle valves, socket for 2 inch waste, and slip-in finishing cover.

2.10 ICE MAKER OUTLET BOXES

A. Description: Plastic preformed square or round rough-in box with brass quarter-turn ball valve, and slip-in finishing cover.

2.11 BACKFLOW PREVENTERS

A. Reduced Pressure Backflow Preventer Assembly:
   1. ASSE 1013; cast bronze body and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure, and non-threaded vent outlet.
   2. Size: _____ inch assembly with threaded gate valves.

2.12 DOUBLE CHECK-VALVE ASSEMBLIES

A. Double Check Valve Assembly:
   1. ASSE 1012; cast bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.
   2. Size: 3/4 to 2 inch, NPS assembly with threaded full port ball valves.

2.13 WATER HAMMER ARRESTORS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
   2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com/#sle.
   3. Zurn Industries, LLC: www.zurn.com/#sle.

B. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

2.14 MIXING VALVES

A. Thermostatic Master Mixing Valves:
   1. Valve: Chrome plated cast brass or glass-filled polysulfonebody, stainless steel or copper alloy bellows or thermoplastic polmer cartridge, with integral temperature adjustment.
   2. Quality Assurance
      a. Maximum Working Pressure: 125 psig (860 kPa), unless otherwise indicated.
      b. Comply with NSF 61, "Drinking Water System Components."
      c. Comply with California Health & Safety Code 116875 for lead free content.
   3. Accessories:
      a. Strainer stop checks on inlets.
      b. Shut-off valve on outlet.
   4. Cabinet: 16 gauge, 0.0598 inch prime-coated steel, for recessed mounting with keyed lock.

B. Automatic Compensating Valves for Individual Showers and Tub and Shower Combinations:
   1. Valve: ASSE 1016, combination thermostatic and pressure balancing, bronze or brass body with inlet checkstops; integral volume and temperature control with adjustable high-temperature limit stop.
   2. Valve Trim: Escutcheon with ADA-compliant lever handle.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.

F. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories sinks and washing machine outlets .

END OF SECTION

SECTION 22 30 00
PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cooling condensate removal pumps.

1.02 RELATED REQUIREMENTS

A. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ANSI Z21.10.1 - Gas Water Heaters, Volume I, Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less; 2019 (Reaffirmed 2024).

B. ANSI Z21.10.3 - Gas-Fired Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous; 2019 (Reaffirmed 2024).

C. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

D. UL 174 - Standard for Household Electric Storage Tank Water Heaters; Current Edition, Including All Revisions.

E. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

F. UL 1453 - Standard for Electric Booster and Commercial Storage Tank Water Heaters; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data:
   1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
   2. Indicate pump type, capacity, power requirements.
   3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
   4. Provide electrical characteristics and connection requirements.

C. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Certifications:
   1. Water Heaters: NSF approved.
   2. Gas Water Heaters: Certified by CSA International to ANSI Z21.10.1, as applicable.
   3. Gas Water Heaters: Comply with SCAQMD Rule 1146.2 requirements for ultra low-NOx emissions.
   4. Electric Water Heaters: UL listed and labeled to UL 174.
   5. Water Tanks: ASME labeled to ASME BPVC-VIII-1.
   6. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

D. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide three year manufacturer warranty for domestic water heaters.

C. Provide five year manufacturer warranty for booster pumps, sewage ejectors, and sump pumps.

PART 2 PRODUCTS

2.01 COOLING CONDENSATE REMOVAL PUMPS

A. Manufacturers:
   1. Aspen Pumps
   2. Little Giant / Franklin Electric
   3. Zoeller Company[<>]: www.zoeller.com

B. Construction: Commercial grade, nonferrous pump with stainless steel shaft, integral discharge check valve, integral float switch, safety switch, thermoplastic reservoir, motor assembly, and power cord with ground.

C. Safety: UL 778.

2.02 ELECTRICAL WORK

A. Provide electrical motor driven equipment specified complete with motors, motor starters, controls, and wiring.

B. Electrical characteristics to be as specified or indicated.

C. Furnish motor starters complete with thermal overload protection and other appurtenances necessary for the motor control specified.

D. Supply manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices not shown.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

C. Pumps:
   1. Provide line sized isolating valve and strainer on suction and line sized soft seated check valve and balancing valve on discharge.
   2. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
   3. Align and verify alignment of base mounted pumps prior to start-up
   4. Provide electrical interlocking from cooling condensate pump safety switch to associated HVAC unit(s) furnished under other Sections.

3.02 SCHEDULES

A. Refer to Drawings.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water closets.
B. Urinals.
C. Lavatories.
D. Sinks.
E. Service sinks.
F. Electric water coolers.
G. Drinking fountains.
H. Eye and face wash fountains.
I. Emergency showers.
J. Hose Bibbs
K. Icemaker Supply Boxes
L. Trap Primers
M. Water Hammer Arrestors
N. Thermostatic Mixing Valves

1.02 RELATED REQUIREMENTS

A. Section 22 10 05 - Plumbing Piping.
B. Section 22 10 06 - Plumbing Piping Specialties.
C. Section 22 30 00 - Plumbing Equipment.
D. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment; 2014.
C. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
D. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
E. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2024.
F. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures; The American Society of Mechanical Engineers; 2008 (R2011).
G. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.
H. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
I. NSF 372 - Drinking Water System Components - Lead Content; 2022.

J. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

C. Accessible Plumbing Fixtures:
   1. Accessible Plumbing Fixtures, plumbing fixtures intended for people with disabilities, shall comply with requirements contained in:
      a. ICC A117.1, "Accessible and Usable Buildings and Facilities"
      b. Public Law 90-480, "Architectural Barriers Act"
      c. Public Law 101-336, "Americans with Disabilities Act"
   2. Plumbing fixtures and accessories in toilet rooms shall comply with CBC Section 11B-213.2 and Section 11B-213.3.
   3. Accessible plumbing fixtures shall comply with all requirements of CBC Section 11B, Division 6.
      a. Clearance around accesible water closets shall be minimum 60 inches measured perpendicular from side wall and 56 inches measured perpendicular from rear wall per CBC Section 11B-604.3.1
      b. Heights and location of accessible plumbing fixtures shall comply with CBC Sections 11B-602 through 11B-612.
      c. Fixture controls for accessible plumbing fixtures shall comply with the following:
         1) CBC Section 11B-602.3 for drinking fountains
         2) CBC Section 11B-604.6 for water closets
         3) CBC Section 11B-604.9.5 for children's water closets
         4) CBC Section 11B-605.4 for urinals
         5) CBC Section 11B-606.4 for lavatories and sinks
         6) CBC Section 11B-607.5 for bath tubs
         7) CBC Section 11B-608.5 for showers
         8) CBC Section 11B-611.3 for washing machines and clothes dryers
   4. Accessible sinks shall be mounted with the front of the counter or rim no higher and 34” above the finished floor.
   5. Depth of lavatories or sinks shall not interfere with knee or toe clearance provided in accordance with CBC Section 11B-306 when a forward approach is required.
   6. Water supply and drain pipes under lavatories and sinks shall be insualted or otherwise configured to protect against contact. There shall be no sharp or abrsive surfaces under lavatories and sinks. Refer to CBC Section 11B-605.5.
   7. Accessible sinks shall be a maximum of 6-1/2” deep.

D. Plumbing Fixture Water Flow Rates:

1. Comply with requirements in Public Law 102-486, "Energy Policy Act," regarding water flow and consumption rates for plumbing fixtures.
2. Comply with requirements of California CCF Title 24, Part 11 "California Green Building Standards", Section 5.303 Indoor Water Use, regarding plumbing fixture maximum flow rates.

E. NSF Standards: Comply with NSF 61, "Drinking Water System Components--Health Effects," and NSF 372 "Lead Content Compliance" for fixture materials that will be in contact with potable water. Provide pipe and fittings with NSF certification marks demonstrating complaince.

F. Lead Content Restrictions: Domestic water piping, valves, and components shall conform to California AB 1953 Legislation as applicable for maximum allowable lead content.

G. Gender Neutral Restrooms: All single-user restrooms shall be designated as gender neutral facilities by a door symbol and signage that complies with CBC Section 11B-216.8 and 11B-703.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 REGULATORY REQUIREMENTS

A. Comply with codes for installation of systems.

B. Comply with requirements.

C. Perform work in accordance with regulations.

2.03 **GENERAL**

A. Refer to schedules in Plumbing drawings for plumbing fixture specifications and additional information.

2.04 FLUSH VALVE WATER CLOSETS

A. Water Closets: Vitreous china, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps. Flush Volume: 1.28 gallon per flush, maximum
   1. Bowl: ASME A112.19.2; 16.5 inches high with elongated rim.
   2. Outlet Size: 2 inches.
   3. Color: White.
   4. Manufacturers:
      a. American Standard, Inc: www.americanstandard-us.com.

b. Kohler Company: www.kohler.com.
c. Zurn Industries, Inc: www.zurn.com.

B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
1. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Sloan Valve Company: www.sloanvalve.com.
c. Zurn Industries, Inc: www.zurn.com.

C. Seats:
1. Manufacturers:
a. Bemis Manufacturing Company: www.bemismfg.com.
b. Church Seat Company: www.churchseats.com.
c. Olsonite: www.olsonite.com.

D. Water Closet Carriers:
1. Manufacturers:
a. JOSAM Company: www.josam.com.
b. Zurn Industries, Inc: www.zurn.com.
c. J.R. Smith Manufacturing Co.: www.jrsmith.com.
2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.05 WALL HUNG URINALS

A. Urinals: Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier. Flush Volume: 0.125 gallon per flush, maximum.
1. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Kohler Company: www.kohler.com.
c. Zurn Industries, Inc: www.zurn.com.

B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
1. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Sloan Valve Company: www.sloanvalve.com.
c. Zurn Industries, Inc: www.zurn.com.

C. Wall Hung Urinal Carriers:
1. Manufacturers:
a. JOSAM Company: www.josam.com.
b. Zurn Industries, Inc: www.zurn.com.
c. J.R. Smith Manufacturing Co.: www.jrsmith.com.
2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.06 **LAVATORIES AND SUPPLY FAUCETS**

A. Manufacturers:
1. American Standard, Inc: www.americanstandard-us.com.
2. Kohler Company: www.kohler.com.
3. Zurn Industries, Inc: www.zurn.com.

B. Vitreous China Wall Hung Basin: ASME A112.19.2; vitreous china wall hung lavatory, 21-1/4" by 18-1/2" inch minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
   1. Drilling Centers: 4 inch.

C. Supply Faucet Manufacturers:
   1. Kohler Company: www.kohler.com.
   2. Zurn Industries, Inc: www.zurn.com.
   3. Chicago Faucets: www.chicagofaucets.com.

D. Supply Faucet: ASME A112.18.1; chrome plated supply fitting with open grid strainer, water economy aerator with maximum flow of 0.5 gallon per minute (low-flow), manual metering type.

2.07 SINKS

A. Manufacturers:
   1. American Standard, Inc: www.americanstandard-us.com.
   2. Kohler Company: www.kohler.com.
   3. Just Manufacturing: www.justmfg.com.
   4. Elkay Manufacturing Company[<>]: www.elkay.com

2.08 DRINKING FOUNTAINS

A. Manufacturers:
   1. Elkay Manufacturing Company: www.elkay.com.
   2. Haws Corporation: www.hawsco.com.

2.09 ELECTRIC WATER COOLERS

A. Manufacturers:
   1. Elkay Manufacturing Company: www.elkay.com.
   2. Haws Corporation: www.hawsco.com.
   3. Oasis, a Lynn Tilton Company: www.oasiscoolers.com/#sle.

2.10 SERVICE SINKS

A. Service Sink Manufacturers:
   1. American Standard, Inc: www.americanstandard-us.com.
   2. Kohler Company: kohler.com.

2.11 EMERGENCY EYE AND FACE WASH

A. Manufacturers:
   1. Haws Corporation: www.hawsco.com.
   2. Bradley Corporation:: www.bradleycorp.com

B. Emergency Wash: ANSI Z358.1; wall-mounted, self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor, twin eye wash heads and face spray ring, stainless steel dust cover, copper alloy control valve and fittings.

2.12 EMERGENCY SHOWERS

A. Manufacturers:
   1. Haws Corporation: www.hawsco.com.
   2. Bradley Corporation. www.bradleycorp.com

B. Emergency Shower: ANSI Z358.1; wall-mounted, self- cleaning, non-clogging 8 inch diameter stainless steel deluge shower head with elbow, one inch full flow valve with pull chain and 8 inch diameter ring, one inch interconnecting fittings.

2.13 HOSE BIBBS

A. Manufacturers:
1. Acorn
2. Jay R. Smith
3. Woodford

2.14 ICEMAKER SUPPLY BOXES

A. Manufacturers:
1. Chicago

2.15 TRAP PRIMERS

A. Manufacturers:
1. MIFAB
2. Precision Plumbing Products

2.16 **WATER HAMMER ARRESTORS**

A. Manufacturers:
1. MIFAB
2. Precision Plumbing Products

2.17 THERMOSTATIC MIXING VALVES

A. Manufacturers:
1. Bradley
2. Apollo Valve
3. Watts

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
C. Install components level and plumb.
D. Install and secure fixtures in place with wall carriers or wall supports and bolts.
E. Seal fixtures to wall and floor surfaces with sealant. Color to match fixture.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.05 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

A. Clean plumbing fixtures and equipment.

3.07 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.
B. Do not permit use of fixtures by construction personnel.
C. Repair or replace damaged products before Date of Substantial Completion.

3.08 SCHEDULES

A. Refer to Drawings.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Piping tube and fitting materials.
   2. Pipe joining materials.
   3. Transition fittings.
   4. Sleeves.
   5. Escutcheons.
   6. Grout.
   7. Mechanical demolition.
   8. Equipment installation requirements common to equipment sections.
   9. Painting and finishing.
   10. Supports and anchorages.

1.02 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. PE: Polyethylene plastic.
   4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. EPDM: Ethylene-propylene-diene terpolymer rubber.
   2. NBR: Acrylonitrile-butadiene rubber.

1.03 SUBMITTALS

A. Product Data: For the following:
   1. Transition fittings.
   2. Mechanical sleeve seals.
   3. Escutcheons.

B. Welding certificates.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.05 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 PIPE, TUBE, AND FITTINGS MATERIALS

A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.02 PIPE JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

C. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

D. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.03 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
   1. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
   2. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
   3. Aboveground Pressure Piping: Pipe fitting.

B. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.04 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms for concrete foundation walls below grade.

F. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.05 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw. Polished chrome-plated and rough brass.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw. Polished chrome-plated and rough brass.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.06 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
   1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5000-psi 28-day compressive strength, unless otherwise indicated in the structural drawings.
   3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
   1. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

2. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
3. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
4. Install piping to permit valve servicing.
5. Install piping at indicated slopes.
6. Install piping free of sags and bends.
7. Install fittings for changes in direction and branch connections.
8. Install piping to allow application of insulation.

C. Select system components with pressure rating equal to or greater than system operating pressure.

3.02 ESCUTCHEONS

A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
1. New Piping:
a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

3.03 PENETRATIONS AND SLEEVES

A. Sleeves are not required for core-drilled holes.

B. Permanent sleeves are not required for holes formed by removable PE sleeves.

C. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
d. Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

D. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

F. Verify final equipment locations for roughing-in.

G. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.04 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.05 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.06 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Grease fittings shall be installed in accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.07 PAINTING

A. Painting of mechanical systems, equipment, and components is specified in Division 9.

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.08 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.09 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Grout Installation:
1. Clean surfaces that will come into contact with grout.
2. Provide forms as required for placement of grout.
3. Avoid air entrapment during placement of grout.
4. Place grout, completely filling equipment bases.
5. Place grout on concrete bases and provide smooth bearing surface for equipment.
6. Place grout around anchors.
7. Cure placed grout.

3.10 MECHANICAL DEMOLITION

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Ducts to Be Removed: Remove portion of ducts indicated to be removed and cap or plug remaining ducts with same or compatible ductwork material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.

C. Owner shall have first right-of refusal for salvage of all items to be removed. All items accepted for salvage by the Owner shall be protected from damage and delivered to the Owner's Representative. All items refused for salvage by the Owner shall be properly dispose dof by the Contractor.

D. For piping to remain, Contractor shall submit samples of existing piping to remain from locations as determined by the Engineer. Based on the results of destructive testing replacement of piping may be considered.

E. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

END OF SECTION

SECTION 23 05 17
SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe sleeves.

1.02 REFERENCE STANDARDS

A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2024.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.

1.03 SUBMITTALS

A. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PIPE SLEEVES

A. Vertical & Horizontal Piping:
   1. Sleeve Length: 1 inch beyond structural wall or floor assembly.
   2. Provide sealant for watertight joint.

B. Clearances:
   1. Provide allowance for insulated piping.
   2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
   3. All Rated Openings: Caulked tight with fire stopping material in compliance with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.

PART 3 EXECUTION

3.01 PREPARATION

3.02 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

B. Install piping to conserve building space, to not interfere with use of space and other work.

C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Provide sleeves when penetrating walls and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
   1. Aboveground Piping:
      a. Pack solid using mineral fiber in compliance with ASTM C592.
      b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
   2. All Rated Openings: Caulk tight with fire stopping material in compliance with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.
   3. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.

E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.03 CLEANING

A. Upon completion of work, clean all parts of the installation.

B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

END OF SECTION

SECTION 23 05 29
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment components.

1.02 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

E. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2023.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.

G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).

H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

L. FM (AG) - FM Approval Guide; Current Edition.

M. MFMA-4 - Metal Framing Standards Publication; 2004.

N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

O. UL (DIR) - Online Certifications Directory; Current Edition.

P. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.

2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
1. Fiberglass Channel (Strut) Framing Systems: Include requirements for strength derating according to ambient temperature.

B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.05 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.

C. Installer Qualifications for Field-Welding: As specified in Section 05 50 00.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
1. Comply with MSS SP-58.
2. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
3. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 2x. Include consideration for vibration, equipment operation, and shock loads where applicable.
5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Prefabricated Trapeze-Framed Metal Strut Systems:
1. Manufacturers:
    a. ABB Installation Products: electrification.us.abb.com/#sle.
    b. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
    c. Gripple, Inc; Fast Track - Standard: www.gripple.com/#sle.
    d. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
2. MFMA-4 compliant, pre-fabricated, MSS SP-58 type 59 continuous-slot metal strut channel with associated tracks, fittings, and related accessories.

C. Strut Channels:
1. Manufacturers:
    a. B-Line, a brand of Eaton Corporation: www.eaton.com/#sle.
    b. Gripple, Inc; Universal Bracket: www.gripple.com/#sle.
    c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
2. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
3. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.

D. Hanger Rods:
1. Threaded zinc-plated steel unless otherwise indicated.
2. Minimum Size, Unless Otherwise Indicated or Required:

E. Thermal Insulated Pipe Supports:
1. General Requirements:
    a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
    b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
    c. Pipe supports to be provided for nominally sized, 1/2 to 30 inch iron pipes.
    d. Insulation inserts to consist of rigid polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.
2. PVC Jacket:
    a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
    b. Minimum Service Temperature: Minus 40 degrees F.
    c. Maximum Service Temperature: 180 degrees F.

d. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
e. Thickness: 60 mil.

3. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.

F. Pipe Supports:
1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. Liquid Temperatures Up To 122 degrees F:
a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
b. Support From Below: MSS SP-58 Types 35 through 38.
3. Operating Temperatures from 122 to 446 degrees F:
a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.
b. Roller Support: MSS SP-58 Types 41 or 43 through 46, with appropriate saddle of MSS SP-58 Type 39 for insulated pipe.

G. Pipe Stanchions: For pipe runs, use stanchions of same type and material where vertical adjustement is required for stationary pipe.
1. Manufacturers:
a. Anvil International; H-Block: www.anvilintl.com/#sle.
b. Approved equal.
2. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
3. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
4. For pipe runs, use stanchions of same type and material where vertical adjustment is required for stationary pipe.

H. Beam Clamps:
1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

I. Riser Clamps:
1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
3. Medium Split Horizontal Pipe Clamp: MSS SP-58 type 4, carbon steel or stainless steel with epoxy plated, plain, stainless steel, or zinc plated finish.
4. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
5. UL (DIR) listed: Pipe sizes 1/2 to 8 inch.

J. U-Bolts:

1. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.

K. Pipe Hangers:
   1. Split Ring Hangers:
      a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
      b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
      c. Provide hanger rod and nuts of the same type and material for a given pipe run.
      d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.

L. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

M. Pipe Shields for Insulated Piping:
   1. General Construction and Requirements:
      a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
      b. Shields Material: UV-resistant polypropylene with glass fill.
      c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
      d. Minimum Service Temperature: Minus 40 degrees F.
      e. Maximum Service Temperature: 178 degrees F.
      f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

N. Anchors and Fasteners:
   1. Manufacturers - Mechanical Anchors:
      a. Hilti, Inc; _____: www.us.hilti.com/#sle.
      b. ITW Red Head, a division of Illinois Tool Works, Inc; _____: www.itwredhead.com/#sle.
      c. Simpson Strong-Tie Company Inc; _____: www.strongtie.com/#sle.
      d. Approved equal.
   2. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   3. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
   4. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
   5. Hollow Masonry: Use toggle bolts.
   6. Hollow Stud Walls: Use toggle bolts.
   7. Steel: Use beam-ceiling clamps, beam clamps, machine bolts, or welded threaded studs.
   8. Sheet Metal: Use sheet metal screws.
   9. Wood: Use wood screws.
   10. Plastic and lead anchors are not permitted.
   11. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
      a. Comply with MFMA-4.
      b. Channel Material: Use galvanized steel.
      c. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
      d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.

H. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.

J. Secure fasteners according to manufacturer's recommended torque settings.

K. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 23 05 48
VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vibration isolation requirements.

B. Seismic control requirements.

C. Vibration-isolated equipment support bases.

D. Seismic restraint systems.

E. Vibration-isolated and/or seismically engineered roof curbs.

1.02 DEFINITIONS

A. HVAC Component: Where referenced in this section in regards to seismic controls, applies to any portion of the HVAC system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., ductwork, piping).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings and Other Structures; 2022.

B. ASCE 19 - Structural Applications of Steel Cables for Buildings; 2016.

C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

D. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment; 2014.

E. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section .

1.05 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
   1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.

C. Shop Drawings - Vibration Isolation Systems:
   1. Include dimensioned plan views and sections indicating proposed arrangement of vibration isolators; indicate equipment weights and static deflections.
   2. Vibration-Isolated Equipment Support Bases: Include base weights, including concrete fill where applicable; indicate equipment mounting provisions.

1.06 QUALITY ASSURANCE

A. Comply with .

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATION REQUIREMENTS

A. vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing HVAC equipment and/or HVAC connections to vibration-isolated equipment.

B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:

C. General Requirements:
   1. Select vibration isolators to provide required static deflection.
   2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.

2.02 VIBRATION-ISOLATED EQUIPMENT SUPPORT BASES

2.03 SEISMIC RESTRAINT SYSTEMS

A. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

B. Cable Restraints:
   1. Comply with ASCE 19.
   2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
   3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
   4. Use protective thimbles for cable loops.

C. Rigid Restraints: Use for structural element; suitable for both compressive and tensile design loads.

2.04 VIBRATION-ISOLATED AND/OR SEISMICALLY ENGINEERED ROOF CURBS

A. Seismic Type:
   1. Non-isolated Curb and Fabricated Equipment Piers:
      a. Location: Between structure and rooftop equipment.
      b. Construction: Steel.
      c. Weather exposed components consist of corrosion resistant materials.
   2. Vibration Isolation Curb:
      a. Location: Between structure and rooftop equipment.
      b. Construction: Steel.
      c. Integral vibration isolation to conform to requirements of this section.
      d. Snubbers consist of minimum 0.25 inch thick resilient pads to avoid metal-to-metal contact without compromising vibration isolating capabilities.
      e. Weather exposed components consist of corrosion resistant materials.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Vibration Isolation Systems:
   1. Vibration-Isolated Equipment Support Bases:
      a. Provide specified minimum clearance beneath base.
   2. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.
   3. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.
   4. Adjust isolators to be free of isolation short circuits during normal operation.
   5. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

3.02 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect vibration isolation and/or seismic control components for damage and defects.

C. Vibration Isolation Systems:
   1. Verify isolator static deflections.
   2. Verify vibration isolation performance during normal operation; investigate sources of isolation short circuits.

D. Correct deficiencies and replace damaged or defective vibration isolation and/or seismic control components.
   1. Refer to Drawings.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.
B. Tags.
C. Duct markers.
D. Pipe markers.
E. Ceiling tacks.

1.02 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2025.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.
B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
D. Product Data: Provide manufacturers catalog literature for each product required.
E. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

A. Control Panels: Nameplates.
B. Ductwork: Duct Markers.
C. Major Control Components: Nameplates.
D. Piping: Pipe markers.
E. Small-sized Equipment: Tags.
F. Thermostats: Adhesive backed abel.
G. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES

A. Content: Minimum information indicating unique equipment tag.
B. Multi-layered metalized polyester with permanent adhesive.
   1. Letter Color: White.
   2. Letter Height: 2 inch, minimum.

3. Background Color: Black.
4. Plastic: Comply with ASTM D709.
5. Fastners: Stainless-steel rivets or self tapping screws
6. Adhesive: Contact type permanent adhesive, compatible with label and with substrate

2.03 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

B. Content: Minimum information indicating unique valve or insturment tag

C. Metal Tags: Stainless Steel with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.04 DUCT MARKERS

A. Material: High gloss acrylic adhesive-backed vinyl film; printed with UV and chemical resistant inks.

B. Style: Multiple Markers on a Roll.

C. Content: Minimum information indicating flow direction arrow and identification of air service.

D. Color: Yellow/Black for concealed ductwork.

E. Size: 12 inch long color field (minimum), 2-1/2 inch high letters.

2.05 PIPE MARKERS

A. Color: Comply with ASME A13.1.

B. Content: Minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Size:
1. Up to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
2. Over 2 inch Outside Diameter of Insualtion or Pipe: 12 inch long color field, 1-1/4 inch high letters.

D. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering.

E. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

F. Color code as follows:
1. HVAC Equipment: Yellow

2.06 CEILING TACKS

A. Description: Steel with 3/4 inch diameter color coded head.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install valve tags with corrosion resistant chain.

C. Install plastic pipe markers or plastic tape pipe markers in accordance with manufacturer's instructions.

D. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

E. Install ductwork with duct labels.

F. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

G. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

1.02 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2024, with Errata (2025).

C. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems; 2019, with Errata (2022).

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2023.

1.03 SUBMITTALS

A. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Architect.
   2. Submit six weeks prior to starting the testing, adjusting, and balancing work.
   3. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
   4. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Identification and types of measurement instruments to be used and their most recent calibration date.
      d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      e. Final test report forms to be used.
      f. Details of how TOTAL flow will be determined; for example:
         1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
         2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
      g. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
      h. Confirmation of understanding of the outside air ventilation criteria under all conditions.

i. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
j. Method of checking building static and exhaust fan and/or relief damper capacity.
k. Procedures for formal deficiency reports, including scope, frequency and distribution.

B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
1. AABC (NSTSB), AABC National Standards for Total System Balance.
2. SMACNA (TAB).
3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of ten years documented experience.
3. Certified by one of the following:
a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
b. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
c. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.

4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.

3.04 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
1. Running log of events and issues.
2. Discrepancies, deficient or uncompleted work by others.
3. Contract interpretation requests.
4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

N. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

END OF SECTION

SECTION 23 07 13
HVAC DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

B. Duct liner.

C. Jacketing and accessories.

1.02 REFERENCE STANDARDS

A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

C. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.

D. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2025.

E. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts; 2016 (Reapproved 2021).

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum ten years of experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
5. Approved equal.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
1. 'K' value (maximum): 0.29 at 75 degrees F, when tested in accordance with ASTM C518.
2. Density: 0.75 lbs/cu. ft. (nominal)
3. Maximum Service Temperature: 250 degrees F.
4. Maximum Water Vapor Absorption: 5.0 percent by weight.
5. Thickness: Per drawing schedule

C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film ('FSK') or White kraft paper with glass fiber yarn ('PSK').
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

2.03 JACKETING AND ACCESSORIES

A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.

B. Aluminum Jacket:
1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
2. Thickness: 0.020 inch sheet.
3. Finish: Embossed.
4. Joining: Longitudinal slip joints and 2 inch laps.

5. Fittings: 0.020 inch thick die-shaped fitting covers with factory-attached protective liner.
6. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

2.04 DUCT LINER

A. Duct liner shall be per drawings insulation schedule and as indicated on plans.

B. Manufacturers:
1. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
2. Ductmate Industries, Inc, a DMI Company; PolyArmor (Basis of Design): www.ductmate.com/#sle.
3. Johns Manville: www.jm.com/#sle.
4. Approved equal.

C. Insulation: Non-corrosive, incombustible polyester fiber complying with ASTM C1071 and ASTM E84; webbed into a thermal blanket which is then bonded with a FSK Facing.
1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Thermal Resistance at 75 degrees F per ASTM C518:
a. 1-inch Thickness: R-4.2
b. 1-1/4 inch Thickness: R-5
c. 1-1/2 inch Thickness: R-6
d. 2-inch Thickness: R-8
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 4000 fpm.
5. Minimum Noise Reduction Coefficients:
a. 1 inch Thickness: 0.65.
b. 1-1/4 inch Thickness: 0.65
c. 1-1/2 inches Thickness: 0.65.
d. 2 inch Thickness: 0.65.

D. Adhesive: Waterproof, fire-retardant type, ASTM C916.

E. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated Ducts Conveying Air Below Ambient Temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Insulated Ducts Conveying Air Above Ambient Temperature:
1. Provide with or without standard vapor barrier jacket.

2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Finish with aluminum jacket.

F. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with aluminum jacket.

G. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.03 SCHEDULES

A. Refer to Drawings for Duct Insulation Schedule.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.
B. Flexible removable and reusable blanket insulation.
C. Jacketing and accessories.

1.02 REFERENCE STANDARDS

A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
C. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.
E. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2025.
F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

1.03 SUBMITTALS

A. Product Data: Provide insulation schedule for all products. Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than ten years of documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum ten years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping on an elevated skid from floor.

1.06 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

A. Manufacturers:
   1. Johns Manville Corporation: www.jm.com.
   2. Knauf Insulation; Earthwool Pipe Insulation: www.knaufinsulation.com/#sle.
   3. Knauf Insulation: www.knaufinsulation.com.
   4. Owens Corning Corporation: www.ocbuildingspec.com/sle.
   5. Approved equal.

B. Insulation: ASTM C547and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. K Value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 650 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier All Service Jacket (ASJ): White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive: Compatible with insulation.

F. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

G. Certifications and Sustainable Features:
   1. Contain an average of a least 25% recycled content.
   2. UL Environment GreenGuard or GreenGuard Gold Certified.
   3. Formaldehyde free or formaldehyde emissions less than 0.010 ppm.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
   1. Aeroflex USA; AEROFLEX Self-Seal: www.aeroflexusa.com/#sle.
   2. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
   3. K-Flex USA LLC; K-Flex Titan: www.kflexusa.com/#sle.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 180 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.04 JACKETING AND ACCESSORIES

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 30 mil.
      e. Connections: Brush on welding adhesive.
   2. Covering Adhesive Mastic: Compatible with insulation.

B. Aluminum Jacket:
   1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
   2. Thickness: 0.024 inch sheet.
   3. Finish: Embossed.
   4. Joining: Longitudinal slip joints and 2 inch laps.
   5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

2.05 **INSULATED PIPE SUPPORTS**

A. Unless otherwise specified, insulated pipe supports shall be provided and installed by the same during pipe support installation.

B. Insulated Pipe Supports should be provided at hanger, support, and guide locations on pipe requiring insulation.

C. The insualted pipe support should consist of either waterproofed calcium silicate or polyisocyanurate foam insulation encircling the entire circumference of the pipe with a PVC or galvanized steel jacket.

D. Provide assembly of same thickness as adjoining insulation. Jacket length shall match or exceed length of insulatin.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

F. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 84 00.

H. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

I. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.03 SCHEDULE

A. Refer to Drawings for HVAC Piping Insulation Schedule

B. Refrigerant Systems: Insulate all refrigerant system suction, liquid, hot-gas and discharge piping per insualtion schedule, code requirements, and equipment manufacturer recommendations.
   1. Flexible Elastomeric Cellular Insualtion, minimum 2.0 inch thick.

END OF SECTION

SECTION 23 09 01
CLOUD-BASED ENERGY MANAGEMENT AND CONTROL SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes equipment and performance criteria for furnishing all labor and materials for the installation and programming for Energy Management System for HVAC Systems utilizing wireless communication with cloud-based servers.

1.02 SUBMITTALS

A. Shop Drawings and product data in accordance with the specifications.

B. All shop drawings shall be prepared in AutoCAD 2000 or newer. In addition, Contractor shall provide drawings in electronic format with x-ref and layer information to other trades as required.

C. All submittals shall be with a table of contents and related section tabs. Three (3) copies shall be submitted to the Architect or engineer for distribution and review.

D. Shop drawings shall include basic floor plans depicting locations of all equipment and wiring, installed by others, to be controlled by system and locations of thermostats, gateways and other equipment provided under this section. Drawings shall also show location of electrical power, low voltage wiring and data ports, provided by others, required for proper installation of systems of this section.

E. Submittal data shall contain manufacturer's data on all hardware and software products required by the specification.

F. Submit three (3) copies of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. The Contractor prior to submitting shall check all documents for accuracy.

G. The Engineer will make corrections, if required, and return to the Contractor. The Contractor will then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.

1.03 SCOPE OF WORK

A. Except as otherwise noted, the control system shall consist of all thermostats, and gateways to fill the intent of the specification and provide for a complete and operable system.

B. The EMS contractor shall review and study existing building/site conditions where applicable and all new construction drawings for the project including HVAC drawings and the entire project specifications to familiarize themselves with the equipment and system operation prior to prior to bidding and submittal of a bid/price and notify the owner immediately of any conflicts between the project and the scope of work of this section, including work to be completed by others.

C. All equipment and installation of control devices associated with the equipment listed below shall be provided under this Contractor.

D. When the EMS system is fully installed and operational, the EMS Contractor will make themselves available to meet with the designated representatives of the owner to review the as-installed condition of the system. At that time, the EMS contractor shall demonstrate the operation of the system and prove that it complies with the intent of the drawings and specifications.

E. The Contractor shall furnish and install a complete EMS control system including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification. Provide and Install EMS controls for the HVAC Equipment as noted on the drawings.

F. Provide technical support necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and the owner's team.

G. Contractor shall provide one training session in the operation of the system, for owner's personnel.

H. All work performed under this section of the specifications will be in compliance with all codes and regulations as mandated by the authority having jurisdiction

1.04 SYSTEM DESCRIPTION

A. The Building Automation System (BAS) shall be as indicated on the drawings and described in these specifications. System shall include a network of commercial Internet-programmable thermostats, their accessories, and any other networked devices required for complete climate management. Devices shall communicate across a wireless network using IEEE 802.15.4 technical standards. Wireless communication shall be of an automated mesh communication type, which self-establishes network addresses, communication routes, and all other setup requirements to establish connection across the entire campus. A single Ethernet-connected Gateway shall be able to connect the wireless mesh network to the Internet, allowing for climate management through a cloud based web-application. This network design is to be used to isolate the BAS from the owner’s private Ethernet network (LAN) and/or WiFi networks. IEEE 802.11 or any other wireless standard of communication or a wired network communication protocol between devices is not acceptable by these BAS specifications. The Gateway is to connect to a single outbound Ethernet connection on the owner’s wide area network (WAN) over a TCP/IP connection. The owner’s firewall shall not require any inbound port assignments for the Gateway to connect to the cloud servers. The Gateway shall not require a Public IP and it shall not run any standard available operating systems, such as Windows or Linux.

B. Access and control of BAS shall be through a web-based graphical management platform. The BAS platform shall sit on a cloud server and be accessible on both local personal computers and remotely by use of a web-browser that supports HTML5 or later.

C. No on-site servers are to be installed or used for the BAS. No licensing fees or future licensing fees shall be required as part of the BAS. These specifications and guidelines are to create a cohesive and secure network that provides full management over the facility’s climate through the cloud BAS.

D. The BAS shall accommodate an unlimited simultaneous multiple-user operation. Access to the BAS shall be limiting based on security permissions of each operator’s role managed by owner site Administrators.

1.05 WORK BY OTHERS

A. The EMS Contractor shall coordinate with other contractors prior to performing the work on this project and cooperate as necessary to achieve a complete and neat installation. To that end, each contractor shall consult the drawings and specifications for all trades to determine the nature and extent of others' work prior to fabrication and installation. The owner's representative shall be immediately notified if an area of conflict occurs between trades prior to fabrication and installation. EMS Contractor shall provide field supervision to the Mechanical Contractor for pre-installation of control components.

B. Low voltage thermostat wiring between equipment and thermostat locations shall be furnished and installed by others. Unless noted otherwise all new low voltage wiring shall be multiple conductor thermostat wiring (wire count as indicated in Thermostat Manufacture's installation instructions) installed per owner's specifications. (Wiring in existing installations shall be minimum 3 conductor / 24-gauge wires per EMS manufacturer's standard specifications, multiple c conductor/24-gauge thermostat wiring preferred - see Installation Instructions for specific conductor counts depending on heating and cooling modes of existing equipment.)

C. Related work provided by others:
   1. 110 V outlets shall be provided within 5 feet of each gateway location.
   2. 1 Data port shall be provided within 10 feet of each gateway location.

D. Equipment start-up and servicing

1.06 CODE COMPLIANCE

A. Provide EMS components and ancillary equipment which are code compliant.

B. All wiring shall conform to the National Electrical Code.

C. All products of the EMS shall reside with the following agency approvals
   1. California 2022 Title 24 Compliant.
   2. California Energy Commission Occupant Control Smart Thermostat (OCST) certified.
   3. OpenADR2.0 certified.

1.07 SYSTEM STARTUP & COMMISSIONING

A. Each EMS component in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the EMS will be tested against the appropriate sequence of operation specified herein. Successful completion of the system test shall constitute the beginning of the warranty period. A written report will be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.

B. The EMS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The EMS Contractor shall have a trained technician available on request during the balancing of the systems. The EMS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract to assist with functional testing of system as it relates to EMS.

C. Upon completion of installation, submit three (3) copies of record documents. The documents shall be submitted for approval prior to final completion and include:
   1. Testing and Commissioning Reports and Checklists signed off by trained field commissioning personnel.
   2. Name, address and telephone number of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.

3. Procedures for operating the BAS, including logging on/off, alarm management, reading reports, trends, modification of setpoints, scheduling, and other interactive system requirements.
4. Provide information on how to receive support from Pelican Wireless Systems and communicate that they are a direct supporting resource. Contact information for Technical Support from Pelican Wireless Systems is to be provided.

1.08 TRAINING

A. The EMS Contractor shall provide training for two (2) owner's representatives and/or maintenance personnel. The EMS Contractor shall provide on-site training to the District's representative(s) and maintenance personnel per the following description:

B. On-site training shall consist of a minimum of two sessions, (4) hours classroom and hands on training, as indicated above of hands-on instruction geared at the operation and maintenance of the systems. The curriculum shall include:
1. System Overview
2. System Software and Operation
3. System access
4. Software features overview
5. Changing set points and other attributes
6. Scheduling
7. Editing programmed variables
8. Displaying color graphics
9. Running reports
10. Workstation maintenance
11. Application programming
12. Operational sequences including start-up, shutdown, adjusting and balancing.
13. Equipment maintenance

1.09 OPERATING AND MAINTENANCE MANUALS

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire EMS. This documentation shall include specific part numbers.

B. Following project completion and testing, the EMS contractor will submit as-built documentation reflecting the exact installation of the system.

1.10 WARRANTY

A. The EMS contractor shall warrant the system for 12 months after system acceptance and beneficial use by the District. During the warranty period, the EMS contractor shall be responsible for all necessary revisions to the software as required to provide a complete and workable system consistent with the letter and intent of the Sequence of Operation section of the specification. EMS equipment shall be warranted for a period of 5 years from the time of system acceptance.

B. Warranty of equipment is limited to replacement of defective products.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Unless noted otherwise, all products shall be of a single manufacturer. The standard of design and quality shall be products as manufactured by Pelican Wireless Systems

2.02 COMMUNICATION

A. This project shall be comprised of a network of devices that use an IEEE 802.15.4 self-creating and self-healing wireless mesh communication network to reach an Ethernet Gateway.

B. The Gateway shall communicate to cloud servers via a single Ethernet connection at the owner's wide area network (WAN) over a TCP/IP connection. The facility's firewall shall not require any inbound port assignments for the Gateway to connect to the cloud servers. The Gateway shall not require a Public IP.

C. No BACnet, modBus, LON, or any other device-to-device wired communication protocol shall be used in the communication network.

D. A single WG shall be capable of providing communication between a dedicated cloud server using TCP/IP and the on-site Internet Programmable Thermostats using the IEEE 802.15.4 wireless communication protocol. Additional WGs can be used for a single site, but each WG must meet or exceed these requirements.

E.

1. Single Ethernet Port
2. One micro-USB 5VDC power input.
3. GHz IEEE std. 802.15.4 built-in communication processor.
4. The WG shall provide the communication link between the entire system and a cloud-based server. Communication with cloud server shall be secured using AES (Advanced Encryption Standard).
5. The WG shall be able to support 2000 Internet Programmable Thermostats.

2.03 OPERATOR INTERFACE

A. The BAS shall be controlled, managed, and configured using a Web-App on any personal computer, smartphone, and/or tablet that runs a browser with HTML5 or newer.

B. The Web-App platform shall run on cloud servers which allow for virtual access. Platform shall not run on a local on-site server.

C. The Web-App shall support at a minimum, the following functions:

1. Personal user log-on identifications (email addresses) and unique passwords shall be required.
2. Custom HTML programming shall not be required to display any graphics, data, or build the Web-App. There shall be no development cost, commissioning costs, or software upgrade cost required to obtain and use the Web-App.
3. Storage of historical data shall reside on the cloud server and shall not sit within the client's computer, internal network, or other devices. A BAS, which requires on-site data storage, is not acceptable.
4. System shall allow for administrator and user defined access privileges.
5. A Push/Pull OpenAPI interface with XML data output shall be available.
6. Servers shall not run a Windows operating system.

D. Control and Override

1. The BAS shall provide view, override, and edit of the status of any object and property in the system. The status of the device shall be defined graphically and shall not require any custom programs or programming.
2. Temporary Overrides. The BAS shall be able to provide temporary override (wherever an override is allowed) and automatically remove the override after a specified period of time.
3. Any override and edit of a object virtually or at the device, if allowable, shall be historically tracked.

E. Scheduling
1. The BAS shall provide users with scheduling of application devices through a graphical interface. Scheduling shall include, but is not limited to:
2. Occupied/Unoccupied Schedules. Shall allow 12 scheduled set-time changes in a single day, be configurable for Daily, Weekly, and Weekday/Weekend layouts, and shall be able to be unique to individual devices or easily shared between multiple devices, where applicable.
   a. Event Schedules. Shall allow for advanced one-time or repeating event type schedules. Event schedules shall override Occupied/Unoccupied Schedules. After the Event schedule ends, the device shall revert back to the Occupied/Unoccupied Schedule automatically.
   b. Vacation Schedules. A 360-day Calendar shall provide override of schedules during vacation days. Thermostats shall be able to automatically or be manually switched to follow Vacation Schedules instead of Occupied/Unoccupied Schedules.

F. Alarm Notification
1. Alarm Notification(s) shall be generated if there are failures detected by devices part of the BAS. These failures shall be, but are not limited to: temperature deviations, temperatures missing targets, temperatures too high or too low, failures of equipment, etc. Alarm Notification(s) shall be posted on the BAS and shall be able to be sent either via email or text message to an unlimited number of users.

G. Reports and Logs
1. Data shall be logged and stored on cloud servers for all devices part of BAS in real-time. Every device real-time “state change”, when applicable, shall be stored and viewable for at least one week, with the option of up to two (2) years.
   a. Each space temperature
   b. Each temperature set point(s)
   c. Each current call: heat, cool, number of stages, fan, economizer, etc.
   d. Each damper position
   e. Each valve position
   f. Each CO^2 change
   g. Each CO^2 setting
   h. Each current call for ventilation due to high CO^2
   i. Each Humidity change
   j. Each Humidity set point
   k. Each current call for dehumidification or humidification.
   l. Each Fan speed adjustment
   m. Supply duct static pressure
   n. Supply, Return, Outside air temperatures
2. Data shall be represented on historical graphs that allow for easy viewing of device state change at different times.
3. Excel outputs shall not be required to view data. Historical data shall be viewable through BAS.

2.04 APPLICATION-SPECIFIC CONTROLLERS

A. Application Specific Controllers shall not require custom programming and shall control specific equipment through simple configuration settings done through the cloud-based BAS. All configuration changes shall automatically upload into the device once set on the BAS and shall be stored by the device's internal memory.

B. Gateways are devices which connected to an Ethernet port and act as a bridge between the BAS cloud servers and the wireless mesh network.
   1. Shall be capable of providing Internet connection to up to 2,000 devices.
   2. Shall be capable of automatically addressing routing tables to all devices part of wireless mesh network and shall not require manual programming or addressing.
   3. Shall communicate to cloud servers over a TCP/IP outbound-only connection.
   4. Shall not require a Public IP address, custom VPNs, or any on-site servers.
   5. Shall communicate to other BAS devices over the dedicated and isolated 802.15.4 IEEE technical standard.
   6. Shall be secured using AES (Advanced Encryption Standards).

C. Internet-Enabled Thermostats are controllers which detect a space/zone temperature and operate equipment or dampers which supply heating, cooling, ventilation, or a combination of the three mechanical states, to their space/zone. Examples are thermostats for VAV, VVT, Fan-Powered Boxes, Fan Coil, Blower Coils, Unit Ventilators, Heat Pumps, Water Source Heat Pumps, and Conventional DX and/or Gas heat equipment.
   1. Shall be capable of providing 24VAC outputs which can be configured to provide control of the following: two stages of fan, three stages of cooling, two stages of heating, one stage of auxiliary heat (heat pumps), floating point zone dampers, two position zone dampers, floating point zone reheat valves, and two position zone reheat valves.
   2. Shall include a removable wiring terminal module that allows for thermostat installation even in situations where there are only three wires between equipment and where the thermostat is to be installed.
   3. Shall be available with the following internal sensors: temperature only, temperature and humidity, temperature, humidity, and CO^2, and temperature and CO^2. All sensors required by the specifications are to be internal to the thermostat and not require two devices on the wall.
   4. Shall be able to accept expansion accessories that allow for more advanced control sequences, and additional temperature detection. Examples are economizer controllers, outside air ventilation control, supply air temperature detection, unit ventilator face/bypass control, and modulating control. All expansion accessories shall be Internet enabled and accessible through EMS.
   5. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
   6. Shall be able to automatically repeat the wireless mesh network to additional devices part of the BAS.
   7. Shall automatically push, in real-time, to the BAS all "state changes" so as to be viewable historically and in real-time from BAS. Examples are changes in equipment operation (heat, cool, fan), number of stages active, the temperatures in the space, damper position, valve position, temperature set-points, etc.
   8. Shall be able to lock-out heat pump compressor(s) based on outside air temperature.
   9. Shall provide set-point (heat & cool) temperature limitations through BAS.
   10. Shall provide full local keypad lock-out from BAS.
   11. Shall meet California 2022 Title 24 code standards.
   12. Shall have a programmable three (3°F) degree heat/cool temperature range which auto-adjusts to a five (5°F) degree dead band.
   13. Shall have both a heat setpoint, cool setpoint, and auto-changeover.

14. Shall have Optimum Start algorithms that will calculate start times based on at least seven (7) days of previous run-time temperature and rate-of-change historical data for its space. Optimum Start algorithm shall recalculate each optimized schedule time before each optimized schedule.
15. Shall be able to be manually overridden through BAS.
16. Shall be configured through BAS.

D. Wired Temperature Inputs are to be available to provide external temperature detection for specific BAS devices. Examples are to provide supply air temperature, water temperature, refrigeration temperature, outside air temperature, etc. to a thermostat or other device.
1. Shall accept 10K type II thermistors.
2. Shall push to the BAS real-time temperature changes so as to be viewable historically and in real-time from the BAS.
3. Shall accept a thermistor at a maximum of up to 100 feet from input terminal.
4. Shall be configured through the BAS.

E. Internet-Enabled Economizer Controller are controllers that modulate an outside air damper to provide ventilation and economization to a single zone.
1. Shall only require a dry-bulb outside air temperature sensor and dry-bulb supply air temperature sensor. No dry-bulb return air temperature sensor or dry-bulb mixing box temperature sensor shall be required to meet full economizer functionality to at a minimum California 2022 Title 24 standards.
2. Shall communicate with thermostat to determine space temperature and space temperature setpoint in order to decide when economization can be used.
3. Shall continue to economize as its only source of cooling as long as the outside air temperature is able to keep the space temperature within 1°F of the cool temperature setpoint.
4. Shall be able to enable mechanical cooling at the same time as economization.
5. Shall be able to prevent the supply air temperature from dropping below a minimum temperature.
6. Shall provide enthalpy by use of pulling humidity and barometric pressure information from the Internet based on the zipcode of installation location. Enthalpy shall not require any additional probes other than the dry-bulb probe and shall be free to enable.
7. If connected to a CO^2 thermostat, shall be able to provide demand ventilation control of outside air damper.
8. Shall have a minimum ventilation damper position and a maximum ventilation damper position.
9. Shall be able to be scheduled to not open the outside air damper for ventilation during unoccupied hours.
10. Shall be able to control a Variable Frequency Drive (VFD) with up to five (5) fan speed inputs. Example of fan speed changes are during ventilation, stage one cooling, stage two cooling, stage one heating, stage two heating.
11. Shall modulate an outside air damper by use of a 0-10VDC signal.
12. Shall accept a 0-10VDC signal feedback input from the outside air damper actuator to confirm outside air damper is working correctly.
13. Shall meet all California 2022 Title 24 codes, including Fault Detection and Diagnostic requirements.
14. Shall send Fault Detection and Diagnostic information to the BAS.
15. Shall accept a minimum of three (3) 10K type II thermistors.
16. Shall be able to modulate a 0-10VDC hot water, steam, or electric SCR for heating and outside air tempering.
17. Shall be able to modulate a 0-10VDC chilled water or modulating DX for cooling and outside air tempering.

18. Shall be able to control a face/bypass damper.
19. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from BAS. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature, the return air temperature, hot water valve position, face/bypass damper position, variable speed fan setting, etc.
20. Shall be able to be manually overridden through the BAS.
21. Shall be configured through the BAS.

F. Internet-Enabled Power Relay Module are controllers which have dry-contact relays able to start/stop different electrical equipment. Examples are exhaust fans, lights, pumps, valves, boilers, chillers, etc.
1. Shall have relays with a max rating of 120 VAC @ 15 AMPs or 240/277 VAC @ 10 AMPs.
2. Shall have a low-voltage terminal for momentary contact override inputs. Override time shall be configurable for a specific amount of minutes through a configuration from the BAS.
3. Shall be able to provide Lead/Lag sequencing between relays.
4. Shall be able to accept an external dry-contact input used to verify flow if being used as a pump controller. If being used as a lead/lag pump controller, shall be able to alarm the BAS if flow is not detected when Pump A is enabled and start Pump B as a stand-by pump.
5. Shall communicate with the wireless mesh network through an external wireless antenna that runs on the 802.15.4 technical standards. Antenna shall be able to communicate with Power Relay Module over three (3) 18-gauge wires up to 500 feet between device terminal inputs.
6. Shall be able to automatically repeat the wireless mesh network to additional devices part of the BAS.
7. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from the BAS. Examples are changes in relay positions On or Off.
8. Shall be able to be manually overridden through the BAS.
9. Shall be configured through the BAS.

G. Zone Controllers are controllers which operate equipment which supply heating, cooling and ventilation, or a combination of these mechanical states to multiple zones.
1. Shall communicate with the wireless mesh network through a removable wireless antenna that runs on the 802.15.4 technical standards.
2. Remote mountable antenna shall be able to communicate to Zone Controller over three (3) 18-gauge wires up to 500 feet between devices terminal inputs.
3. Communication from the Zone Controller to all zone/space Thermostats shall be over the wireless mesh network.
4. Shall be capable of providing 24VAC outputs which can be configured to provide control of the following: multiple stages of fan, multiple stages of cooling, and multiple stages of heating.
5. Shall be capable of providing 0-10VDC outputs which can be configured to provide control of the following: variable speed fan (VFD), modulating outside air damper, modulating heating valve.
6. Shall have integrated outside air damper control logic and not require a third-party or additional controllers to provide economization and ventilation control.
7. Shall directly accept a supply duct static pressure probe. Shall have an integrated short-term and long-term learning PID loop algorithm for maintaining target supply static configurations. PID loop shall not require any type of cost for programming and is to be factory loaded into controller.
8. Shall only require dry-bulb outside, return, and supply air temperature sensors.

9. If communicating to CO^2 thermostat(s), shall be able to provide demand ventilation control of outside air damper.
10. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from the BAS. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature, the return air temperature, the outside air temperature, hot water valve position, supply duct static reading, variable speed fan setting, etc.
11. Shall be able to be manually overridden through the BAS.
12. Shall be configured through the BAS.

H. Make-up Air Controllers which operate equipment supplying ventilation to the building.
1. Shall communicate with the wireless mesh network through a removable wireless antenna that runs on the 802.15.4 technical standards.
2. Remote mountable antenna shall be able to communicate to Controller over three (3) 18-gauge wires up to 500 feet between devices terminal inputs.
3. Communication from the Controller to zone/space Thermostat(s) shall be over the wireless mesh network.
4. Shall be capable of providing 24VAC outputs which can be configured to provide control of the following: multiple stages of fan, multiple stages of cooling, and multiple stages of heating.
5. Shall be capable of providing 0-10VDC outputs which can be configured to provide control of the following: modulating variable speed fan (VFD), modulating outside air damper, modulating heating, modulating cooling.
6. Shall be able to modulate a VFD to maintain a targeted building static pressure.
7. Shall be able to modulate a 0-10VDC hot water, steam, or electric SCR for heating and outside air tempering.
8. Shall be able to modulate a 0-10VDC chilled water or modulating DX for cooling and outside air tempering.
9. Shall have integrated outside air damper control logic.
10. Shall directly accept a building pressure probe. Shall have an integrated short-term and long-term learning PID loop algorithm for maintaining target building pressure. PID loop shall not require any type of cost for programming, is to be factory loaded into controller, and updatable virtually through EMS.
11. Shall only require dry-bulb outside and supply air temperature sensors.
12. If communicating to CO^2 thermostat(s), shall be able to provide demand ventilation control of outside air damper.
13. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from the BAS. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature, the return air temperature, the outside air temperature, hot water valve position, supply duct static reading, variable speed fan setting, etc.
14. Shall be scheduled On or Off through the BAS.
15. Shall be able to be manually overridden through the BAS.
16. Shall be configured through the BAS.

I. Wireless Proximity Sensors are thermostat accessories which are able to detect when a door or window is opened or closed, or be able to accept a dry-contact input from an occupancy sensor.
1. Shall be able to communicate to a single Internet-Programmable Thermostat over wireless mesh network.
2. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
3. Shall run on two AA batteries and not require any unique type of battery to operate.

4. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from the BAS. Examples are if the door is open, if the space is unoccupied, if a window is open.
5. Shall be configured through the BAS.

J. Remote Wireless Sensors are thermostat accessories which are used to either average temperatures between the sensors location and a master thermostat or to relocate the sensing location of the master thermostat without having to run new wire.
1.
2. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
3. Shall run on two AA batteries and not require any unique type of battery to operate.
4. Shall push all “state changes” to the BAS as to be viewable historically and in real-time from the BAS. Examples are changes in equipment operation (heat, cool, fan), number of stages active, the temperatures in the space, temperature set-points, etc.
5. Shall be configured through the BAS.

K. Wireless Repeaters are devices which extend the 802.15.4 wireless mesh network across large expanses or where BAS devices are unable to repeat the wireless mesh network on their own. Examples are when bridging the wireless mesh network from one building to another.
1. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
2. Shall be able to automatically repeat the wireless mesh network to additional devices part of the BAS.
3. Shall not require an Ethernet connection or any TCP/IP connection.
4. Shall only require a single 120V outlet for power.

L.
1. To meet the sequence of operation for each controller, the controller shall be configured through the BAS by the installing contractor. No custom programming or downloading by use of a service tool shall be required.
2. Stand-Alone Operation: Each piece of equipment specified shall provide stand-alone operation. BAS devices shall not require web connection or communication to the BAS to run under normal operations.

PART 3 - EXECUTION

3.01 CONTRACTOR RESPONSIBILITES

A. General
1. The BAS installing contractor shall protect all work and material from damage by their work or personnel, and shall be liable for all damage thus caused.
2. The BAS installing contractor shall be responsible for their work and equipment until final inspection, testing, and acceptance. The BAS installing contractor shall protect their work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.
3. Installation of BAS shall be performed by an approved Contractor. Approved contractor is one whom either has installed the BAS before or has been approved by the BAS manufacturer. The Contractor shall certify all work as proper and complete. Under no circumstance shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor unless that subcontractor meets the BAS approved Contractor requirements as stated above.

B. Demolition
   1. Remove controls which do not remain as part of the Energy Management System. The Owner will inform the Contractor of any equipment which is to be removed that will remain the property of the Owner. All other equipment which is removed will be disposed of by the Contractor.

C. Access to Site
   1. Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the District or the District's Representative.

D. Code Compliance
   1. All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations.

E. Cleanup
   1. At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract.

3.02 WIRING, CONDUIT, AND CABLE

A. All control wires between HVAC units and thermostat locations to be furnished and installed by others. The EMS contractor shall not begin work on this contract until all wiring is installed to the satisfaction of the EMS contractor. The EMS contractor shall provide wiring between remote temperature sensors, TA1 and thermostats as required, unless noted otherwise in drawings or specifications.

3.03 HARDWARE INSTALLATION

A. Installation Practices for Devices
   1. All devices are to be mounted level/plumb and per the manufacturer's installation documentation.

B. Identification
   1. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with as-built drawings.
   2. All field enclosures, other than controllers, shall be identified with a back lite nameplate. The lettering shall be in white against a black or blue background.
   3. Junction box covers will be marked to indicate that they are a part of the EMS system.
   4. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with name plates.
   5. All I/O field devices inside FIP's shall be labeled.

C. Existing Controls.
   1. Existing controls are not to be reused. All EMS devices will be new.

D. Control System Switch-over
   1. The Contractor shall minimize control system downtime during switch-over. Sufficient installation mechanics will be on site so that the entire switch-over can be accomplished in a reasonable time frame.

E. Location
   1. The location of sensors is per mechanical and architectural drawings.
   2. Space humidity or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.

3. If Input Temperature Sensor(s) (ITS) is used as Outdoor air sensor, Outdoor air sensors will be mounted on the north building face directly in the outside air. Install sensors such that the effects of heat radiated from the building or sunlight is minimized.
4. If any line voltage electrical control is being installed, field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

3.04 SYSTEM PROGRAMMING

A. General
1. The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software.
2. Contractor shall work with owner's representative to determine programming parameters including but not limited to hours of operation, set points, system variables, thermostat naming, and site naming. Thermostat & Site naming shall be performed by the contractor. Naming convention (equipment # or name, or space served) shall be provided by or agreed upon with the Owner.

3.05 COMMISSIONING AND SYSTEM STARTUP

A. Each system for which a EMS device has been installed shall be tested for proper installation and functional operation. Test shall include on-site control test to verify each wireless device is responding to signals sent from cloud-based servers and responding in accordance with manufacture's specifications.

3.06 SYSTEM COMMISSIONING AND SYSTEM STARTUP

A. Basic subscription (Free)

B. Each BAS component in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the BAS will be tested against the appropriate sequence of operation specified herein. Documentation shall be provided to the owner that proves installation and testing has been completed and points out any mechanical issues found that are not related to the installation of the BAS. Successful completion of the system tests shall constitute the beginning of the warranty period.

C. The BAS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The BAS Contractor shall have a trained technician available on request during the balancing of the systems. The BAS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract to assist with functional testing of system as it relates to BAS.

D. Upon completion of installation, submit three (3) copies of record documents. The documents shall be submitted for approval prior to final completion and include:
1. Testing and Commissioning Reports and Checklists signed off by trained field commissioning personnel.
2. Name, address and telephone number of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.
3. Procedures for operating the BAS including logging on/off, alarm management, reading reports, trends, modification of setpoints, scheduling, and other interactive system requirements.

4. Provide information on how to receive support from Pelican Wireless Systems and demonstrate that they are a direct supporting resource. Contact information for Technical Support from Pelican Wireless Systems is to be provided.

END OF SECTION

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping.
B. Refrigerant.
C. Moisture and liquid indicators.
D. Valves.
E. Strainers.
F. Pressure regulators.
G. Pressure relief valves.
H. Filter-driers.
I. Solenoid valves.
J. Expansion valves.
K. Flexible connections.

1.02 REFERENCE STANDARDS

A. AHRI 710 (I-P) - Performance Rating of Liquid-Line Driers; 2009.
B. AHRI 711 (SI) - Performance Rating of Liquid-Line Driers; 2009.
C. AHRI 760 (I-P) - Performance Rating of Solenoid Valves for Use with Volatile Refrigerants; 2014.
D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).
E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
G. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2022.
H. ASME B31.9 - Building Services Piping; 2020.
I. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
L. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
M. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2023.
N. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
O. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
P. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide general assembly of specialties, including manufacturer's catalogue information. Provide manufacturer's catalog data including load capacity.

C. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.

D. Design Data: Submit design data indicating pipe sizing. Indicate load-carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Test Reports: Provide test results of pressure test per manufacturer's recommendations.

F. Submit welders certification of compliance with ASME BPVC-IX.

G. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.

H. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum ten years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Filter-Driers:
   1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

2.02 REGULATORY REQUIREMENTS

A. Comply with ASME B31.9 for installation of piping system.

2.03 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.

B. Copper Tube to 7/8-inch OD: ASTM B88 (ASTM B88M), Type L (A), annealed.
   1. Fittings: ASME B16.26 cast copper.

2. Joints: Flared.

C. Pipe Supports and Anchors:
1. Provide hangers and supports that comply with MSS SP-58.
a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Vertical Support: Steel riser clamp.
7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
9. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
10. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
11. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
a. Bases: High density, UV tolerant, polypropylene or reinforced PVC.
b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.04 MOISTURE AND LIQUID INDICATORS

A. Indicators: Single port type, UL listed, with copper or brass body, flared or soldered ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.05 VALVES

A. Packed Angle Valves:
1. Forged brass or nickel plated forged steel, forged brass seal caps with copper gasket, rising stem and seat with backseating, molded stem packing, soldered or flared ends; for maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

B. Ball Valves:
1. Two piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals; for maximum working pressure of 500 psi and maximum temperature of 300 degrees F.

2.06 STRAINERS

2.07 PRESSURE REGULATORS

A. Brass body, stainless steel diaphragm, direct acting, adjustable over 0 to 80 psi range, for maximum working pressure of 450 psi.

2.08 PRESSURE RELIEF VALVES

A. Straight Through or Angle Type: Brass body and disc, neoprene seat, factory sealed and stamped with ASME UV and National Board Certification NB, selected to ASHRAE Std 15, with standard setting of 235 psi.

2.09 FILTER-DRIERS

A. Performance:
   1. Flow Capacity - Liquid Line: As indicated in schedule, minimum, rated in accordance with AHRI 710 (I-P) (AHRI 711 (SI)).
   2. Pressure Drop: 2 psi, maximum, when operating at full connected evaporator capacity.
   3. Design Working Pressure: 350 psi, minimum.

B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.

C. Construction: UL listed.
   1. Connections: As specified for applicable pipe type.

2.10 SOLENOID VALVES

A. Valve: AHRI 760 (I-P), pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), integral strainer, with flared, soldered, or threaded ends; for maximum working pressure of 500 psi.

B. Coil Assembly: UL 429 UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box with pilot light.

2.11 EXPANSION VALVES

A. Angle or Straight Through Type: AHRI 760 (I-P); design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with nonreplaceable capillary tube and remote sensing bulb and remote bulb well.

B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

2.12 ELECTRONIC EXPANSION VALVES

A. Valve:
   1. Brass body with flared or soldered connection, needle valve with floating needle and machined seat, stepper motor drive.

2.13 FLEXIBLE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain-end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   7. Provide copper plated hangers and supports for copper piping.

G. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

H. Provide clearance for installation of insulation and access to valves and fittings.

I. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08 31 00.

J. Flood piping system with nitrogen when brazing.

K. Insulate piping and equipment.

L. Fully charge completed system with refrigerant after testing.

M. Follow manufactuer's requirements for testing of refrigerant systems for pressure & final vacuum limits prior to final charge of system. Minimum line test pressure performance requirements are:
   1. Suction lines for heat pump applications - 325 PSIG
   2. Hot Gas & Liquid Lines - 325 PSIG

3.03 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
   2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.

3. 1-3/8 inch OD: Maximum span, 7 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ducts.

B. Flexible ducts.

C. Air plenums and casings.

1.02 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

F. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.

G. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012, 2nd Edition.

H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

I. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.

J. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

K. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Product Data: Provide data for duct materials.

B. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate per appropriate seal class, following SMACNA (LEAK).

D. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience, and approved by manufacturer.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum ten years of documented experience.

1.05 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with SMACNA (DCS) guidelines unless stated otherwise.

B. Provide metal duct unless otherwise indicated.

C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 23 33 19.

D. Seismic Restraint: Fabricate in compliance with SMACNA (SRM) requirements; see Section 23 05 48.

E. Duct Sealing and Leakage in accordance with Static Pressure Class:
   1. Low Pressure Service: Up to 2 in-wc:
      a. Seal: Class C, apply to seal off transverse joints.
      b. Leakage:
         1) Rectangular: Class 24 or 24 cfm/100 sq ft.
         2) Round: Class 12 or 12 cfm/100 sq ft.
   2. Low Pressure Service: From 2 in-wc to 3 in-wc:
      a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
      b. Leakage:
         1) Rectangular: Class 12 or 12 cfm/100 sq ft.
         2) Round: Class 6 or 6 cfm/100 sq ft.

F. Duct Fabrication Requirements:
   1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
   2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
   3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
   4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
   5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

6. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.02 METAL DUCTS

A. Material Requirements:
   1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Rectangular Metal Duct:
   1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.

C. Round Spiral Duct:
   1. Round spiral lock seam duct with galvanized steel outer wall.

D. Connectors, Fittings, Sealants, and Miscellaneous:
   1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
   2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
   3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
      a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
      b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
      c. For Use with Flexible Ducts: UL labeled.
   4. Gasket Tape:
      a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.

2.03 FLEXIBLE DUCTS

A. Flexible Air Ducts:
   1. UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound spring steel wire.
   2. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
   3. Pressure Rating: From at least 2 in-wc positive to 0.5 in-wc negative.
   4. Maximum Velocity: 4,000 fpm.
   5. Maximum length: 5 feet
   6. Insulation: Minimum R-4.2, unless otherwise indicated.
   7. Temperature Range: 0 to 200 degrees F.
   8. Manufacturers:
      a. Casco, Silent Flex II.
      b. Flexmaster, Type 1M or Type 6M.
      c. Atco, UPC#037

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Install products following the manufacturer's instructions.

C. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.

D. Flexible Ducts: Connect to metal ducts with mechanical fastener.

E. Exposed, Painted Ductwork: Prior to painting prepare ductwork surface by cleaning with water-based detergent to remove residual dirt and lubricating oils and wipe dry with lint free cloth.

F. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

G. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.

H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

I. Use double nuts and lock washers on threaded rod supports for equipment subject to vibration.

J. At exterior wall louvers, seal duct to louver frame and install blank-out panels.

K. Louver Fit-out:
   1. Provide blank-out panels sealing available area of wall-mounted exterior-faced louver when connected ductwork is smaller than actual louver free area, and duct outlet is smaller than the louver frame.
   2. Use the same duct material painted black on the exterior side, then seal louver frame and duct.

3.02 **DUCT LEAKAGE TESTING**

A. Duct leakage testing shall follow requirements in California Mechanical Code, Chapter 6 and shall follow procedures in HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012, 2nd Edition.

B. The maximum permitted duct leakage shall be 8 cfm/100 sf duct surface area when tested at 3 in wg.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air turning devices/extractors.
B. Backdraft dampers - metal.
C. Combination fire and smoke dampers.
D. Duct access doors.
E. Duct test holes.
F. Fire dampers.
G. Flexible duct connectors.
H. Manual volume control dampers.
I. Miscellaneous Products:
   1. Damper operators.
   2. Damper position switch.
   3. Duct opening closure film.

1.02 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
B. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association
C. NFPA 92 - Standard for Smoke Control Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
E. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
F. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
G. UL 555C - Standard for Safety Ceiling Dampers; Current Edition, Including All Revisions.
H. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Product Data: Provide for shop-fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
C. Comply with NFPA 90A and NFPA 90B.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS - METAL

A. Gravity Backdraft Dampers, Size 18 by 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.03 COMBINATION FIRE AND SMOKE DAMPERS

2.04 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Access doors with sheet metal screw fasteners are not acceptable.

2.05 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.06 FIRE DAMPERS

2.07 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.
   1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.
      a. Net Fabric Width: Approximately 2 inches wide.
   2. Metal: 3 inches wide, 24 gauge, 0.0239 inch thick galvanized steel.

C. Maximum Installed Length: 14 inch.

2.08 **MANUAL VOLUME CONTROL DAMPERS**

A. Application: Provide Manual Volume Control Dampers for any balancing damper located in an accessible location.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Splitter Dampers:

1. Material: Same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

D. Single Blade Dampers:
1. Fabricate for duct sizes up to 6 by 30 inch.
2. Blade: 24 gauge, 0.0239 inch, minimum.

E. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches. Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
1. Blade: 18 gauge, 0.0478 inch, minimum.

F. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

G. Quadrants:
1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 31 00 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 by 8 inch size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch size access door for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire-rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.

G. Demonstrate re-setting of fire dampers to Owner's representative.

H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

I. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

J. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.

K. Use splitter dampers only where indicated.

L. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 34 23
HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof exhausters.

B. Ceiling exhaust fans.

C. Laboratory-fume exhaust fans.

1.02 REFERENCE STANDARDS

A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.

B. AMCA 99 - Standards Handbook; 2016.

C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016, with Errata (2018).

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

G. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

H. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.

C. Manufacturer's Instructions: Indicate installation instructions.

D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Fan Belts: One set for each individual fan.

1.04 FIELD CONDITIONS

A. Request Owner permission to use permanent ventilator(s) for ventilation during construction.

B. Permanent ventilators may not be used for ventilation during construction.

C. Storage: Store materials in a dry area indoor, protected from damage and in accordance with manufacturer's instructions.

D. Handling: Handle and lift fans in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.05 WARRANTY

A. Provide owner with one (1) year manufacturer's warranty for all equipment compoenents including fan motor from date of owner's acceptance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Greenheck Fan Corporation: www.greenheck.com/#sle.
B. Loren Cook Company: www.lorencook.com/#sle.
C. PennBarry, Division of Air System Components: www.pennbarry.com/#sle.
D. Substitutions: Refer to Division 01.

2.02 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: Comply with AMCA 204.
B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
D. Fabrication: Comply with AMCA 99.
E. UL Compliance: UL 705, listed, labeled, designed, manufactured, and tested.
F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 ROOF EXHAUSTERS

A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
B. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.04 CEILING EXHAUST FANS

A. Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with acoustic insulation, resiliently mounted motor, gravity backdraft damper in discharge.
B. Disconnect Switch: Cord and plug-in housing for thermal overload protected motor.
C. Grille: Molded white plastic.
D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is reached with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.05 LABORATORY FUME-EXHAUST FANS

A. Application:

B. Fan Section Requirements:
   1. Impeller:
      a. Non-overloading, backward-inclined centrifugal.
      b. Material: Aluminum.
   2. Fan Shaft:
      a. Ground and polished steel with anticorrosive coating.
      b. First critical speed at least 25 percent over maximum cataloged operating speed.
      c. Enclosed over OSHA recommended safety-yellow painted guards.
   3. Bearings:
      a. 100 percent factory tested surface-mounted bearings outside of the airstream.
      b. Operate during a minimum L10 service life in excess of 100,000 hours at maximum cataloged operating speed.
   4. Belt-drive Assembly:
      a. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
      b. Belts: Static-free and oil resistant.
      c. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
      d. Motor pulley adjustable for final system balancing, readily accessible for maintenance.
   5. Housing:
      a. Construct of heavy gauge aluminum with standard factory finish.
      b. Mounting Base:
      c. Construct drive frame assembly of heavy gauge steel, mounted on vibration isolators.
      d. Provide breather tube for fresh air motor cooling and wiring.
      e. Minimum Assembly Height: 120 inches above the roof surface.
   6. Isolation Damper:
      a. With parallel blade damper, constructed of matching materials and finish.
      b. Provided by manufacturer, bolted to access drawer or panel for easy removal from contaminated airstream.
      c. With two-position damper actuator:
         1) Provided by manufacturer.
         2) Operate interlocked with fan starter.
         3) With integral auxiliary switches to monitor blade position status.
         4) Rated for NEMA EN 10250, Type 4 (IP66) environment within protective weather-housing out of contaminated airstream, connected through linkages.
   7. Fan Discharge Outlet-Nozzle:
   8. Fan Inlet Flow Sensor: Provide factory-mounted pitot tube-based differential pressure sensor probe ready for connection into differential pressure-based flow transmitter.
      a. Transmitter Housing: Provide NEMA EN 10250, Type 4 enclosure.

C. Roof Curbs:
   1. 12 inch high flanged, self-flashing of matching material and finish with continuously welded seams.
   2. Provide integral formed steel support framework with curb cap guides.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
D. Install backdraft dampers on inlet to roof and wall exhausters.
E. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

3.02 SCHEDULES

A. Refer to Drawings.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Diffusers:

B. Rectangular ceiling diffusers.

C. Registers/grilles:
   1. Ceiling-mounted, exhaust and return register/grilles.
   2. Ceiling-mounted, supply register/grilles.
   3. Wall-mounted, supply register/grilles.
   4. Wall-mounted, exhaust and return register/grilles.

D. Duct-mounted supply and return registers/louvers.

E. Roof hoods.

F. Goosenecks.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.

B. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

C. Project Record Documents: Record actual locations of air outlets and inlets.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Refer to Drawings for air outlet and inlet requirements.

2.02 MANUFACTURERS

A. Krueger-HVAC: www.krueger-hvac.com/#sle.

B. Price Industries: www.price-hvac.com/#sle.

C. Ruskin Company: www.ruskin.com/#sle.

D. Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.

2.03 RECTANGULAR CEILING DIFFUSERS

A. Type: Provide square, plaque diffuser to discharge air in four way pattern.

B. Connections: Round.

C. Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.

D. Fabrication: Steel with baked enamel finish.

E. Color: As selected by Architect from manufacturer's standard range.

2.04 DUCT-MOUNTED SUPPLY AND RETURN REGISTERS/LOUVERS

A. Type: Duct-mounted, rectangular register for round-spiral duct with adjustable pivot-ended blades, end caps, built-in volume damper, and dual cover flanges to lay flush on duct surface regardless of diameter. Performance to match manufacturer's catalog data.

B. Construction: Double deflection with front blades parallel to short dimension. Closed cell foam end gasket. Mounting frame shall be supplied with countersunk screw holes.

C. Air Scoop: Material to match register construction. Provide with steel with cable operator.

2.05 CEILING SUPPLY REGISTERS

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.

B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

C. Construction: Made of aluminum extrusions with factory enamel finish.

D. Color: As selected by Architect from manufacturer's standard range.

2.06 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

B. Frame: 1-1/4 inch margin with countersunk screw mounting.

C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

E. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

2.07 WALL SUPPLY REGISTERS

A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, double deflection.

B. Frame: 1 inch margin with concealed mounting and gasket.

C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

2.08 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.

B. Frame: 1 inch margin with concealed mounting.

C. Fabrication: Steel frames and blades, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

2.09 ROOF HOODS

A. Fabricate air inlet or exhaust hoods in accordance with SMACNA (DCS).

B. Fabricate of galvanized steel, minimum 16 gauge, 0.0598 inch base and 20 gauge, 0.0359 inch hood, or aluminum, minimum 16 gauge, 0.0598 inch base and 18 gauge, 0.0598 inch hood; suitably reinforced; with removable hood; birdscreen with 1/2 inch square mesh for exhaust and 3/4 inch for intake, and factory prime coat finish.

C. Mount unit on minimum 12 inch high curb base with insulation between duct and curb.

2.10 GOOSENECKS

A. Fabricate in accordance with of minimum 18 gauge, 0.0598 inch galvanized steel.

B. Mount on minimum 12 inch high curb base where size exceeds 9 by 9 inch.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.

C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

D. Install diffusers to ductwork with air tight connection.

E. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

F. Paint ductwork visible behind air outlets and inlets matte black.

3.02 PROTECTION

A. Protect installed products until completion of project.

B. Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION

SECTION 23 40 00
HVAC AIR CLEANING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disposable, extended area panel filters.

B. Disposable panel filters.

C. Extended surface high efficiency media filters.

D. Filter frames and housings.

E. Filter gauges.

1.02 REFERENCE STANDARDS

A. AHRI 851 (SI) - Performance Rating of Commercial and Industrial Air Filter Equipment; 2013 (Reaffirmed 2023).

B. ASHRAE Std 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.{\ch\#33}

C. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017, with Addendum (2022).

D. UL 900 - Standard for Air Filter Units; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide data on filter media, filter performance data, filter assembly and filter frames, dimensions, motor locations and electrical characteristics and connection requirements.

C. Shop Drawings: Indicate filter assembly and filter frames, dimensions, motor locations, and electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Indicate assembly and change-out procedures.

E. Operation and Maintenance Data: Include instructions for operation, changing, and periodic cleaning.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section Division 01 for additional provisions.
   2. Extra Filters: One set of each type and size.

1.04 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 DELIVERY

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including filter type and size.

B. Protect filters from weather and construction traffic, dirt, water, chemical, and mechanical damage by storing in original wrapping on an elevated skid from floor.

PART 2 PRODUCTS

2.01 FILTER MANUFACTURERS

A. American Filtration Inc: www.americanfiltration.com/#sle.

B. AAF International/American Air Filter: www.aafintl.com/#sle.

C. The Camfil Group: www.camfilfarr.com/#sle.

2.02 PERFORMANCE REQUIREMENTS

A. Comply with the rating requirements in AHRI 851 (SI).

2.03 DISPOSABLE, EXTENDED AREA PANEL FILTERS

A. Media: UL 900 Class 1, pleated, lofted, non-woven, reinforced cotton fabric; supported and bonded to welded wire grid by corrugated aluminum separators.
   1. Frame: Non-flammable.
   2. Nominal thickness: 2 inches.

B. Minimum Efficiency Reporting Value (MERV): 13, when tested in accordance with ASHRAE 52.2.

C. Performance Rating, per ASHRAE Std 52.1:
   1. Initial resistance at 500 fpm face velocity: 0.20 in-wc.
   2. Recommended final resistance: 0.9 in-wc.

2.04 DISPOSABLE PANEL FILTERS

A. Media: UL 900 Class 2, fiber blanket, factory sprayed with flameproof, non-drip, non-volatile adhesive.
   1. Frame: Cardboard
   2. Nominal Thickness: 2 inch.

B. Minimum Efficiency Reporting Value (MERV): 8, when tested in accordance with ASHRAE 52.2.

C. Performance Rating:
   1. Initial Resistance at 500 FPM face velocity: 0.15 inch WG.
   2. Recommended Final Resistance: 0.50 in-wc.

2.05 EXTENDED SURFACE HIGH EFFICIENCY MEDIA FILTERS

2.06 FILTER FRAMES AND HOUSINGS

A. General: Fabricate filter frames and supporting structures of 16 gauge, 0.0598 inch galvanized steel or extruded aluminum T-section construction with necessary gasketing between frames and walls.

B. Standard Sizes: Provide for interchangeability of filter media of other manufacturers; for panel filters, size for 24 by 24 inches filter media, minimum 2 inches thick; for extended surface and high efficiency particulate air filters, provide for upstream mounting of panel filters.

C. Side Servicing Housings: Flanged for insertion into ductwork, of reinforced 16 gauge, 0.0598 inch galvanized steel; access doors with continuous gasketing and positive locking devices on both sides; extruded aluminum tracks or channels for primary secondary filters with positive sealing gaskets.

2.07 FILTER GAUGES

A. Manufacturers:
   1. Dwyer Instruments, Inc: www.dwyer-inst.com/#sle.
   2. H.O. Trerice Co: www.trerice.com/#sle.
   3. Weiss Instruments: www.weissinstruments.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Direct Reading Dial: 3-1/2 inch diameter diaphragm actuated dial in metal case, vent valves, black figures on white background, front recalibration adjustment, range 0 to 0.5 in-wc, 2 percent of full scale accuracy.

C. Accessories: Static pressure tips with integral compression fittings, 1/4 inch aluminum tubing, 2-way or 3-way vent valves.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install air cleaning devices in accordance with manufacturer's instructions.

B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with clean set.

D. Provide filter gauges on filter banks, installed with separate static pressure tips upstream and downstream of filters.

3.02 **SCHEDULES:**

A. Refer to Drawings.

END OF SECTION

SECTION 23 81 26
SPLIT-SYSTEM AIR CONDITIONERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air cooled condensing units.

B. Indoor air handling (fan and coil) units for ductless systems.

C. Refrigerant piping.

1.02 REFERENCE STANDARDS

A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.

B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.

C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).

D. ASHRAE Std 23 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Compressor Units; 2022.

E. NEMA MG 00001 - Motors and Generators; 2024.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

G. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.

H. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

D. Design Data: Indicate refrigerant pipe sizing.

E. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

G. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturers warranty for heat exchangers, condensing units, and compressors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carrier Corporation: www.carrier.com/#sle.

B. Trane Inc: www.trane.com/#sle.

C. York International Corporation / Johnson Controls: www.york.com/#sle.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
   1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator.
   2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with all refrigerant lines insulated.

B. Performance Requirements: See Drawings for additional requirements.

C. Electrical Characteristics: As Indicated on Drawings
   1. Disconnect Switch: Factory mount disconnect switch on equipment under provisions of Section 26 05 83.

2.03 INDOOR UNITS FOR DUCTED SYSTEMS

A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories; wired for single power connection with control transformer.
   1. Air Flow Configuration: Upflow.
   2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.
   1. Motor: NEMA MG 1; 1750 rpm single speed, permanently lubricated, hinge mounted.

C. Air Filters: 2 inch thick glass fiber disposable type arranged for easy replacement.

D. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
   1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
   2. Manufacturers: System manufacturer.

2.04 INDOOR AIR HANDLING UNITS FOR DUCTLESS SYSTEMS

A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.

1. Location: Ceiling or Wall Mount as Indicated.
2. Cabinet: Galvanized steel.
   a. Finish: White.
3. Fan: Line-flow fan direct driven by a single motor.

B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
   1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
   2. Manufacturer: System manufacturer.

2.05 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
   1. Comply with AHRI 210/240.
   2. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
   3. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL 207.

B. Compressor: Scroll, two speed 1800 and 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high-pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

D. Accessories: Filter drier, high-pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
   1. Provide thermostatic expansion valves.
   2. Provide heat pump reversing valves.

E. Operating Controls:
   1. Control by room thermostat to maintain room temperature setting.

F. Mounting Pad: Precast concrete parking bumpers, minimum 4 inches square; minimum of two located under cabinet feet.

2.06 **REFRIGERANT PIPING**

A. Copper Tube: ASTM B280, H58 hard drawn Type L.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy.

B. Pipe Supports and Anchors:
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.

B. Install in accordance with NFPA 90A and NFPA 90B.

3.03 **PIPING INSTALLATION**

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Install refrigeration systems in accordance with ASHRAE Std 15.

G. Provide pessure testing for refrigerant piping per manufacturer's recommendations.

H. Pipe condensate drain from indoor unit to drain as indicated on Drawings.

I. Insulate all refrigerant system suction, liquid, hot-gas and discharge piping per insualtion schedule, code requirements, and equipment manufacturer recommendations.
   1. Flexible Elastomeric Cellular Insualtion, minimum 1 inch thick.

J. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.

3.04 **SCHEDULE**

A. Refer to Drawings.

END OF SECTION

SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

2.01 SECTION INCLUDES

A. Electrical demolition.

2.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

2.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Sustainable Design Documentation: Submit certification of removal and appropriate disposal of abandoned cables containing lead stabilizers.

PART 2 PRODUCTS

3.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

4.01 EXAMINATION

A. Verify field measurements and circuiting arrangements are as indicated.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Owner before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

4.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner before partially or completely disabling system.
   2. Notify local fire service.
   3. Make notifications at least 24 hours in advance.
   4. Make temporary connections to maintain service in areas adjacent to work area.

F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner at least 24 hours before partially or completely disabling system.
   2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
   3. Make temporary connections to maintain service in areas adjacent to work area.

4.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
   1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
   2. PCB- and DEHP-containing lighting ballasts.
   3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

F. Disconnect and remove abandoned panelboards and distribution equipment.

G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

I. Repair adjacent construction and finishes damaged during demolition and extension work.

J. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

K. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

4.04 CLEANING AND REPAIR

A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

B. Clean and repair existing materials and equipment that remain or that are to be reused.

C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace broken electrical parts.

END OF SECTION

SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.
B. Nonmetallic-sheathed cable.
C. Underground feeder and branch-circuit cable.
D. Service entrance cable.
E. Armored cable.
F. Metal-clad cable.
G. Power and control tray cable.
H. Wiring connectors.
I. Electrical tape.
J. Heat shrink tubing.
K. Oxide inhibiting compound.
L. Wire pulling lubricant.
M. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
C. Section 26 05 36 - Cable Trays for Electrical Systems: Additional installation requirements for cables installed in cable tray systems.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 26 21 00 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conductors.
F. Section 26 31 00 - Photovoltaic Collectors: Additional wiring requirements for photovoltaic systems.
G. Section 28 46 00 - Fire Detection and Alarm: Fire alarm system conductors and cables.
H. Section 31 23 16 - Excavation.
I. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.
J. Section 31 23 23 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2024).
B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
E. ASTM B800 - Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes - Annealed and Intermediate Tempers; 2005 (Reapproved 2021).
F. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2024.
G. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
H. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation); 2008a (Validated 2019).
I. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
J. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
K. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2024.
L. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
M. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
O. UL 4 - Armored Cable; Current Edition, Including All Revisions.
P. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
Q. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
R. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
S. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
T. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
U. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
V. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
W. UL 719 - Nonmetallic-Sheathed Cables; Current Edition, Including All Revisions.
X. UL 854 - Service-Entrance Cables; Current Edition, Including All Revisions.
Y. UL 1277 - Electrical Power and Control Tray Cables with Optional Optical-Fiber Members; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

C. Manufactured Wiring System Shop Drawings: Provide plan views indicating proposed system layout with components identified; indicate branch circuit connections.

D. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.

E. Field Quality Control Test Reports.

F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

G. Project Record Documents: Record actual installed circuiting arrangements. Record actual routingfor underground circuits.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Manufactured Wiring Systems Cable Assemblies: One of each configuration, 6 feet length.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
   1. Exceptions:
      a. Use manufactured wiring systems for branch circuits where concealed under raised floors.
         1) Exception: Provide single conductor building wire in raceway for circuit homerun from distribution box to panelboard.
      b. Use power and control tray cable or metal-clad cable for installation in cable tray.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Armored cable is permitted only as follows:
   1. Where not otherwise restricted, may be used:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
         1) Maximum Length: 6 feet.
   2. In addition to other applicable restrictions, may not be used:
      a. Unless approved by Owner.
      b. Where not approved for use by the authority having jurisdiction.
      c. Where exposed to view.
      d. Where exposed to damage.
      e. For damp, wet, or corrosive locations.
      f. For isolated ground circuits.

F. Metal-clad cable is not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:12 AWG.
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
         3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 480Y/277 V, 3 Phase, 4 Wire System:
         1) Phase A: Brown.
         2) Phase B: Orange.
         3) Phase C: Yellow.
         4) Neutral/Grounded: Gray.
      b. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      c. 240/120 V High-Leg Delta, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B (High-Leg): Orange.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      d. 240/120 V, 1 Phase, 3 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Neutral/Grounded: White.
      e. Equipment Ground, All Systems: Green.
      f. Isolated Ground, All Systems: Green with yellow stripe.
      g. Travelers for 3-Way and 4-Way Switching: Pink.
      h. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
   1. Copper Building Wire:
      a. Cerro Wire LLC: www.cerrowire.com.
      b. Encore Wire Corporation: www.encorewire.com/#sle.
      c. General Cable Technologies Corporation: www.generalcable.com/#sle.
      d. Southwire Company: www.southwire.com/#sle.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
   1. Feeders and Branch Circuits:
      a. Size 10 AWG and Smaller: Solid.
      b. Size 8 AWG and Larger: Stranded.
   2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
      a. Size 4 AWG and Larger: Type XHHW-2.
      b. Installed Underground: Type XHHW-2.
      c. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

2.04 SERVICE ENTRANCE CABLE

A. Manufacturers:
   1. Copper Service Entrance Cable:
      a. Cerro Wire LLC: www.cerrowire.com/#sle.
      b. Encore Wire Corporation: www.encorewire.com/#sle.
      c. Southwire Company: www.southwire.com/#sle.

B. Service Entrance Cable for Underground Use: NFPA 70, Type USE single-conductor cable listed and labeled as complying with UL 854, Type USE-2, and with UL 44 Type RHH/RHW-2.

C. Conductor Stranding: Stranded.

D. Insulation Voltage Rating: 600 V.

2.05 ARMORED CABLE

A. Manufacturers:
   1. AFC Cable Systems Inc: www.afcweb.com/#sle.
   2. Encore Wire Corporation: www.encorewire.com/#sle.
   3. Southwire Company: www.southwire.com/#sle.

B. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:
   1. Size 10 AWG and Smaller: Solid.
   2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN.

F. Grounding: Combination of interlocking armor and integral bonding wire.
   1. Provide additional full-size integral insulated equipment grounding conductor for redundant grounding, suitable for general purpose, non-essential electrical systems in non-hazardous patient care areas of health care facilities.

G. Armor: Steel, interlocked tape.

2.06 POWER AND CONTROL TRAY CABLE

A. Manufacturers:
   1. Encore Wire Corporation: www.encorewire.com/#sle.
   2. General Cable Technologies Corporation
   3. Okonite: www.okonite.com/#sle.
   4. Southwire Company: www.southwire.com/#sle.

B. Description: NFPA 70, Type TC cable listed and labeled as complying with UL 1277.

C. Where exposed run cable is indicated between cable tray and utilization equipment in qualifying industrial establishments as determined by authorities having jurisdiction, provide tray cable marked as Type TC-ER in accordance with NFPA 70.

D. Conductor Stranding: Stranded.

E. Insulation Voltage Rating: 600 V.

F. Insulation: Type XHHW or XHHW-2.

G. Grounding: Full-size integral equipment grounding conductor.

H. Jacket: PVC or Chlorinated Polyethylene (CPE).

2.07 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.

C. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
   5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
   6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
   7. Conductors for Control Circuits: Use crimped terminals for all connections.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. Ideal Industries, Inc: www.idealindustries.com/#sle.
      c. NSI Industries LLC: www.nsiindustries.com/#sle.

H. Mechanical Connectors: Provide bolted type or set-screw type.
   1. Manufacturers:
   2.
      a. Burndy LLC: www.burndy.com/#sle.
      b. Bundy, LLC

c. Ilsco: www.ilsco.com/#sle.
d. Thomas & Betts Corporation: www.tnb.com/#sle.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
1. Manufacturers:
a. Burndy LLC: www.burndy.com/#sle.
b. Ilsco: www.ilsco.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.

J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
1. Manufacturers:
a. Burndy LLC: www.burndy.com/#sle.
b. Ilsco: www.ilsco.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.08 WIRING ACCESSORIES

A. Electrical Tape:
1. Manufacturers:
a. 3M: www.3m.com/#sle.
b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
1. Manufacturers:
a. 3M: www.3m.com/#sle.
b. Burndy LLC: www.burndy.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
1. Manufacturers:
a. Burndy LLC: www.burndy.com/#sle.
b. Ideal Industries, Inc: www.idealindustries.com/#sle.
c. Ilsco: www.ilsco.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. American Polywater Corporation: www.polywater.com/#sle.
      c. Ideal Industries, Inc: www.idealindustries.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

E. Cable Ties: Material and tensile strength rating suitable for application.
   1. Manufacturers:
      a. Burndy LLC: www.burndy.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated without specific routing, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
   7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
   8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
   9. Provide oversized neutral/grounded conductors where indicated and as specified below.
      a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
      b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install armored cable (Type AC) in accordance with NECA 120.

E. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

H. Terminate cables using suitable fittings.
   1. Armored Cable (Type AC):
      a. Use listed fittings and anti-short, insulating bushings.
      b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

I. Install conductors with a minimum of 12 inches of slack at each outlet.

J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

M. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
   5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.
B. Conductors for grounding and bonding.
C. Connectors for grounding and bonding.
D. Ground bars.
E. Ground rod electrodes.
F. Chemically-enhanced ground electrodes.
G. Ground plate electrodes.
H. Ground enhancement material.
I. Ground access wells.

1.02 RELATED REQUIREMENTS

A. Section 09 65 00 - Resilient Flooring: Static control flooring.
B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
   1. Includes oxide inhibiting compound.
C. Section 26 05 36 - Cable Trays for Electrical Systems: Additional grounding and bonding requirements for cable tray systems.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 26 31 00 - Photovoltaic Collectors: Additional grounding and bonding requirements for photovoltaic systems.
F. Section 26 56 00 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.
G. Section 33 79 00 - Site Grounding.

1.03 REFERENCE STANDARDS

A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2012.
B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
F. NFPA 99 - Health Care Facilities Code; 2024.
G. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2023.

H. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
   3. For signal reference grids, coordinate the work with access flooring furnished in accordance with Section 09 69 00.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

C. Shop Drawings:
   1. Indicate proposed arrangement for signal reference grids. Include locations of items to be bonded and methods of connection.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Field quality control test reports.

F. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
   2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
   3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Metal Underground Water Pipe(s):
      a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
      b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
      c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
   3. Metal In-Ground Support Structure:
      a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
   4. Concrete-Encased Electrode:
      a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
   5. Ground Rod Electrode(s):
      a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
      b. Space electrodes not less than 10 feet from each other and any other ground electrode.
      c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
      d. Provide ground enhancement material around electrode where indicated.

e. Provide ground access well for each electrode.

6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
7. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
   a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
   b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
   c. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
8. Ground Riser: Provide common grounding electrode conductor not less than 3/0 AWG for tap connections to multiple separately derived systems as permitted in NFPA 70.

F. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:
1. Provide grounding electrode system for each separate building or structure.
2. Provide equipment grounding conductor routed with supply conductors.
3. For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.
4. Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.

H. Separately Derived System Grounding:
1. Separately derived systems include, but are not limited to:
   a. Transformers (except autotransformers such as buck-boost transformers).
   b. Uninterruptible power supplies (UPS), when configured as separately derived systems.
   c. Generators, when neutral is switched in the transfer switch.
2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
4. Where common grounding electrode conductor ground riser is used for tap connections to multiple separately derived systems, provide bonding jumper to connect the metal building frame and metal water piping in the area served by the derived system to the common grounding electrode conductor.
5. Outdoor Source: Where the source of the separately derived system is located outside the building or structure supplied, provide connection to grounding electrode at source in accordance with NFPA 70.

6. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
7. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.

I. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
   a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
   b. Metal gas piping.
   c. Metal process piping.
8. Provide bonding for interior metal air ducts.
9. Provide bonding for metal building frame.
10. Provide bonding for metal siding not effectively bonded through attachment to metal building frame.
11. Provide bonding and equipment grounding for pools and fountains and associated equipment in accordance with NFPA 70.
12. Provide redundant grounding and bonding for patient care areas of health care facilities in accordance with NFPA 70 and NFPA 99.

J. Isolated Ground System:
1. Where isolated ground receptacles or other isolated ground connections are indicated, provide separate isolated/insulated equipment grounding conductors.
2. Connect isolated/insulated equipment grounding conductors only to separate isolated/insulated equipment ground busses.
3. Connect the isolated/insulated equipment grounding conductors to the solidly bonded equipment ground bus only at the service disconnect or separately derived system disconnect. Do not make any other connections between isolated ground system and normal equipment ground system on the load side of this connection.

K. Communications Systems Grounding and Bonding:
1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
   a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.

b. Raceway Size: 3/4 inch trade size unless otherwise indicated or required.
c. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
d. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
1. Use insulated copper conductors unless otherwise indicated.
a. Exceptions:
1) Use bare copper conductors where installed underground in direct contact with earth.
2) Use bare copper conductors where directly encased in concrete (not in raceway).
2. Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gage of specified conductors.

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
a. Exceptions:
1) Use mechanical connectors for connections to electrodes at ground access wells.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
a. Exceptions:
1) Use exothermic welded connections for connections to metal building frame.
4. Manufacturers - Mechanical and Compression Connectors:
a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
b. Burndy LLC: www.burndy.com/#sle.
c. Harger Lightning & Grounding: www.harger.com/#sle.
d. Thomas & Betts Corporation: www.tnb.com/#sle.
5. Manufacturers - Exothermic Welded Connections:
a. Burndy LLC: www.burndy.com/#sle.
b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.
c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com/#sle.

D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
2. Size: As indicated.
3. Holes for Connections: As indicated or as required for connections to be made.
4. Manufacturers:

E. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
2. Material: Copper-bonded (copper-clad) steel.
3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

4. Where rod lengths of greater than 10 feet are indicated or otherwise required, sectionalized ground rods may be used.
5. Manufacturers:
   a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
   b. Erico International Corporation: www.erico.com/#sle.
   c. Galvan Industries, Inc: www.galvanelectrical.com/#sle.
   d. Harger Lightning & Grounding: www.harger.com/#sle.

F. Ground Enhancement Material:
1. Description: Factory-mixed conductive material designed for permanent and maintenance-free improvement of grounding effectiveness by lowering resistivity.
2. Manufacturers:

G. Ground Access Wells:
1. Description: Open bottom round or rectangular well with access cover for testing and inspection; suitable for the expected load at the installed location.
2. Size: As required to provide adequate access for testing and inspection, but not less than minimum size requirements specified.
3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 10 inches.
4. Cover: Factory-identified by permanent means with word "GROUND".
5. Manufacturers:
   a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
   b. Erico International Corporation: www.erico.com/#sle.
   c. Harger Lightning & Grounding: www.harger.com/#sle.
   d. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
2. Indoor Installations: Unless otherwise indicated, install with 4 inches of top of rod exposed.

D. Ground Plate Electrodes: Unless otherwise indicated, install ground plate electrodes at a depth of not less than 30 inches.

E. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

F. Identify grounding and bonding system components in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

B. Section 05 50 00 - Metal Fabrications: Materials and requirements for fabricated metal supports.

C. Section 26 05 33.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

D. Section 26 05 36 - Cable Trays for Electrical Systems: Additional support and attachment requirements for cable tray.

E. Section 26 05 33.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

F. Section .

G. Section 26 25 13 - Low-Voltage Busways: Additional support and attachment requirements for busway.

H. Section 26 31 00 - Photovoltaic Collectors: Photovoltaic module mounting systems.

I. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

J. Section 26 56 00 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

F. MFMA-4 - Metal Framing Standards Publication; 2004.

G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.
   1. Fiberglass Channel (Strut) Framing Systems: Include requirements for strength derating according to ambient temperature.

C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

D. Derating Calculations for Fiberglass Channel (Strut) Framing Systems: Indicate load ratings adjusted for applicable service conditions.

E. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.

F. Installer's Qualification Statement: Include evidence of compliance with specified requirements.

G. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

D. Installer Qualifications for Field-Welding: As specified in Section 05 50 00.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Components for Vibration Isolation and/or Seismic Controls: Comply with Section .

C. Materials for Metal Fabricated Supports: Comply with Section 05 50 00.

D. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.
   3. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      d. Thomas & Betts Corporation: www.tnb.com/#sle.

E. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
   1. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      d. Thomas & Betts Corporation: www.tnb.com/#sle.

F. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   1. Comply with MFMA-4.
   2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
   3. Channel Material:
      a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
   4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
   5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
   6. Manufacturers:
      a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Thomas & Betts Corporation: www.tnb.com/#sle.
      c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
      d. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

G. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Busway Supports: 1/2 inch diameter.
      c. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
      d. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
      e. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
      f. Outlet Boxes: 1/4 inch diameter.
      g. Luminaires: 1/4 inch diameter.

H. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
   1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
   3. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
   4. Manufacturers:
      a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. PHP Systems/Design: www.phpsd.com/#sle.
      d. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.

I. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
   3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
   4. Hollow Masonry: Use toggle bolts.
   5. Hollow Stud Walls: Use toggle bolts.
   6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
   7. Sheet Metal: Use sheet metal screws.
   8. Wood: Use wood screws.

9. Plastic and lead anchors are not permitted.
10. Powder-actuated fasteners are not permitted.
11. Hammer-driven anchors and fasteners are not permitted.
12. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Comply with MFMA-4.
    b. Channel Material: Use galvanized steel.
    c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
14. Manufacturers - Mechanical Anchors:
    a. Hilti, Inc: www.us.hilti.com/#sle.
    b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
    c. Powers Fasteners, Inc: www.powers.com/#sle.
    d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Provide required vibration isolation and/or seismic controls in accordance with Section .

I. Equipment Support and Attachment:
    1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
    2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
    3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
    4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch high concrete pad constructed in accordance with Section 03 30 00.
    5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

J. Conduit Support and Attachment: Also comply with Section 26 05 33.13.

K. Cable Tray Support and Attachment: Also comply with Section 26 05 36.

L. Box Support and Attachment: Also comply with Section 26 05 33.16.

M. Busway Support and Attachment: Also comply with Section 26 25 13.

N. Interior Luminaire Support and Attachment: Also comply with Section 26 51 00.

O. Exterior Luminaire Support and Attachment: Also comply with Section 26 56 00.

P. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

Q. Secure fasteners according to manufacturer's recommended torque settings.

R. Remove temporary supports.

S. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with NFPA 70.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 26 05 33.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).
B. Aluminum rigid metal conduit (RMC).
C. Intermediate metal conduit (IMC).
D. PVC-coated galvanized steel rigid metal conduit (RMC).
E. Flexible metal conduit (FMC).
F. Liquidtight flexible metal conduit (LFMC).
G. Electrical metallic tubing (EMT).
H. Rigid polyvinyl chloride (PVC) conduit.
I. Reinforced thermosetting resin conduit (RTRC).
J. Conduit fittings.
K. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete encasement of conduits.
B. Section 07 84 00 - Firestopping.
C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.
D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
    1. Includes additional requirements for fittings for grounding and bonding.
E. Section 26 05 29 - Hangers and Supports for Electrical Systems.
F. Section 26 05 33.16 - Boxes for Electrical Systems.
G. Section .
H. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
I. Section 26 21 00 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.
J. Section 27 10 00 - Structured Cabling: Additional requirements for communications systems conduits.
K. Section 31 23 16 - Excavation.
L. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.
M. Section 31 23 23 - Fill: Bedding and backfilling.
N. Section 33 71 19 - Electrical Underground Ducts, Ductbanks, and Manholes.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.
B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit - Aluminum (ERMC-A); 2025.
D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.
E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
F. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
G. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.
H. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
I. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.
J. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
K. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
M. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
N. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
O. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
P. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
Q. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
R. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
S. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Shop Drawings:
   1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
   2. Include proposed locations of roof penetrations and proposed methods for sealing.

D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
   5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
   6. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.

7. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.

D. Embedded Within Concrete:
   1. Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   2. Within Slab Above Ground (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from concrete.

E. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT). Do not use MC cable in walls or ceilings except for the final connection to lighting fixtures, and less than 6' lengths.

F. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

G. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

J. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit.

K. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

2.02 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Electrical Service Conduits: Also comply with Section 26 21 00.

C. Communications Systems Conduits: Also comply with Section 27 10 00.

D. Fittings for Grounding and Bonding: Also comply with Section 26 05 26.

E. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

F. Provide products listed, classified, and labeled as suitable for the purpose intended.

G. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
   2. Underground, Interior: 3/4 inch (21 mm) trade size.
   3. Underground, Exterior: 1 inch (27 mm) trade size.

H. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com/#sle.
2. Republic Conduit: www.republic-conduit.com/#sle.
3. Wheatland Tube, a Division of Zekelman Industries www.wheatland.com/#sle.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
4. Material: Use steel or malleable iron.
a. Do not use die cast zinc fittings.
5. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 ALUMINUM RIGID METAL CONDUIT (RMC)

A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com/#sle.
2. Republic Conduit: www.republic-conduit.com/#sle.
3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
4. Material: Use aluminum.
5. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 INTERMEDIATE METAL CONDUIT (IMC)

A. Manufacturers:
1. Allied Tube & Conduit www.alliedeg.com/#sle.
2. Republic Conduit: www.republic-conduit.com/#sle.

3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.06 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.

C. PVC-Coated Fittings:
1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.

D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.

2.07 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
2. Electri-Flex Company www.electriflex.com/#sle.
3. International Metal Hose: www.metalhose.com/#sle.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
b. O-Z/Gedney, a brand of Emerson Electric Co www.emerson.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.

2.08 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
2. Electri-Flex Company: www.electriflex.com/#sle.
3. International Metal Hose: www.metalhose.com/#sle.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
   1. Manufacturers:
      a. Bridgeport Fittings Inc www.bptfittings.com/#sle.
      b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      c. Thomas & Betts Corporation: www.tnb.com/#sle.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.

2.09 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube & Conduit www.alliedeg.com/#sle.
   2. Republic Conduit www.republic-conduit.com/#sle.
   3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:
      a. Bridgeport Fittings Inc www.bptfittings.com/#sle.
      b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      c. Thomas & Betts Corporation: www.tnb.com/#sle.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.
   4. Connectors and Couplings: Use compression (gland) type.
      a. Do not use indenter type connectors and couplings.
      b. Do not use set-screw type connectors and couplings.
   5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
   6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.10 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:
   1. Cantex Inc: www.cantexinc.com/#sle.
   2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com/#sle.
   3. JM Eagle www.jmeagle.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

C. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.11 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).

B. Supports: Per manufacturer's recommendations.

C. Fittings: Same type and manufacturer as conduit to be connected.

2.12 ACCESSORIES

A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.

B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

D. Epoxy Adhesive for RTRC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

E. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

F. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

G. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

H. Duct Bank Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for concrete encasement in open trench installation; suitable for the conduit/duct arrangement to be installed.
   1. Products:
      a. Advance Products & Systems, LLC; Duct Bank Spacers: www.apsonline.com/#sle.
      b. Substitutions:

I. Bore Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for installation within casing; furnished with roller wheels to facilitate installation, openings to facilitate grout flow, and holes for stabilization cable; suitable for the casing and conduit/duct arrangement to be installed.
   1. Products:
      a. Advance Products & Systems, LLC; Bore Spacers: www.apsonline.com/#sle.
      b. Substitutions:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.

E. Install intermediate metal conduit (IMC) in accordance with NECA 101.

F. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.

G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

H. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.
   5. Unless otherwise approved, do not route conduits exposed:
      a. Across floors.
      b. Across roofs.
      c. Across top of parapet walls.
      d. Across building exterior surfaces.
   6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
   7. Arrange conduit to maintain adequate headroom, clearances, and access.
   8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
   9. Arrange conduit to provide no more than 150 feet between pull points.
   10. Route conduits above water and drain piping where possible.
   11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
   13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
      a. Heaters.
      b. Hot water piping.
      c. Flues.
   14. Group parallel conduits in the same area together on a common rack.

I. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide required vibration isolation and/or seismic controls in accordance with Section .
   3. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   4. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   5. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
   6. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
   7. Use conduit clamp to support single conduit from beam clamp or threaded rod.

8. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
9. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
10. Use of spring steel conduit clips for support of conduits is not permitted.
11. Use of wire for support of conduits is not permitted.
    a. For securing conduits to studs in hollow stud walls.
    b. For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).
12. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

J. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

K. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
9. Provide metal escutcheon plates for conduit penetrations exposed to public view.
10. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

L. Underground Installation:
1. Provide trenching and backfilling in accordance with Section 31 23 16.13.
2. Minimum Cover, Unless Otherwise Indicated or Required:

a. Underground, Exterior: 24 inches.
b. Under Slab on Grade: 12 inches to bottom of slab.

3. Provide underground warning tape in accordance with Section 26 05 53 along entire conduit length for service entrance where not concrete-encased.

M. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 30 00 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.

N. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with NFPA 70.

O. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
4. Where conduits are subject to earth movement by settlement or frost.

P. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
3. Where conduits penetrate coolers or freezers.

Q. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

R. Provide grounding and bonding in accordance with Section 26 05 26.

S. Identify conduits in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

D. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Boxes and enclosures for integrated power, data, and audio/video.

D. Boxes for hazardous (classified) locations.

E. Floor boxes.

F. Underground boxes/enclosures.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 07 84 00 - Firestopping.

C. Section 08 31 00 - Access Doors and Panels: Panels for maintaining access to concealed boxes.

D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

E. Section 26 05 29 - Hangers and Supports for Electrical Systems.

F. Section 26 05 33.13 - Conduit for Electrical Systems:
   1. Conduit bodies and other fittings.
   2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.

G. Section .

H. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

I. Section 26 27 26 - Wiring Devices:
   1. Wall plates.
   2. Floor box service fittings.
   3. Poke-through assemblies.
   4. Access floor boxes.
   5. Additional requirements for locating boxes for wiring devices.

J. Section 26 28 13 - Fuses: Spare fuse cabinets.

K. Section 27 10 00 - Structured Cabling: Additional requirements for communications systems outlet boxes.

L. Section 33 71 19 - Electrical Underground Ducts, Ductbanks, and Manholes: Concrete manholes for electrical systems.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
F. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013 (Reaffirmed 2020).
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
H. SCTE 77 - Specifications for Underground Enclosure Integrity; 2023.
I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
J. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
1. Underground Boxes/Enclosures: Include reports for load testing in accordance with SCTE 77 certified by a professional engineer or an independent testing agency upon request.
C. Samples:
1. Floor Boxes: Provide one sample(s) of each floor box proposed for substitution upon request.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Keys for Lockable Enclosures: Two of each different key.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
   4. Use cast aluminum boxes where aluminum rigid metal conduit is used.
   5. Use suitable concrete type boxes where flush-mounted in concrete.
   6. Use suitable masonry type boxes where flush-mounted in masonry walls.
   7. Use raised covers suitable for the type of wall construction and device configuration where required.
   8. Use shallow boxes where required by the type of wall construction.
   9. Do not use "through-wall" boxes designed for access from both sides of wall.

10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
15. Minimum Box Size, Unless Otherwise Indicated:
    a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
    b. Communications Systems Outlets: Comply with Section 27 10 00.
16. Wall Plates: Comply with Section 26 27 26.
17. Manufacturers:
    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
    b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
    c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
    d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
    e. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
    a. Indoor Clean, Dry Locations: Type 1, painted steel.
    b. Outdoor Locations: Type 3R, painted steel.
3. Junction and Pull Boxes Larger Than 100 cubic inches:
    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
    b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
    b. Back Panels: Painted steel, removable.
    c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.
5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
6. Manufacturers:
    a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
    b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.
    c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.
    d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Boxes and Enclosures for Integrated Power, Data, and Audio/Video: Size and configuration as indicated or as required with partitions to separate services; field-connected gangable boxes may be used.
1. Manufacturers:
    a. Hubbell Incorporated: www.hubbell.com/#sle.
    b. Substitutions: See Section 01 60 00 - Product Requirements.

E. Boxes for Hazardous (Classified) Locations: Listed and labeled as complying with UL 1203 for the classification of the installed location.

F. Floor Boxes:
   1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
   2. Manufacturer: Same as manufacturer of floor box service fittings.

G. Underground Boxes/Enclosures:
   1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
   2. Size: As indicated on drawings.
   3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
   4. Provide logo on cover to indicate type of service.
   5. Applications:
      a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77 Tier 8 load rating.
      b. Parking Lots, in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77 Tier 15 load rating.
      c. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.
   6. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
      a. Manufacturers:
         1) Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com/#sle.
         2) MacLean Highline: www.macleanhighline.com/#sle.
         3) Oldcastle Precast, Inc: www.oldcastleprecast.com/#sle.
         4) Substitutions: See Section 01 60 00 - Product Requirements.
      b. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Architect.
   2. Unless dimensioned, box locations indicated are approximate.
   3. Locate boxes as required for devices installed under other sections or by others.
      a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
      b. Communications Systems Outlets: Comply with Section 27 10 00.
   4. Locate boxes so that wall plates do not span different building finishes.
   5. Locate boxes so that wall plates do not cross masonry joints.
   6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
   7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
   8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
   9. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
      a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
      b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
   10. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 05 33.13.
   11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
      a. Concealed above accessible suspended ceilings.
      b. Within joists in areas with no ceiling.
      c. Electrical rooms.
      d. Mechanical equipment rooms.

I. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide required seismic controls in accordance with Section .
   3. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
   4. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
   5. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.

2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Floor-Mounted Cabinets: Mount on properly sized 3 inch high concrete pad constructed in accordance with Section 03 30 00.

M. Install boxes as required to preserve insulation integrity.

N. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.

O. Underground Boxes/Enclosures:
1. Install enclosure on gravel base, minimum 6 inches deep.
2. Flush-mount enclosures located in concrete or paved areas.
3. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.
4. Provide cast-in-place concrete collar constructed in accordance with Section 03 30 00, minimum 10 inches wide by 12 inches deep, around enclosures that are not located in concrete areas.
5. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

P. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

R. Close unused box openings.

S. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

T. Provide grounding and bonding in accordance with Section 26 05 26.

U. Identify boxes in accordance with Section 26 05 53.

3.03 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 05 48
VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vibration isolation requirements.

B. Seismic control requirements.
   1. Includes requirements for seismic qualification of equipment not specified in this section.

C. Vibration-isolated equipment support bases.

D. Vibration isolators.

E. External seismic snubber assemblies.

F. Seismic restraint systems.

1.02 RELATED REQUIREMENTS

A. Section 01 45 33 - Code-Required Special Inspections and Procedures.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 05 50 00 - Metal Fabrications: Materials and requirements for fabricated metal supports.

D. Section 26 05 29 - Hangers and Supports for Electrical Systems.

1.03 DEFINITIONS

A. Electrical Component: Where referenced in this section in regards to seismic controls, applies to any portion of the electrical system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g. conduit, cable tray).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.04 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings and Other Structures; 2022.

B. ASCE 19 - Structural Applications of Steel Cables for Buildings; 2016.

C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.

E. FEMA 413 - Installing Seismic Restraints for Electrical Equipment; 2004.

F. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage; 2012.

G. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. ICC-ES AC156 - Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components; 2010, with Editorial Revision (2020).

I. MFMA-4 - Metal Framing Standards Publication; 2004.

J. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Seismic Controls:
      a. Coordinate the arrangement of seismic restraints with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
      b. Coordinate the work with other trades to accommodate relative positioning of essential and non-essential components in consideration of seismic interaction.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Design Documents: Prepare and submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, details, and calculations.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
   1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification method for spring element load capacities.
   2. Seismic Controls: Include seismic load capacities.

D. Certification for seismically qualified equipment; identify basis for certification.

E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Evidence of qualifications for seismic controls designer.

G. Evidence of qualifications for manufacturer.

H. Manufacturer’s detailed field testing and inspection procedures.

I. Field quality control test reports.

1.07 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

D. Seismic Controls Designer Qualifications: Registered professional engineer licensed in the State in which the Project is located and with minimum five years experience designing seismic restraints for nonstructural components.
   1. Designer may be employed by the manufacturer of the seismic restraint products.

E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATION REQUIREMENTS

A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing electrical equipment and/or electrical connections to vibration-isolated equipment.

B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:

C. General Requirements:
   1. Select vibration isolators to provide required static deflection.
   2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.
   3. Select seismic type vibration isolators to comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
   4. Select vibration isolators for outdoor equipment to comply with wind design requirements.
   5. Select vibration-isolated equipment support bases and associated vibration isolators to provide minimum 2 inch operating clearance beneath base unless otherwise indicated.

D. Equipment Isolation:
   1. Transformers:
      a. Specified vibration isolators are in addition to any factory-installed internal core and coil assembly vibration isolators unless otherwise indicated.
      b. Floor-Mounted Transformers, Non-Seismic Applications: Use resilent material isolator pads, resilient material isolator mounts, or open (unhoused) spring isolators.
      c. Floor-Mounted Transformers, Seismic Applications: Use seismic type resilient material isolator mounts or seismic type restrained spring isolators.
      d. Suspended Transformers, Non-Seismic Applications: Use resilient material isolator hangers, spring isolator hangers, or combination resilient material/spring isolator hangers.
      e. Suspended Transformers, Seismic Applications: Use seismic type resilient material isolator hangers, seismic type spring isolator hangers, or seismic type combination resilient material/spring isolator hangers.

f. Wall-Mounted Transformers, Non-Seismic Applications: Use resilient material isolator mounts.
g. Wall-Mounted Transformers, Seismic Applications: Use seismic type resilient material isolator mounts.
h. Minimum Static Deflection:
1) Transformers Mounted on Grade-Level Slabs: 0.25 inch deflection unless otherwise indicated.
2) Transformers Mounted at Above-Grade Levels: 0.5 inch deflection unless otherwise indicated.

E. Conduit Isolation:
1. Use flexible conduit or cable for electrical connections to vibration-isolated equipment, including equipment installed under other sections or by others.
a. Minimum Length: 3 feet unless otherwise indicated.
2. Vibration Isolators:
a. Provide vibration isolators for conduit supports:
1) Located within 50 feet of connected vibration-isolated equipment where flexible connection to equipment is not possible.
2) For conduits over 2 inch trade size located below or within 50 feet of noise-sensitive areas indicated.
b. Minimum Static Deflection:
1) First Three Supports Closest to Isolated Equipment: Same as static deflection of equipment; maximum of 2 inch deflection required.
2) Remainder of Supports: 0.75 inch deflection unless otherwise indicated.
c. Suspended Conduits, Non-Seismic Applications: Use resilient material isolator hangers, spring isolator hangers, or combination resilient material/spring isolator hangers.
d. Suspended Conduits, Seismic Applications: Use seismic type resilient material isolator hangers, seismic type spring isolator hangers, or seismic type combination resilient material/spring isolator hangers.
e. Use modular seal or approved resilient material where vibration-isolated conduits penetrate building elements (e.g. walls, floors) arranged to prevent vibration transmission to structure.

2.02 SEISMIC CONTROL REQUIREMENTS

A. Design and provide electrical component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor electrical components.

B. Seismic Design Criteria: As indicated on drawings.

C. Seismic Qualification of Equipment:
1. Provide special certification for electrical equipment furnished under other sections and assigned a component importance factor (Ip) of 1.5, certifying that equipment will remain operable following a design level earthquake.
2. Seismic qualification to be by shake table testing in accordance with recognized testing standard procedure, such as ICC-ES AC156, acceptable to authorities having jurisdiction.
3. Notify Architect and obtain direction where mounting restrictions required by conditions of seismic certification conflict with specified requirements.
4. Seismically qualified equipment to be furnished with factory-installed labels referencing certificate of compliance and associated mounting restrictions.

D. Premanufactured Modular Electrical Equipment: Where not otherwise seismically qualified, premanufactured modules 6 feet high and taller furnished under other sections to be designed in accordance with seismic provisions for nonbuilding structures.

E. Seismic Restraints:
   1. Provide seismic restraints for electrical components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Seismic Restraint Exemptions:
      a. Exemptions for Seismic Design Category C:
         1) Electrical components where either of the following apply:
            (a) The component importance factor (Ip) is 1.0 and the component is positively attached to the structure.
            (b) The component weighs 20 pounds or less or, in the case of a distributed system, 5 pounds per foot or less.
      b. Exemptions for Seismic Design Category D, E, and F:
         1) Discrete electrical components that are positively attached to the structure where either of the following apply:
            (a) The component weighs 400 pounds or less, has a center of mass located 4 feet or less above the adjacent floor level, flexible connections are provided between the component and associated ductwork, piping, and conduit, and the component importance factor (Ip) is 1.0.
            (b) The component weighs 20 pounds or less or, in the case of a distributed system, 5 pounds per foot or less.
      c. Conduit, Cable Tray, and Raceway Exemptions, All Seismic Design Categories:
         1) Raceways with component importance factor (Ip) of 1.0 where flexible connections are provided between cable tray or raceway and associated components, where cable tray or raceway is positively attached to the structure, and where one of the following apply:
            (a) Trapeze supported conduits, cable trays, or raceways with trapeze assemblies using 3/8 inch diameter rod hangers not exceeding 12 inches in length from support point connection to the supporting structure, and the total weight supported by any single trapeze is 100 pounds or less.
            (b) Trapeze supported conduits, cable trays, or raceways with trapeze assemblies using 1/2 inch diameter rod hangers not exceeding 12 inches in length from support point connection to the supporting structure, and the total weight supported by any single trapeze is 200 pounds or less.
            (c) Trapeze supported conduits, cable trays, or raceways with trapeze assemblies using 1/2 inch diameter rod hangers not exceeding 24 inches in length from support point connection to the supporting structure, and the total weight supported by any single trapeze is 100 pounds or less.
            (d) Hanger supported conduits, cable trays, or raceways with individual rod hangers 3/8 inch or 1/2 inch in diameter not exceeding 12 inches in length from support point connection to the supporting structure, and the total weight supported by any single rod is 50 pounds or less.
         2) Conduits less than 2-1/2 inch trade size.
      d. Lighting Exemptions, All Seismic Design Categories:
         1) Suspended luminaires where attachments are designed to accommodate 1.4 times the operating weight acting in both the vertical and horizontal directions and connections to structure allow for 360 degree range of motion in the horizontal plane; arrange to prevent impact between luminaires and the structure or other nonstructural components.

2) Lay-in luminaires weighing less than 56 pounds secured to ceiling grid and provided with safety wires in accordance with ASTM E580/E580M.

3. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
   a. ASHRAE (HVACA).
   b. FEMA 413.
   c. FEMA E-74.
   d. SMACNA (SRM).
4. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third party registered professional engineer acceptable to authorities having jurisdiction.
5. Seismic Type Vibration Isolators:
   a. Comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
6. External Seismic Snubber Assemblies:
   a. Provide quantity and arrangement of external seismic snubber assemblies as required to restrain equipment in all directions (both lateral and vertical).
   b. Do not use external seismic snubber assemblies that restrain equipment only in one or more lateral directions (but not vertical) except where uplift forces are zero or are addressed by other restraints.
7. Seismic Restraint Systems:
   a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
   b. Use only cable restraints to restrain vibration-isolated electrical components, including distributed systems.
   c. Use only one restraint system type for a given electrical component or distributed system (e.g. conduit, cable tray) run; mixing of cable and rigid restraints on a given component/run is not permitted.
   d. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain electrical component in all lateral directions; consider bracket geometry in anchor load calculations.
   e. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported electrical component weight.
   f. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported electrical component weight.
   g. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
   h. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
   i. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.
   j. Manufacturer's certified seismic restraint design may be submitted as an alternative to project-specific design and documentation, subject to approval of authorities having jurisdiction.

F. Seismic Attachments:
   1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.

2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
3. Do not use power-actuated fasteners.
4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
   a. Increase size of pad as required to comply with anchor requirements.
   b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

G. Seismic Interactions:
1. Include provisions to prevent seismic impact between electrical components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.
3. Comply with minimum clearance requirements between electrical equipment, distribution systems, and associated supports and fire protection sprinkler system drops and sprigs.

H. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
   a. Relative displacements at connections between components, including distributed systems (e.g. conduit, cable tray); do not exceed load limits for equipment utility connections.
   b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
   c. Design displacements at seismic separations.
   d. Anticipated drifts between floors.

2.03 VIBRATION-ISOLATED EQUIPMENT SUPPORT BASES

A. Manufacturers:
1. Vibration-Isolated Equipment Support Bases:
   a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
   b. Mason Industries: www.mason-ind.com/#sle.
   c. Vibration Eliminator Company, Inc: www.veco-nyc.com/#sle.
2. Source Limitations: Furnish vibration-isolated equipment support bases and associated components and accessories produced by the same manufacturer as the vibration isolators and obtained from a single supplier.

B. Vibration-Isolated Structural Steel Bases:
1. Description: Engineered structural steel frames with integral mounting provisions for vibration isolators, sized and configured for mounting of equipment.

C. Vibration-Isolated Concrete Inertia Bases:
1. Description: Concrete-filled engineered steel forms with integral mounting provisions for vibration isolators, sized and configured for mounting of equipment.
2. Minimum Base Depth: 6 inches.
3. Minimum Base Mass (Including Concrete): 1.5 times weight of supported equipment.

4. Concrete Reinforcement: Welded or tied reinforcing bars running both ways in a single layer.
5. Concrete: Filled on site with minimum 3000 psi concrete in accordance with Section 03 30 00.

2.04 VIBRATION ISOLATORS

A. Manufacturers:
   1. Vibration Isolators:
      a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
      b. Mason Industries: www.mason-ind.com/#sle.
      c. Vibration Eliminator Company, Inc: www.veco-nyc.com/#sle.
   2. Source Limitations: Furnish vibration-isolators and associated accessories produced by a single manufacturer and obtained from a single supplier.

B. General Requirements:
   1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.
   2. Spring Elements for Spring Isolators:
      a. Color code or otherwise identify springs to indicate load capacity.
      b. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
      c. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.
      d. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.
      e. Selected to provide designed deflection of not less than 75 percent of specified deflection.
      f. Selected to function without undue stress or overloading.
   3. Seismic Snubbing Elements for Seismic Isolators:
      a. Air Gap: Between 0.125 inches and 0.25 inches unless otherwise indicated.
      b. Points of Contact: Cushioned with resilient material, minimum 0.25 inch thick; capable of being visually inspected for damage and replaced.

C. Vibration Isolators for Non-Seismic Applications:
   1. Resilient Material Isolator Pads:
      a. Description: Single or multiple layer pads utilizing elastomeric (e.g. neoprene, rubber) or fiberglass isolator material.
      b. Pad Thickness: As required for specified minimum static deflection; minimum 0.25 inch thickness.
      c. Multiple Layer Pads: Provide bonded, galvanized sheet metal separation plate between each layer.
   2. Resilient Material Isolator Mounts, Non-Seismic:
      a. Description: Mounting assemblies for bolting equipment to supporting structure utilizing elastomeric (e.g. neoprene, rubber) or fiberglass isolator material; fail-safe type.
   3. Open (Unhoused) Spring Isolators:
      a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) without a housing.
      b. Bottom Load Plate: Non-skid molded elastomeric isolator material or steel with non-skid elastomeric isolator pad with provisions for bolting to supporting structure as required.
      c. Furnished with integral leveling device for positioning and securing supported equipment.
   4. Housed Spring Isolators:

a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing.
b. Furnished with integral elastomeric snubbing elements, non-adjustable type, for limiting equipment movement and preventing metal-to-metal contact between housing elements.
c. Bottom Load Plate: Steel with non-skid elastomeric isolator pad with provisions for bolting to supporting structure as required.
d. Furnished with integral leveling device for positioning and securing supported equipment.

5. Restrained Spring Isolators, Non-Seismic:
a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop.
b. Bottom Load Plate: Steel with non-skid elastomeric isolator pad with provisions for bolting to supporting structure as required.
c. Furnished with integral leveling device for positioning and securing supported equipment.
d. Provides constant free and operating height.

6. Resilient Material Isolator Hangers, Non-Seismic:
a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing elastomeric (e.g. neoprene, rubber) or fiberglass isolator material for the lower hanger rod connection.

7. Spring Isolator Hangers, Non-Seismic:
a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection.
b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short circuiting of isolation.

8. Combination Resilient Material/Spring Isolator Hangers, Non-Seismic:
a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) for the lower hanger rod connection and elastomeric (e.g. neoprene, rubber) or fiberglass isolator material for the upper hanger rod connection.
b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short circuiting of isolation.

D. Vibration Isolators for Seismic Applications:
1. Resilient Material Isolator Mounts, Seismic:
a. Description: Mounting assemblies for bolting equipment to supporting structure utilizing elastomeric (e.g. neoprene, rubber) isolator material; specifically designed and rated for seismic applications with integral snubbing in all directions.

2. Restrained Spring Isolators, Seismic:
a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) in series with elastomeric (e.g. neoprene, rubber) isolator material within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop; specifically designed and rated for seismic applications with integral snubbing in all directions.
b. Bottom Load Plate: Steel with provisions for bolting to supporting structure as required.
c. Furnished with integral leveling device for positioning and securing supported equipment.
d. Provides constant free and operating height.

3. Resilient Material Isolator Hangers, Seismic:

a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing elastomeric (e.g. neoprene, rubber) isolator material for the lower hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.

4. Spring Isolator Hangers, Seismic:
   a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
   b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short circuiting of isolation.
5. Combination Resilient Material/Spring Isolator Hangers, Seismic:
   a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) for the lower hanger rod connection and elastomeric (e.g. neoprene, rubber) isolator material for the upper hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
   b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short circuiting of isolation.

2.05 EXTERNAL SEISMIC SNUBBER ASSEMBLIES

A. Manufacturers:
   1. External Seismic Snubber Assemblies:
      a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
      b. Mason Industries: www.mason-ind.com/#sle.
      c. Vibration Eliminator Company, Inc: www.veco-nyc.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.
   3. Source Limitations: Furnish external seismic snubber assemblies and associated accessories produced by the same manufacturer as the vibration isolators and obtained from a single supplier.

B. Description: Steel snubbing assemblies designed for external attachment to both equipment and supporting structure that, as part of a complete system, restrain equipment motion in all directions during a seismic event while maintaining vibration isolation during normal operation.

C. Seismic Snubbing Elements:
   1. Air Gap: Between 0.125 inches and 0.25 inches unless otherwise indicated.
   2. Points of Contact: Cushioned with resilient material, minimum 0.25 inch thick; capable of being visually inspected for damage and replaced.

2.06 SEISMIC RESTRAINT SYSTEMS

A. Manufacturers:
   1. Seismic Restraint Systems:
      a. Eaton Corporation: www.eaton.com/#sle.
      b. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
      c. Mason Industries: www.mason-ind.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.
   3. Source Limitations: Furnish seismic restraint system components and accessories produced by a single manufacturer and obtained from a single supplier.

B. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

C. Cable Restraints:
   1. Comply with ASCE 19.
   2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
   3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
   4. Use protective thimbles for cable loops where potential for cable damage exists.

D. Rigid Restraints: Use MFMA-4 steel channel (strut), steel angle, or steel pipe for structural element; suitable for both compressive and tensile design loads.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 CODE-REQUIRED SPECIAL INSPECTIONS

A. Arrange work to accommodate tests and/or inspections performed by Special Inspection Agency employed by Owner or Architect in accordance with Section 01 45 33 and statement of special inspections as required by applicable building code.

B. Frequency of Special Inspections: Where special inspections are designated as continuous or periodic, arrange work accordingly.
   1. Continuous Special Inspections: Special Inspection Agency to be present in the area where the work is being performed and observe the work at all times the work is in progress.
   2. Periodic Special Inspections: Special Inspection Agency to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

C. Prior to starting work, Contractor to submit written statement of responsibility to authorities having jurisdiction and to Owner acknowledging awareness of special requirements contained in the statement of special inspections.

D. Special Inspection Agency services do not relieve Contractor from performing inspections and testing specified elsewhere.

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install products in accordance with applicable requirements of NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Secure fasteners according to manufacturer's recommended torque settings.

E. Install flexible conduit and cable connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

F. Vibration Isolation Systems:

1. Vibration-Isolated Equipment Support Bases:
   a. Provide specified minimum clearance beneath base.
2. Spring Isolators:
   a. Position equipment at operating height; provide temporary blocking as required.
   b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
   c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
3. Isolator Hangers:
   a. Use precompressed isolator hangers where required to facilitate installation and prevent damage to equipment utility connection provisions.
   b. Locate isolator hangers at top of hanger rods in accordance with manufacturer's instructions.
4. Clean debris from beneath vibration-isolated equipment that could cause short circuiting of isolation.
5. Use elastomeric grommets for attachments where required to prevent short circuiting of isolation.
6. Adjust isolators to be free of isolation short circuits during normal operation.
7. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

G. Seismic Controls:
1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris or other obstructions.
2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch, use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch or less.
4. Equipment with Sheet Metal Housings:
   a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
   b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
   c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
5. Concrete Housekeeping Pads:
   a. Size in accordance with seismic design to meet anchor requirements.
   b. Install pad reinforcement and doweling in accordance with seismic design to ensure integrity of pad and associated connection to slab.
6. Seismic Restraint Systems:
   a. Do not attach seismic restraints and gravity supports to dissimilar parts of structure that may move differently during an earthquake.
   b. Install restraints within permissible angles in accordance with seismic design.
   c. Install cable restraints straight between component/run and structural attachment; do not bend around other nonstructural components or structural elements.
   d. Install cable restraints for vibration-isolated components slightly slack to prevent short circuiting of isolation.
   e. Install hanger rod stiffeners where indicated using only specified clamps; do not weld stiffeners to hanger rod.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect vibration isolation and/or seismic control components for damage and defects.

C. Provide services of a manufacturer's authorized representative for vibration isolation systems and seismic controls to observe installation and assist in inspection and testing. Include manufacturer's detailed testing and inspection procedures and field reports with submittals.

D. Vibration Isolation Systems:
   1. Verify isolator static deflections.
   2. Verify required clearance beneath vibration-isolated equipment support bases.
   3. Verify vibration isolation performance during normal operation; investigate sources of isolation short circuits.

E. Seismic Controls:
   1. Verify snubbing element air gaps.

F. Correct deficiencies and replace damaged or defective vibration isolation and/or seismic control components.

G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.05 ATTACHMENTS

A. Statement of special inspections.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.
B. Identification nameplates and labels.
C. Wire and cable markers.
D. Voltage markers.
E. Underground warning tape.
F. Floor marking tape.
G. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 09 91 13 - Exterior Painting.
B. Section 09 91 23 - Interior Painting.
C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
D. Section 26 05 36 - Cable Trays for Electrical Systems: Additional identification requirements for cable tray systems.
E. Section 26 05 73 - Power System Studies: Arc flash hazard warning labels.
F. Section 26 23 00 - Low-Voltage Switchgear: Factory-installed mimic bus.
G. Section 26 27 26 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.
H. Section 26 31 00 - Photovoltaic Collectors: Additional identification requirements for photovoltaic systems.
I. Section 27 10 00 - Structured Cabling: Identification for communications cabling and devices.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.
B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.
E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
   2. Do not install identification products until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

C. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.

D. Samples:
   1. Identification Nameplates: One of each type and color specified.
   2. Warning Signs and Labels: One of each type and legend specified.

E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Switchgear:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location when not within sight of equipment.
         4) Use identification nameplate to identify main and tie devices.
         5) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
         6) See Section 26 23 00 for factory-installed mimic bus.
      b. Switchboards:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location when not within sight of equipment.

4) Use identification nameplate to identify main overcurrent protective device.
5) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

c. Panelboards:
1) Identify ampere rating.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

d. Transformers:
1) Identify kVA rating.
2) Identify voltage and phase for primary and secondary.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Identify load(s) served. Include location when not within sight of equipment.

e. Enclosed switches, circuit breakers, and motor controllers:
1) Identify voltage and phase.
2) Identify power source and circuit number. Include location when not within sight of equipment.
3) Identify load(s) served. Include location when not within sight of equipment.

f. Enclosed Contactors:
1) Identify ampere rating.
2) Identify voltage and phase.
3) Identify configuration, e.g., E.O.E.H. (electrically operated, electrically held) or E.O.M.H. (electrically operated, mechanically held).
4) Identify coil voltage.
5) Identify load(s) and associated circuits controlled. Include location.

g. Centralized Emergency Lighting Inverters:
1) Identify input and output voltage and phase.
2) Identify power source and circuit number for normal power source. Include location when not within sight of equipment.
3) Identify load(s) served. Include location.

h. Electricity Meters:
1) Identify load(s) metered.

2. Service Equipment:
a. Use identification nameplate to identify each service disconnecting means.
b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.

3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.

4. Use identification nameplate to identify equipment utilizing series ratings, where permitted, in accordance with NFPA 70.

5. Use identification nameplate to identify switchboards and panelboards utilizing a high leg delta system in accordance with NFPA 70.
6. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
7. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
8. Use identification label or handwritten text using indelible marker on inside of door at each motor controller to identify nameplate horsepower, full load amperes, code letter, service factor, voltage, and phase of motor(s) controlled.
9. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
10. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
    a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches wide, painted in accordance with Section 09 91 23 and 09 91 13.
11. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
    a. Service equipment.
    b. Elevator control panels.
    c. Industrial machinery.
12. Arc Flash Hazard Warning Labels: Comply with Section 26 05 73.
13. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
14. Use warning signs to identify electrical hazards for entrances to all buildings, vaults, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".
15. Use warning labels to identify electrical hazards for equipment, compartments, and enclosures containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".
16. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.

C. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
2. Identification for Communications Conductors and Cables: Comply with Section 27 10 00.
3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
4. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
    a. At each source and load connection.
    b. Within boxes when more than one circuit is present.
    c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
    d. In cable tray, at maximum intervals of 20 feet.

5. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.
6. Use underground warning tape to identify direct buried cables.

D. Identification for Raceways:
1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
2. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.
   a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.
      1) Color Code:
         (a) Emergency Power System: Red.
      2) Field-Painting: Comply with Section 09 91 23 and 09 91 13.
      3) Vinyl Color Coding Electrical Tape: Comply with Section 26 05 19.
3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.
4. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
5. Use underground warning tape to identify underground raceways.
6. Use voltage markers to identify highest voltage present for wireways at maximum intervals of 20 feet.

E. Identification for Cable Tray: Comply with Section 26 05 36.

F. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
2. Use voltage markers or color coded boxes to identify systems other than normal power system.
   a. Color-Coded Boxes: Field-painted in accordance with Section 09 91 23 and 09 91 13 per the same color code used for raceways.
3. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
   a. For exposed boxes in public areas, use only identification labels.
4. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

G. Identification for Devices:
1. Identification for Communications Devices: Comply with Section 27 10 00.
2. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
3. Factory Pre-Marked Wallplates: Comply with Section 26 27 26.
4. Use identification label to identify fire alarm system devices.
   a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.
5. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
   a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.
6. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
7. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

H. Identification for Luminaires:
1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

I. Identification for Photovoltaic Systems: Comply with Section 26 31 00

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Manufacturers:
a. Brimar Industries, Inc: www.brimar.com/#sle.
b. Kolbi Pipe Marker Co{CH#275749}: www.kolbipipemarkers.com/#sle.
c. Seton Identification Products: www.seton.com/#sle.
2. Materials:
a. Indoor Clean, Dry Locations: Use plastic nameplates.
b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Manufacturers:
a. Brady Corporation: www.bradyid.com/#sle.
b. Brother International Corporation: www.brother-usa.com/#sle.
c. Panduit Corp: www.panduit.com/#sle.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
a. Use only for indoor locations.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:
a. System designation where applicable:
1) Emergency Power System: Identify with text "EMERGENCY".
2) Fire Alarm System: Identify with text "FIRE ALARM".
b. Equipment designation or other approved description.
c. Other information as indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
a. System Designation: 1 inch.
b. Equipment Designation: 1/2 inch.
c. Other Information: 1/4 inch.
d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
5. Color:
a. Normal Power System: White text on black background.

b. Emergency Power System: White text on red background.
c. Fire Alarm System: White text on red background.

D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.
a. Exceptions:
1) Provide white text on red background for general information or operational instructions for emergency systems.
2) Provide white text on red background for general information or operational instructions for fire alarm systems.

E. Format for Caution and Warning Messages:
1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

G. Format for Control Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Load controlled or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

H. Format for Fire Alarm Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Designation indicated and device zone or address.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Red text on white background.

2.03 WIRE AND CABLE MARKERS

A. Manufacturers:
1. Brady Corporation: www.bradyid.com/#sle.
2. HellermannTyton: www.hellermanntyton.com/#sle.
3. Panduit Corp: www.panduit.com/#sle.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

A. Manufacturers:
1. Brady Corporation: www.bradyid.com/#sle.
2. Brimar Industries, Inc: www.brimar.com/#sle.
3.
4. Seton Identification Products: www.seton.com/#sle.

B. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

C. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

D. Minimum Size:
1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
4. Markers for Junction Boxes: 1/2 by 2 1/4 inches.

E. Legend:
1. Markers for Voltage Identification: Highest voltage present.
2. Markers for System Identification:
a. Emergency Power System: Text "EMERGENCY".

F. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE

A. Manufacturers:
1. Brady Corporation: www.bradyid.com/#sle.
2. Brimar Industries, Inc: www.brimar.com/#sle.
3. Seton Identification Products: www.seton.com/#sle.

B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
1. Exception: Use foil-backed detectable type tape where required by serving utility or where directed by Owner.

C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.

D. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.

E. Legend: Type of service, continuously repeated over full length of tape.

F. Color:
1. Tape for Buried Power Lines: Black text on red background.
2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.06 FLOOR MARKING TAPE

A. Manufacturers:
   1. Brady Corporation: www.bradyid.com/#sle.
   2. Brimar Industries, Inc: www.brimar.com/#sle.
   3. Seton Identification Products: www.seton.com/#sle.

B. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlaminate, 3 inches wide, with alternating black and white stripes.

2.07 WARNING SIGNS AND LABELS

A. Manufacturers:
   1. Brimar Industries, Inc: www.brimar.com/#sle.
   2. Clarion Safety Systems, LLC: www.clarionsafety.com/#sle.
   3. Seton Identification Products: www.seton.com/#sle.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:
   1. Materials:
      a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
      b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
   2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
   3. Minimum Size: 7 by 10 inches unless otherwise indicated.

D. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Branch Devices: Adjacent to device.
   6. Interior Components: Legible from the point of access.
   7. Conduits: Legible from the floor.
   8. Boxes: Outside face of cover.

9. Conductors and Cables: Legible from the point of access.
10. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

G. Secure rigid signs using stainless steel screws.

H. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 26 05 73
POWER SYSTEM STUDIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Short-circuit study.

B. Protective device coordination study.

C. Arc flash and shock risk assessment.
   1. Includes arc flash hazard warning labels.

D. Criteria for the selection and adjustment of equipment and associated protective devices not specified in this section, as determined by studies to be performed.

1.02 RELATED REQUIREMENTS

A. Section 26 05 53 - Identification for Electrical Systems: Additional requirements for arc flash hazard warning labels.

B. Section 26 21 00 - Low-Voltage Electrical Service Entrance.
   1. Includes Utility Company contact information.

C. Section 26 23 00 - Low-Voltage Switchgear.

D. Section 26 24 13 - Switchboards.

E. Section 26 24 16 - Panelboards.

F. Section 26 28 13 - Fuses.

G. Section 26 28 16.16 - Enclosed Switches.

H. Section 26 33 23 - Central Battery Equipment.

1.03 REFERENCE STANDARDS

A. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.

B. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants; 1993 (Reaffirmed 1999).

C. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems; 2001, with Errata (2003).

D. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis; 1997.

E. IEEE 551 - IEEE Recommended Practice for Calculating Short-Circuit Currents in Industrial and Commercial Power Systems; 2006.

F. IEEE 1584 - IEEE Guide for Performing Arc-Flash Hazard Calculations; 2018, with Errata (2019).

G. NEMA MG 00001 - Motors and Generators; 2024.

H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work to provide equipment and associated protective devices complying with criteria for selection and adjustment, as determined by studies to be performed.
   2. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Pre-Study Meeting: Conduct meeting with Owner to discuss system operating modes and conditions to be considered in studies.

C. Sequencing:
   1. Submit study reports prior to or concurrent with product submittals.
   2. Do not order equipment until matching study reports and product submittals have both been evaluated by Architect.
   3. Verify naming convention for equipment identification prior to creation of final drawings, reports, and arc flash hazard warning labels (where applicable).

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Study preparer's qualifications.

C. Field testing agency's qualifications.

D. Study reports, stamped or sealed and signed by study preparer.

E. Product Data: In addition to submittal requirements specified in other sections, include manufacturer's standard catalog pages and data sheets for equipment and protective devices indicating information relevant to studies.
   1. Include characteristic time-current trip curves for protective devices.
   2. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
   3. Include documentation of listed series ratings upon request.
   4. Identify modifications made in accordance with studies that:
      a. Can be made at no additional cost to Owner.
      b. As submitted will involve a change to the contract sum.

F. Arc Flash Hazard Warning Label Samples: One of each type and legend specified.

G. Site-specific arc flash hazard warning labels.

H. Field quality control reports.

I. Certification that field adjustable protective devices have been set in accordance with requirements of studies.

J. Project Record Documents: Revise studies as required to reflect as-built conditions.
   1. Include hard copies with operation and maintenance data submittals.
   2. Include computer software files used to prepare studies with file name(s) cross-referenced to specific pieces of equipment and systems.

1.06 POWER SYSTEM STUDIES

A. Scope of Studies:
   1. Perform analysis of new electrical distribution system as indicated on drawings.

2. Except where study descriptions below indicate exclusions, analyze system at each bus from primary protective devices of utility source down to each piece of equipment involved, including parts of system affecting calculations being performed (e.g. fault current contribution from motors).
3. Include in analysis alternate sources and operating modes (including known future configurations) to determine worst case conditions.
    a. Known Operating Modes:
        1) Utility as source.

B. General Study Requirements:
1. Comply with NFPA 70.
2. Perform studies utilizing computer software complying with specified requirements; manual calculations are not permitted.

C. Data Collection:
1. Compile information on project-specific characteristics of actual installed equipment, protective devices, feeders, etc. as necessary to develop single-line diagram of electrical distribution system and associated input data for use in system modeling.
    a. Utility Source Data: Include primary voltage, maximum and minimum three-phase and line-to-ground fault currents, impedance, X/R ratio, and primary protective device information.
        1) Obtain up-to-date information from Utility Company.
        2) Utility Company: See Section 26 21 00 for Utility Company contact information.
    b. Generators: Include manufacturer/model, kW and voltage ratings, and impedance.
    c. Motors: Include manufacturer/model, type (e.g. induction, synchronous), horsepower rating, voltage rating, full load amps, and locked rotor current or NEMA MG 00001 code letter designation.
    d. Transformers: Include primary and secondary voltage ratings, kVA rating, winding configuration, percent impedance, and X/R ratio.
    e. Protective Devices:
        1) Circuit Breakers: Include manufacturer/model, type (e.g. thermal magnetic, electronic trip), frame size, trip rating, voltage rating, interrupting rating, available field-adjustable trip response settings, and features (e.g. zone selective interlocking).
        2) Fuses: Include manufacturer/model, type/class (e.g. Class J), size/rating, and speed (e.g. time delay, fast acting).
    f. Protective Relays: Include manufacturer/model, type, settings, current/potential transformer ratio, and associated protective device.
    g. Conductors: Include feeder size, material (e.g. copper, aluminum), insulation type, voltage rating, number per phase, raceway type, and actual length.

D. Short-Circuit Study:
1. Comply with IEEE 551 and applicable portions of IEEE 141, IEEE 242, and IEEE 399.
2. For purposes of determining equipment short circuit current ratings, consider conditions that may result in maximum available fault current, including but not limited to:
    a. Maximum utility fault currents.
    b. Maximum motor contribution.
    c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
3. For each bus location, calculate the maximum available three-phase bolted symmetrical and asymmetrical fault currents. For grounded systems, also calculate the maximum available line-to-ground bolted fault currents.

E. Protective Device Coordination Study:
1. Comply with applicable portions of IEEE 242 and IEEE 399.

2. Analyze alternate scenarios considering known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
3. Analyze protective devices and associated settings for suitable margins between time-current curves to achieve full selective coordination while providing adequate protection for equipment and conductors.

F. Arc Flash and Shock Risk Assessment:
1. Comply with NFPA 70E.
2. Perform incident energy and arc flash boundary calculations in accordance with IEEE 1584 (as referenced in NFPA 70E Annex D), where applicable.
   a. To clarify IEEE 1584 statement that "equipment below 240 V need not be considered unless it involves at least one 125 kVA or larger low-impedance transformer in its immediate power supply" for purposes of studies, study preparer to include equipment rated less than 240 V fed by transformers less than 125 kVA in calculations.
   b. Where reasonable, study preparer may assume a maximum clearing time of two seconds in accordance with IEEE 1584, provided that the conditions are such that a worker's egress from an arc flash event would not be inhibited.
   c. For single-phase systems, study preparer to perform calculations assuming three-phase system in accordance with IEEE 1584 yielding conservative results.
3. For equipment with main devices mounted in separate compartmentalized sections, perform calculations on both the line and load side of the main device.
4. Analyze alternate scenarios considering conditions that may result in maximum incident energy, including but not limited to:
   a. Maximum and minimum utility fault currents.
   b. Maximum and minimum motor contribution.
   c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).

G. Study Reports:
1. General Requirements:
   a. Identify date of study and study preparer.
   b. Identify study methodology and software product(s) used.
   c. Identify scope of studies, assumptions made, implications of possible alternate scenarios, and any exclusions from studies.
   d. Identify base used for per unit values.
   e. Include single-line diagram and associated input data used for studies; identify buses on single-line diagram as referenced in reports, and indicate bus voltage.
   f. Include conclusions and recommendations.
2. Short-Circuit Study:
   a. For each scenario, identify at each bus location:
      1) Calculated maximum available symmetrical and asymmetrical fault currents (both three-phase and line-to-ground where applicable).
      2) Fault point X/R ratio.
      3) Associated equipment short circuit current ratings.
   b. Identify locations where the available fault current exceeds the equipment short circuit current rating, along with recommendations.
3. Protective Device Coordination Study:
   a. For each scenario, include time-current coordination curves plotted on log-log scale graphs.
   b. For each graph include (where applicable):
      1) Partial single-line diagram identifying the portion of the system illustrated.

2) Protective Devices: Time-current curves with applicable tolerance bands for each protective device in series back to the source, plotted up to the maximum available fault current at the associated bus.
3) Conductors: Damage curves.
4) Transformers: Inrush points and damage curves.
5) Generators: Full load current, overload curves, decrement curves, and short circuit withstand points.
6) Motors: Full load current, starting curves, and damage curves.
7) Capacitors: Full load current and damage curves.

c. For each protective device, identify fixed and adjustable characteristics with available ranges and recommended settings.
1) Circuit Breakers: Include long time pickup and delay, short time pickup and delay, and instantaneous pickup.
2) Include ground fault pickup and delay.
3) Include fuse ratings.
4) Protective Relays: Include current/potential transformer ratios, tap, time dial, and instantaneous pickup.

d. Identify cases where either full selective coordination or adequate protection is not achieved, along with recommendations.

4. Arc Flash and Shock Risk Assessment:
a. For each scenario, identify at each bus location:
1) Calculated incident energy and associated working distance.
2) Calculated arc flash boundary.
3) Bolted fault current.
4) Arcing fault current.
5) Clearing time.
6) Arc gap distance.

b. For purposes of producing arc flash hazard warning labels, summarize the maximum incident energy and associated data reflecting the worst case condition of all scenarios at each bus location.

c. Identify locations where the calculated maximum incident energy exceeds 40 calories per sq cm.

1.07 QUALITY ASSURANCE

A. Study Preparer Qualifications: Professional electrical engineer licensed in the State in which the Project is located and with minimum five years experience in the preparation of studies of similar type and complexity using specified computer software.
1. Study preparer may be employed by the manufacturer of the electrical distribution equipment.
2. Study preparer may be employed by field testing agency.

B. Field Testing Agency Qualifications: Independent testing organization specializing in testing, analysis, and maintenance of electrical systems with minimum five years experience; NETA Accredited Company.
1. Field Supervisor: Certified electrical testing technician; NETA ETT Level III.

C. Computer Software for Study Preparation: Use the latest edition of commercially available software utilizing specified methodologies.
1. Acceptable Software Products:
a. EasyPower LLC: www.easypower.com/#sle.
b. ETAP/Operation Technology, Inc: www.etap.com/#sle.
c. Power Analytics Corporation: www.poweranalytics.com/#sle.
d. SKM Systems Analysis, Inc: www.skm.com/#sle.

PART 2 PRODUCTS

2.01 ARC FLASH HAZARD WARNING LABELS

A. Provide warning labels complying with ANSI Z535.4 to identify arc flash hazards for each work location analyzed by the arc flash and shock risk assessment.
   1. Materials: Comply with Section 26 05 53.
   2. Legend: Provide custom legend in accordance with NFPA 70E based on equipment-specific data as determined by arc flash and shock risk assessment.
      a. Include orange header that reads "WARNING" where calculated incident energy is less than 40 calories per square cm.
      b. Include red header that reads "DANGER" where calculated incident energy is 40 calories per square cm or greater.
      c. Include the text "Arc Flash and Shock Hazard; Appropriate PPE Required" or approved equivalent.
      d. Include the following information:
         1) Arc flash boundary.
         2) Available incident energy and corresponding working distance.
         3) Site-specific PPE (personnel protective equipment) requirements.
         4) Nominal system voltage.
         5) Limited approach boundary.
         6) Restricted approach boundary.
         7) Equipment identification.
         8) Date calculations were performed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install arc flash warning labels in accordance with Section 26 05 53.

3.02 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide the services of field testing agency or equipment manufacturer's representative to perform inspection, testing, and adjusting.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Adjust equipment and protective devices for compliance with studies and recommended settings.

E. Notify Architect of any conflicts with or deviations from studies. Obtain direction before proceeding.

F. Submit detailed reports indicating inspection and testing results, and final adjusted settings.

3.03 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Training: Include as part of the base bid training for Owner's personnel on electrical safety pertaining to arc flash and shock hazards.

1. Use site-specific arc flash and shock risk assessment report as training reference, supplemented with additional training materials as required.
2. Provide minimum of eight hours of training.
3. Instructor: Representative of entity performing study.
4. Location: At project site.

3.04 ATTACHMENTS

A. Previous studies.

B. Existing drawings.

END OF SECTION

SECTION 26 05 83
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment.

1.02 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
B. Section 26 05 33.13 - Conduit for Electrical Systems.
C. Section 26 05 33.16 - Boxes for Electrical Systems.
D. Section 26 27 26 - Wiring Devices.
E. Section 26 28 16.16 - Enclosed Switches.

1.03 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   2. Determine connection locations and requirements.
B. Sequencing:
   1. Install rough-in of electrical connections before installation of equipment is required.
   2. Make electrical connections before required start-up of equipment.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.
B. Products: Listed, classified, and labeled as suitable for the purpose intended.
C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
   1. Colors: Conform to NEMA WD 1.
   2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
   3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Disconnect Switches: As specified in Section 26 28 16.16 and in individual equipment sections.

C. Wiring Devices: As specified in Section 26 27 26.

D. Flexible Conduit: As specified in Section 26 05 33.13.

E. Wire and Cable: As specified in Section 26 05 19.

F. Boxes: As specified in Section 26 05 33.16.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Occupancy sensors.
B. Outdoor motion sensors.
C. Time switches.
D. In-wall time switches.
E. In-wall interval timers.
F. Outdoor photo controls.
G. Daylighting controls.
H. Lighting contactors.
I. Control accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
B. Section 26 05 29 - Hangers and Supports for Electrical Systems
C. Section 26 05 33.16 - Boxes for Electrical Systems.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 26 05 73 - Power System Studies.
F. Section : Devices for manual control of lighting, including .
    1. Includes finish requirements for wall controls specified in this section.
    2. Includes accessory receptacles, switches, dimmers and wall plates, to match lighting controls specified in this section.
G. Section 26 28 13 - Fuses.
H. Section 26 51 00 - Interior Lighting.
I. Section 26 55 61 - Theatrical Lighting: Controls for stage lighting units.
J. Section 26 56 00 - Exterior Lighting.

1.03 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices; current edition.
B. ANSI C136.10 - American National Standard for Roadway and Area Lighting Equipment - Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing; 2023.
C. ANSI C136.24 - American National Standard for Roadway and Area Lighting Equipment - Nonlocking (Button) Type Photocontrols; 2020.
D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
E. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

F. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.

G. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

H. NEMA IA 10030 - Industrial Control and Systems: Enclosures; 2024.

I. NEMA IA 10039 - Control Circuit and Pilot Devices; 2025.

J. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. UL 773 - Plug-in, Locking Type Photocontrols for Use with Area Lighting; Current Edition, Including All Revisions.

M. UL 773A - Nonindustrial Photoelectric Switches for Lighting Control; Current Edition, Including All Revisions.

N. UL 916 - Energy Management Equipment; Current Edition, Including All Revisions.

O. UL 917 - Clock-Operated Switches; Current Edition, Including All Revisions.

P. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

Q. UL 60947-1 - Low-Voltage Switchgear and Controlgear - Part 1: General Rules; Current Edition, Including All Revisions.

R. UL 60947-4-1 - Low-Voltage Switchgear and Controlgear - Part 4-1: Contactors and Motor-starters - Electromechanical Contactors and Motor-starters; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
   3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
   4. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
   5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install lighting control devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
   1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

C. Shop Drawings:

1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.
2. Daylighting Controls: Provide lighting plan indicating location, model number, and orientation of each photo sensor and associated system component.

D. Field Quality Control Reports.

E. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Operation and Maintenance Data: Include detailed information on device programming and setup.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Locking Receptacle-Mounted Outdoor Photo Controls: Five percent of total quantity installed for each type, but not less than two of each type.
3. Indicating Lights: Two of each different type.

H. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.08 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for all occupancy sensors.

C. Provide five year manufacturer warranty for utility grade locking receptacle-mounted outdoor photo controls.

D. Provide two year manufacturer warranty for all daylighting controls.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

C. Products for Switching of Electronic Ballasts/Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.02 OCCUPANCY SENSORS

A. Manufacturers:
1. Hubbell Incorporated: www.hubbell.com/#sle.
2. Lutron Electronics Company, Inc: www.lutron.com/#sle.
3. Sensor Switch Inc: www.sensorswitch.com/#sle.
4. WattStopper: www.wattstopper.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.
6. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

B. All Occupancy Sensors:
1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:
a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
d. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.
3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
7. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
8. Sensitivity: Field adjustable.
9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
10. Integral Photocell: For field selectable and adjustable inhibition of automatic turn-on of load when ambient lighting is above the selected level.

11. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
12. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on drawings.
13. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.
14. Where wired sensors are indicated, wireless sensors are acceptable provided that all components and wiring modifications necessary for proper operation are included.
15. Wireless Sensors:
    a. RF Range: 30 feet through typical construction materials.
    b. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class B application.
    c. Power: Battery-operated with minimum ten-year battery life.

C. Wall Switch Occupancy Sensors:
1. All Wall Switch Occupancy Sensors:
    a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
    b. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.
    c. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.
    d. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
    e. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
    f. Provide selectable audible alert to notify occupant of impending load turn-off.
    g. Finish: Match finishes specified for wiring devices in Section 26 27 26, unless otherwise indicated.
    h. Provide vandal resistant lenses for passive infrared (PIR) and dual technology wall switch occupancy sensors where indicated.
2. Passive Infrared (PIR) Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet.

D. Wall Dimmer Occupancy Sensors:
1. General Requirements:
    a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability , and no leakage current to load in off mode.
    b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
    c. Manual-Off Override Control Capability: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
    d. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
    e. Provide field adjustable dimming preset for occupied state.
    f. Provide fade-to-off operation to notify occupant of impending load turn-off.

g. Finish: Match finishes specified for wiring devices in Section 26 27 26, unless otherwise indicated.

2. Passive Infrared (PIR) Wall Dimmer Occupancy Sensors: Capable of detecting motion within an area of 900 square feet.

E. Ceiling Mounted Occupancy Sensors:

1. All Ceiling Mounted Occupancy Sensors:
   a. Description: Low profile occupancy sensors designed for ceiling installation.
   b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
   c. Provide field selectable setting for disabling LED motion detector visual indicator.
   d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
   e. Finish: White unless otherwise indicated.
2. Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
   b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
      1) Products:
3. Ultrasonic Ceiling Mounted Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
   b. Medium Range Sensors: Capable of detecting motion within an area of 1,000 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
   c. Extended Range Sensors: Capable of detecting motion within an area of 2,000 square feet at a mounting height of 9 feet.
4. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
   b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
5. Passive Infrared/Acoustic Dual Technology Ceiling Mounted Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
   b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet.

F. Directional Occupancy Sensors:

1. All Directional Occupancy Sensors: Designed for wall or ceiling mounting, with integral swivel for field adjustment of motion detection coverage.
   a. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
   b. Provide field selectable setting for disabling LED motion detector visual indicator.
   c. Finish: White unless otherwise indicated.
2. Passive Infrared (PIR) Directional Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within a distance of 40 feet at a mounting height of 10 feet.

G. Luminaire Mounted Occupancy Sensors: Designed for direct luminaire installation and control, suitable for use with specified luminaires.

H. Power Packs for Low Voltage Occupancy Sensors:

1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
3. Input Supply Voltage: Dual rated for 120/277 V ac.
4. Load Rating: As required to control the load indicated on drawings.

I. Power Packs for Wireless Occupancy Sensors:
1. Description: Plenum rated, self-contained relay compatible with specified wireless occupancy sensors for switching of line voltage loads.
2. Input Supply Voltage: Dual rated for 120/277 V ac.
3. Load Rating: As required to control the load indicated on drawings.

2.03 OUTDOOR MOTION SENSORS

A. Manufacturers:
1. Hubbell Lighting, Inc: www.hubbelllighting.com/#sle.
2. Lithonia Lighting: www.lithonia.com/#sle.
3. WattStopper: www.wattstopper.com/#sle.

B. Description: Factory-assembled wet location listed device suitable for wall or ceiling/eave mounting, with integral swivel for field adjustment of coverage, capable of detecting motion for automatic control of load indicated.

C. Sensor Technology: Passive Infrared (PIR) designed to detect occupancy by sensing movement of thermal energy between zones.

D. Operation: Unless otherwise indicated, motion sensor to turn load on when motion is detected and to turn load off when no motion is detected during an adjustable turn-off delay time interval.

E. Turn-Off Delay: Field adjustable, with time delay settings available up to 15 minutes.

F. Integral Photocell: For dusk to dawn operation.

G. Manual Override: Activated by switching power off to unit and then back on.

H. Load Rating: 1,000 W incandescent and fluorescent load at 120 V ac.

I. Coverage: Capable of detecting motion within a distance of 50 feet at a mounting height of 8 feet, with a field of view of 270 degrees.

2.04 TIME SWITCHES

2.05 IN-WALL TIME SWITCHES

2.06 IN-WALL INTERVAL TIMERS

2.07 OUTDOOR PHOTO CONTROLS

A. Stem-Mounted Outdoor Photo Controls:
1. Description: Direct-wired photo control unit with threaded conduit mounting stem and field-adjustable swivel base, listed and labeled as complying with UL 773A.
2. Housing: Weatherproof, impact resistant polycarbonate.
3. Photo Sensor: Cadmium sulfide.
4. Provide external sliding shield for field adjustment of light level activation.
5. Light Level Activation: 1 to 5 footcandles turn-on and 3 to 1 turn-off to turn-on ratio with delayed turn-off.
6. Voltage: As required to control the load indicated on the drawings.

7. Failure Mode: Fails to the on position.
8. Load Rating: As required to control the load indicated on the drawings.
9. Provide accessory wall-mounting bracket where indicated or as required to complete installation.

B. Manufacturers:
1. Hubbell Control Solutions: www.hubbell.com/hubbellcontrolsolutions/en/#sle.
2. Lutron Electronics Company, Inc: www.lutron.com/#sle.
3. Sensor Switch Inc: www.sensorswitch.com/#sle.
4. WattStopper: www.wattstopper.com/#sle.

C. System Description: Control system consisting of photo sensors and compatible control modules and power packs, contactors, or relays as required for automatic control of load indicated according to available natural light; capable of integrating with occupancy sensors and manual override controls.

D. Daylighting Control Photo Sensors: Low voltage class 2 photo sensor units with output signal proportional to the measured light level and provision for zero or offset based signal.
1. Sensor Type: Filtered silicon photo diode.
2. Sensor Range:
a. Indoor Photo Sensors: 5 to 100 footcandles.
b. Outdoor Photo Sensors: 5 to 250 footcandles.
c. Atrium Photo Sensors: 200 to 2,500 footcandles.
d. Skylight Photo Sensors: 1,000 to 6,000 footcandles.
e. Open Loop Photo Sensors: 3 to 6,000 footcandles.
3. Finish: White unless otherwise indicated.
4. Where wired sensors are indicated, wireless sensors are acceptable provided that all components and wiring modifications necessary for proper operation are included.
5. Wireless Daylighting Control Photo Sensors:
a. RF Range: 30 feet through typical construction materials.
b. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class B application.
c. Power: Battery-operated with minimum ten-year battery life.
d. Products:
1) Lutron Radio Powr Savr Wireless Sensors; www.lutron.com/#sle.

E. Dimming Photo Sensors: Photo sensor units with integral controller compatible with specified dimming ballasts, for direct continuous dimming of up to 50 ballasts.

F. Daylighting Control Switching Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors, for switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
1. Operation: Unless otherwise indicated, load to be turned on when light level is below selected low set point and load to be turned off when light level is above selected high set point, with a no switching dead band between set points to prevent unwanted cycling.
2. Input Delay: To prevent unwanted cycling due to intermittent light level fluctuations.
3. Control Capability:
a. Single Zone Switching Modules: Capable of controlling one programmable channel.
b. Multi-Zone Switching Modules: Capable of controlling up to three separately programmable channels.

G. Daylighting Control Switching Modules for Wireless Sensors:
1. Description: Plenum rated, self-contained relay compatible with specified wireless photo sensors for switching of line voltage loads in response to changes in measured light levels according to selected settings.

2. Operation: Unless otherwise indicated, load to be turned on when light level is below selected low set point and load to be turned off when light level is above selected high set point, with a no switching dead band between set points to prevent unwanted cycling.
3. Input Delay: To prevent unwanted cycling due to intermittent light level fluctuations.
4. Control Capability: Capable of controlling one programmable channel.
5. Input Supply Voltage: Dual rated for 120/277 V ac.

H. Daylighting Control Dimming Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors and with specified dimming ballasts, for both continuous dimming of compatible dimming ballasts and switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
1. Operation: Unless otherwise indicated, specified load to be continuously brightened as not enough daylight becomes available and continuously dimmed as enough daylight becomes available.
2. Control Capability: Capable of controlling up to three separately programmable channels, with up to 50 ballasts per channel.
3. Dimming and Fade Rates: Adjustable from 5 to 60 seconds.
4. Cut-Off Delay: Selectable and adjustable from 0 to 20 minutes.

I. Daylighting Control Dimming Modules for Wireless Sensors:
1. Description: Plenum rated control unit compatible with specified wireless photo sensors and with specified dimming ballasts, for continuous dimming of compatible dimming ballasts in response to changes in measured light levels according to selected settings.
2. Operation: Unless otherwise indicated, specified load to be continuously brightened as not enough daylight becomes available and continuously dimmed as enough daylight becomes available.
3. Load to be turned off when available daylight is sufficient to fully dim the load, after the selected time delay.
4. Control Capability: Capable of controlling up to 32 ballasts with up to two separately programmable daylighting zones.

J. Power Packs for Low Voltage Daylighting Control Modules:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage daylighting control modules for switching of line voltage loads. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
2. Input Supply Voltage: Dual rated for 120/277 V ac.
3. Load Ratings: As required to control the load indicated on drawings.

K. Accessories:
1. Where indicated, provide compatible accessory wall switches for manual override control.
2. Where indicated, provide compatible accessory wireless controls for manual override control.
    a. Products:
        1) Lutron Pico Wireless Controls; www.lutron.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of lighting control devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switch Occupancy Sensors: 48 inches above finished floor.
      b. In-Wall Time Switches: 48 inches above finished floor.
      c. In-Wall Interval Timers: 48 inches above finished floor.
   2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
   3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 27 26.

G. Provide required supports in accordance with Section 26 05 29.

H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

I. Identify lighting control devices in accordance with Section 26 05 53.

J. Occupancy Sensor Locations:
   1. Location Adjustments: Do not make adjustments to locations without obtaining approval from the Architect.
   2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

K. Outdoor Photo Control Locations:

1. Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.
2. Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

L. Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

M. Daylighting Control Photo Sensor Locations:
1. Location Adjustments: Do not make adjustments to locations without obtaining approval from the Architect.
2. Unless otherwise indicated, locate photo sensors for closed loop systems to accurately measure the light level controlled at the designated task location, while minimizing the measured amount of direct light from natural or artificial sources such as windows or pendant luminaires.
3. Unless otherwise indicated, locate photo sensors for open loop systems to accurately measure the level of daylight coming into the space, while minimizing the measured amount of lighting from artificial sources.

N. Combination Enclosed Lighting Contactors:
1. Except where indicated to be mounted adjacent to the equipment they supply, mount lighting contactors such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

O. Lamp Burn-In: Operate lamps at full output for minimum of 100 hours or prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

P. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

Q. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each lighting control device for damage and defects.

C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

D. Test time switches to verify proper operation.

E. Test outdoor photo controls to verify proper operation, including time delays where applicable.

F. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable. Record test results in written report to be included with submittals.

G. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

C. Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.

D. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

E. Adjust time switch settings to achieve desired operation schedule as indicated or as directed by Architect. Record settings in written report to be included with submittals.

F. Adjust external sliding shields on outdoor photo controls under optimum lighting conditions to achieve desired turn-on and turn-off activation as indicated or as directed by Architect.

G. Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated or as directed by Architect. Record settings in written report to be included with submittals. Readjust controls calibrated prior to installation of final room finishes, furniture, and window treatments that do not function properly as determined by Architect.

3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.07 COMMISSIONING

A. See Section 01 91 13 - General Commissioning Requirements for commissioning requirements.

3.08 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.

D. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.
   3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
   4. Location: At project site.

END OF SECTION

SECTION 26 21 00
LOW-VOLTAGE ELECTRICAL SERVICE ENTRANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical service requirements.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Materials and installation requirements for cast-in-place concrete equipment pads.
B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
D. Section 26 05 29 - Hangers and Supports for Electrical Systems.
E. Section 26 05 33.13 - Conduit for Electrical Systems.
F. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
G. Section 26 23 00 - Low-Voltage Switchgear: Service entrance equipment.
H. Section 26 24 13 - Switchboards: Service entrance equipment.
I. Section 26 24 16 - Panelboards: Service entrance equipment.
J. Section 26 27 13 - Electricity Metering: Non-utility electrical metering.
K. Section 26 28 16.16 - Enclosed Switches: Service entrance equipment.
L. Section 26 31 00 - Photovoltaic Collectors: Photovoltaic system for interconnection with normal utility electrical supply.
M. Section 26 43 00 - Surge Protective Devices: Service entrance surge protective devices.
N. Section 31 23 16 - Excavation.
O. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.
P. Section 31 23 23 - Fill: Bedding and backfilling.
Q. Section 33 71 19 - Electrical Underground Ducts, Ductbanks, and Manholes.

1.03 PRICE AND PAYMENT PROCEDURES

A. Allowances:
   1. See Section 01 21 00 - Allowances, for allowances affecting this section.
   2. Include cash allowance for Utility Company charges associated with providing service.
B. Unit Prices:
   1. See Section 01 22 00 - Unit Prices, for additional unit price requirements.
   2. Primary:
      a. Basis of Measurement: By the lineal foot, for each configuration.
      b. Basis of Payment: Includes all work designated to be provided by Contractor in "Division of Responsibility" under Part 2 article "Electrical Service Requirements" below, including purchase, delivery, and installation.
   3. Secondary:

a. Basis of Measurement: By the lineal foot, for each configuration.
b. Basis of Payment: Includes all work designated to be provided by Contractor in "Division of Responsibility" under Part 2 article "Electrical Service Requirements" below, including purchase, delivery, and installation.

4. Transformer Pad/Vault:
a. Basis of Measurement: Per unit, for each type.
b. Basis of Payment: Includes purchase, delivery, and installation.

1.04 DEFINITIONS

A. Service Point: The point of connection between the facilities of the serving utility and the premises wiring as defined in NFPA 70, and as designated by the Utility Company.

1.05 REFERENCE STANDARDS

A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.06 ADMINISTRATIVE REQUIREMENTS

A. No later than two weeks following date of the Agreement, notify Utility Company of anticipated date of service.

B. Coordination:
1. Verify the following with Utility Company representative:
a. Utility Company requirements, including division of responsibility.
b. Exact location and details of utility point of connection.
c. Utility easement requirements.
d. Utility Company charges associated with providing service.
2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for electrical service and associated equipment.
3. Coordinate arrangement of service entrance equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

C. Arrange for Utility Company to provide permanent electrical service. Prepare and submit documentation required by Utility Company.

D. Utility Company charges associated with providing permanent service to be paid by Owner.

E. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Utility Company representative.

F. Scheduling:
1. Arrange for inspections necessary to obtain Utility Company approval of installation.

1.07 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.08 QUALITY ASSURANCE

A. Comply with the following:
1. IEEE C2 (National Electrical Safety Code).

2. NFPA 70 (National Electrical Code).
3. The requirements of the Utility Company.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

B. Store products indoors in a clean, dry space having a uniform temperature to prevent condensation (including outdoor rated products which are not weatherproof until completely and properly installed). Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle products carefully to avoid damage to internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 ELECTRICAL SERVICE REQUIREMENTS

A. Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.

B. Electrical Service Characteristics: As indicated on drawings.

C. Utility Company: As indicated on drawings.

D. Division of Responsibility: As indicated on drawings.

E. Products Furnished by Contractor: Comply with Utility Company requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that ratings and configurations of service entrance equipment are consistent with the indicated requirements.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Verify and mark locations of existing underground utilities.

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions and Utility Company requirements.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances and required maintenance access.

D. Provide required support and attachment components in accordance with Section 26 05 29.

E. Provide grounding and bonding for service entrance equipment in accordance with Section 26 05 26.

F. Identify service entrance equipment, including main service disconnect(s) in accordance with Section 26 05 53.

3.04 PROTECTION

A. Protect installed equipment from subsequent construction operations.

END OF SECTION

SECTION 26 24 13
SWITCHBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Low-voltage (600 V and less) switchboards and associated accessories for service and distribution applications.

B. Overcurrent protective devices for switchboards.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section 26 05 29 - Hangers and Supports for Electrical Systems.

D. Section .
   1. Includes requirements for the seismic qualification of equipment specified in this section.

E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

F. Section 26 05 73 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.

G. Section 26 21 00 - Low-Voltage Electrical Service Entrance.
   1. Includes Utility Company contact information.

H. Section 26 23 00 - Low-Voltage Switchgear.

I. Section 26 25 13 - Low-Voltage Busways.

J. Section 26 28 13 - Fuses: Fuses for fusible switches.
   1. Includes requirements for spare fuses and spare fuse cabinets.

K. Section 26 43 00 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).

B. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

D. NECA 400 - Standard for Installing and Maintaining Switchboards; 2007.

E. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).

F. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

G. NEMA PB 2 - Deadfront Distribution Switchboards; 2011.

H. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 1000 Volts or Less; 2023.

I. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

N. UL 891 - Switchboards; Current Edition, Including All Revisions.

O. UL 977 - Fused Power-Circuit Devices; Current Edition, Including All Revisions.

P. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the electrical outage time with the school district for crossover of power when the new switchboard is installed. Do not discionnect power from the school without written authorization.Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
3. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Coordinate with manufacturer to provide shipping splits suitable for the dimensional constraints of the installation.
6. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Service Entrance Switchboards:
1. Coordinate with Utility Company to provide switchboards with suitable provisions for electrical service and utility metering, where applicable.
2. Coordinate with Owner to arrange for Utility Company required access to equipment for installation and maintenance.
3. Obtain Utility Company approval of switchboard prior to fabrication.
4. Arrange for inspections necessary to obtain Utility Company approval of installation.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for switchboards, enclosures, overcurrent protective devices, and other installed components and accessories.
1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.

C. Shop Drawings: Indicate dimensions, voltage, bus ampacities, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
1. Include dimensioned plan and elevation views of switchboards and adjacent equipment with all required clearances indicated.

2. Include wiring diagrams showing all factory and field connections.
3. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
4. Include documentation of listed series ratings upon request.
5. Identify mounting conditions required for equipment seismic qualification.

D. Manufacturer's equipment seismic qualification certification.

E. Service Entrance Switchboards: Include documentation of Utility Company approval of switchboard.

F. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 2 as production (routine) tests.

G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

H. Field Quality Control Test Reports.

I. Project Record Documents: Record actual installed locations of switchboards and final equipment settings.

J. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Enclosure Keys: Two of each different key.
3. Electronic Trip Circuit Breakers: Provide one portable test set.
4. Drawout Devices:
   a. Handles Necessary for Racking of Devices: One for each electrical room containing switchgear with drawout devices.
   b. Lifting Yokes: One of each different yoke required, for each electrical room containing drawout devices.
   c. Portable Lifting Devices: One for each electrical room containing switchboards with drawout devices and no integral top rail-mounted lifting device.
   d. Removable Covers: One for blocking each different opening size when device is temporarily removed from its compartment.
5. See Section 26 28 13 for requirements for spare fuses and spare fuse cabinets.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store switchboards in accordance with manufacturer's instructions, NECA 400, and NEMA PB 2.1.

B. Store in a clean, dry space having a uniform temperature to prevent condensation (including outdoor switchboards, which are not weatherproof until completely and properly installed). Where necessary, provide temporary enclosure space heaters or temporary power for permanent factory-installed space heaters.

C. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

D. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.08 FIELD CONDITIONS

A. Maintain field conditions within required service conditions during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Switchboards:
   1. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

B. Products by Siemens Industry are not permitted.

C. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

D. Source Limitations: Furnish switchboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 SWITCHBOARDS

A. Switchboard shall be provided with weatherproof enclosure suitable for outdoor location as required.

B. Provide switchboards consisting of all required components, control power transformers, instrumentation and control wiring, accessories, etc. as necessary for a complete operating system.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.

E. Front-Connected Switchboards:
   1. Main Device(s): Individually-mounted.
   2. Feeder Devices: Panel/group-mounted.
   3. Arrangement: Front accessible only (not rear accessible), rear aligned.
   4. Gutter Access: Bolted covers.

F. Service Entrance Switchboards:
   1. Listed and labeled as suitable for use as service equipment according to UL 869A.
   2. For solidly-grounded wye systems, provide factory-installed main bonding jumper between neutral and ground busses, and removable neutral disconnecting link for testing purposes.
   3. Comply with Utility Company requirements for electrical service.

4. Utility Metering Provisions: Provide separate barriered compartment complying with Utility Company requirements where indicated or where required by Utility Company. Include hinged sealable door and provisions for Utility Company current transformers (CTs), potential transformers (PTs), or potential taps as required.
5. See Section 26 21 00 for additional requirements.

G. Switchboards With Busway Transitions: Configured for bussed connection to busway provided in accordance with Section 26 25 13.

H. Switchboards With Fire Pump Taps: Provide separate bussed vertical section with suitable lugs for fire pump connection to line side of main service disconnect device(s).

I. Switchboards With Drawout Devices: Provide integral top rail-mounted lifting device where indicated.

J. Seismic Qualification: Provide switchboards and associated components suitable for application under the seismic design criteria specified in Section where required. Include certification of compliance with submittals.

K. Service Conditions:
1. Provide switchboards and associated components suitable for operation under the following service conditions without derating:
a. Altitude: Less than 6,600 feet.
b. Ambient Temperature:
1) Switchboards Containing Molded Case or Insulated Case Circuit Breakers: Between 23 degrees F and 104 degrees F.
2) Switchboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.
2. Provide switchboards and associated components suitable for operation at indicated ratings under the service conditions at the installed location.

L. Short Circuit Current Rating:
1. Provide switchboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
2. Provide switchboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 05 73.
3. Minimum Rating: 65,000 rms symmetrical amperes.
4. Listed series ratings are acceptable, except where not permitted by motor contribution according to NFPA 70.
5. Label equipment utilizing series ratings as required by NFPA 70.

M. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

N. Main Devices: Configure for top or bottom incoming feed as indicated or as required for the installation. Provide separate pull section and/or top-mounted pullbox as indicated or as required to facilitate installation of incoming feed.

O. Bussing: Sized in accordance with UL 891 temperature rise requirements.
1. Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
2. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
3. Provide solidly bonded equipment ground bus through full length of switchboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
4. Phase and Neutral Bus Material: Aluminum.
5. Ground Bus Material: Aluminum.

P. Conductor Terminations: Suitable for use with the conductors to be installed.

1. Line Conductor Terminations:
   a. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   b. Main and Neutral Lug Type: Mechanical.
2. Load Conductor Terminations:
   a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   b. Lug Type:
      1) Provide mechanical lugs unless otherwise indicated.
      2) Provide compression lugs where indicated.

Q. Enclosures:
1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
   a. Indoor Clean, Dry Locations: Type 1 or Type 2 (drip-proof).
   b. Outdoor Locations: Type 3R.
2. Finish: Manufacturer's standard unless otherwise indicated.
3. Enclosure Space Heaters:
   a. Size according to manufacturer's recommendations for worst case ambient temperature to prevent condensation.
   b. Heater Control: Thermostat.
   c. Heater Power Source: Provide connection to transformer factory-installed in switchboard or suitable external branch circuit as indicated or as required.
4. Outdoor Enclosures:
   a. Enclosure Type: Non-walk-in type unless otherwise indicated.
   b. Color: Manufacturer's standard.
   c. Access Doors: Lockable, with all locks keyed alike.
   d. Walk-in Enclosure Features:
      1) Personnel Doors: Open to exterior; equipped with panic hardware.
      2) Aisle lighting, with switch at each access door.
      3) GFCI duplex convenience receptacle.

R. Future Provisions:
1. Prepare designated spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
2. Equip distribution sections with full height vertical bussing to accommodate maximum utilization of space for devices.

S. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 43 00, list switchboards as a complete assembly including surge protective device.

T. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
1. Where overcurrent protective devices equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
2. Where accessory ground fault sensing and relaying equipment is used, equip companion overcurrent protective devices with ground-fault shunt trips.
   a. Use zero sequence or residual ground fault detection method unless otherwise indicated.
   b. Provide test panel and field-adjustable ground fault pick-up and delay settings.
   c. Provide zone selective interlocking capability where indicated, capable of communicating with other electronic trip circuit breakers and external ground fault sensing systems to control ground fault delay functions for system coordination purposes.

U. Arc Flash Energy-Reducing Maintenance Switching: For circuit breakers rated 1200 A or higher, provide a local accessory switch with status indicator light that permits selection of a maintenance mode with alternate electronic trip unit settings for reduced fault clearing time.

V. Instrument Transformers:
1. Comply with IEEE C57.13.
2. Select suitable ratio, burden, and accuracy as required for connected devices.
3. Current Transformers: Connect secondaries to shorting terminal blocks.
4. Potential Transformers: Include primary and secondary fuses with disconnecting means.

2.03 OVERCURRENT PROTECTIVE DEVICES

A. Fusible Devices:
1. Fusible Switches:
a. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA BS 31047, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.
b. Fuse Clips: As required to accept indicated fuses.
1) Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
c. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
2. Fused Power-Circuit Devices:
a. Description: Quick-make, quick-break, dead-front bolted-pressure contact switches and high-pressure butt contact switches listed and labeled as complying with UL 977; ratings, configurations, and features as indicated on the drawings.
b. Bolted-Pressure Contact Switches: Devices with additional pressure or clamping action provided at both ends of switch blades when blades are in the fully closed position.
c. High-Pressure Butt Contact Switches: Devices with butt-type contacts and spring-charged mechanism.
d. Minimum Short Circuit Current Rating: 200,000 rms symmetrical amperes when protected by Class L fuses.
e. Fuse Clips: As required to accept Class L fuses.
f. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
g. Provide the following features and accessories where indicated or where required to complete installation:
1) Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
2) Auxiliary Switch: SPDT switch suitable for connection to system indicated for indicating switch position.
3) Blown fuse protection and indication.

B. Circuit Breakers:
1. Interrupting Capacity:
a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than specified minimum requirements.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.

2. Molded Case Circuit Breakers:
   a. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
      1) Provide thermal magnetic circuit breakers unless otherwise indicated.
      2) Provide electronic trip circuit breakers where indicated.
   b. Minimum Interrupting Capacity:
      1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
      2) 14,000 rms symmetrical amperes at 480 VAC.
   c. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
      1) Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
      2) Provide interchangeable trip units where indicated.
   d. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
      1) Provide the following field-adjustable trip response settings:
         (a) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
         (b) Long time delay.
         (c) Short time pickup and delay.
         (d) Instantaneous pickup.
         (e) Ground fault pickup and delay where ground fault protection is indicated.
      2) Provide zone selective interlocking capability where indicated, capable of communicating with other electronic trip circuit breakers and external ground fault sensing systems to control short time delay and ground fault delay functions for system coordination purposes.
      3) Provide communication capability where indicated: Compatible with system indicated.
   e. Provide the following circuit breaker types where indicated:
      1) 100 Percent Rated Circuit Breakers: Listed for application within the switchboard where installed at 100 percent of the continuous current rating.
      2) Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.
   f. Provide the following features and accessories where indicated or where required to complete installation:
      1) Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
      2) Pad-Lock Provision: For locking circuit breaker handle in OFF position.
      3) Auxiliary Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped or been turned off.
      4) Undervoltage Release: For tripping circuit breaker upon predetermined drop in coil voltage with field-adjustable time delay to prevent nuisance tripping.
      5) Alarm Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped.

3. Insulated Case Circuit Breakers:
   a. Description: Quick-make, quick-break, trip-free circuit breakers with two-step stored energy closing mechanism; standard 80 percent rated unless otherwise indicated; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
   b. Operation:
      1) Provide manually operated circuit breakers unless otherwise indicated.
      2) Provide electrically operated circuit breakers where indicated.
      3) Pad-Lock Provision: For preventing circuit breaker closing operation.
   c. Construction:
      1) Provide fixed-mount circuit breakers unless otherwise indicated.
      2) Provide drawout circuit breakers where indicated.
   d. Drawout Circuit Breakers:
      1) Allows withdrawal of circuit breaker into test and disconnected positions, with racking position indication (connected, test, disconnected, withdrawn).
      2) Provide safety interlock to prevent racking of circuit breaker while in the ON position.
      3) Pad-Lock Provision: For preventing circuit breaker drawout operation.
   e. Minimum Interrupting Capacity:
      1) 42,000 rms symmetrical amperes at 240 VAC or 208 VAC.
      2) 65,000 rms symmetrical amperes at 480 VAC.
   f. Trip Units: Solid state, microprocessor-based, true rms sensing.
      1) Provide the following field-adjustable trip response settings:
         (a) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
         (b) Long time delay.
         (c) Short time pickup and delay.
         (d) Instantaneous pickup.
         (e) Ground fault pickup and delay where ground fault protection is indicated.
      2) Provide zone selective interlocking capability where indicated, capable of communicating with other electronic trip circuit breakers and external ground fault sensing systems to control short time delay and ground fault delay functions for system coordination purposes.
      3) Provide communication capability where indicated: Compatible with system indicated.
   g. Provide the following circuit breaker types where indicated:
      1) Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.
   h. Provide the following features and accessories where indicated or where required to complete installation:
      1) Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
      2) Auxiliary Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped or been turned off.
      3) Undervoltage Release: For tripping circuit breaker upon predetermined drop in coil voltage with field-adjustable time delay to prevent nuisance tripping.
      4) Alarm Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped.

2.04 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Factory test switchboards according to NEMA PB 2, including the following production (routine) tests on each switchboard assembly or component:
   1. Dielectric tests.
   2. Mechanical operation tests.
   3. Grounding of instrument transformer cases test.
   4. Electrical operation and control wiring tests, including polarity and sequence tests.
   5. Ground-fault sensing equipment test.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the switchboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive switchboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install switchboards in accordance with NECA 1 (general workmanship), NECA 400, and NEMA PB 2.1.

C. Arrange equipment to provide required clearances and maintenance access, including accommodations for any drawout devices.

D. Where switchboard is indicated to be mounted with inaccessible side against wall, provide minimum clearance of 1/2 inch between switchboard and wall.

E. Provide required support and attachment in accordance with Section .

F. Provide required seismic controls in accordance with Section .

G. Install switchboards plumb and level.

H. Unless otherwise indicated, mount switchboards on properly sized 4 inch high concrete pad constructed in accordance with Section 03 30 00.

I. Provide grounding and bonding in accordance with Section 26 05 26.

J. Install all field-installed devices, components, and accessories.

K. Provide fuses complying with Section 26 28 13 for fusible switches as indicated.

L. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

M. Set field-adjustable circuit breaker tripping function settings as indicated.

N. Set field-adjustable ground fault protection pickup and time delay settings as indicated.

O. Provide filler plates to cover unused spaces in switchboards.

P. Identify switchboards in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's reports with submittals.

C. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

D. Before energizing switchboard, perform insulation resistance testing in accordance with NECA 400 and NEMA PB 2.1.

E. Inspect and test in accordance with NETA ATS, except Section 4.

F. Perform inspections and tests listed in NETA ATS, Section 7.1.

G. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

H. Molded Case and Insulated Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.

I. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
   1. Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is not required.

J. Meters: Perform inspections and tests listed in NETA ATS, Section 7.11.2.

K. Instrument Transformers: Perform inspections and tests listed in NETA ATS, Section 7.10. The dielectric withstand tests on primary windings with secondary windings connected to ground listed as optional are not required.

L. Test shunt trips to verify proper operation.

M. Correct deficiencies and replace damaged or defective switchboards or associated components.

N. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of switchboard covers and doors.

3.05 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Clean dirt and debris from switchboard enclosures and components according to manufacturer's instructions.

C. Repair scratched or marred surfaces to match original factory finish.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Training: Train Owner's personnel on operation, adjustment, and maintenance of switchboard and associated devices.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Instructor: Manufacturer's authorized representative.
4. Location: At project site.

3.07 PROTECTION

A. Protect installed switchboards from subsequent construction operations.

END OF SECTION

SECTION 26 27 13
ELECTRICITY METERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Equipment for Owner electricity metering:
   1. Single circuit electricity meters.
   2. Multi-circuit electricity meters.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 33.16 - Boxes for Electrical Systems: Cabinets and enclosures for metering system components.

D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

E. Section 26 21 00 - Low-Voltage Electrical Service Entrance: Requirements for Utility Company electricity metering.

F. Section 26 23 00 - Low-Voltage Switchgear: For interface with meters specified in this section.

G. Section 26 24 13 - Switchboards: For interface with meters specified in this section.

H. Section 26 24 16 - Panelboards: For interface with meters specified in this section.

I. Section 26 28 13 - Fuses.
   1. Includes requirements for spare fuses and spare fuse cabinets.

1.03 REFERENCE STANDARDS

A. ANSI C12.1 - Electric Meters - Code for Electricity Metering; 2024.

B. ANSI C12.20 - American National Standard for Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes; 2022.

C. IEC 62053-21 - Electricity Metering Equipment - Particular Requirements - Part 21: Static Meters for AC Active Energy (Classes 0,5, 1 and 2); 2020.

D. IEC 62053-22 - Electricity Metering Equipment - Particular Requirements - Part 22: Static Meters for AC Active Energy (Classes 0,1S,0,2S and 0,5S); 2020.

E. IEC 62053-23 - Electricity Metering Equipment - Particular Requirements - Part 23: Static Meters for Reactive Energy (Classes 2 and 3); 2020.

F. IEEE 1459 - IEEE Standard Definitions for the Measurement of Electric Power Quantities Under Sinusoidal, Nonsinusoidal, Balanced, or Unbalanced Conditions; 2025, with Errata.

G. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.

H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

I. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

J. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate work to provide equipment suitable for interface with electricity metering systems to be provided.
   2. Coordinate the work with other installers to provide communication lines required for electricity metering system interface.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Preinstallation Meeting: Conduct meeting with facility representative and other related equipment manufacturers to discuss electricity metering system interface requirements.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for electricity metering systems and associated components and accessories. Include ratings, configurations, standard wiring diagrams, dimensions, service condition requirements, and installed features.

C. Shop Drawings: Include system interconnection schematic diagrams showing all factory and field connections. Include requirements for interface with other systems.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Field Quality Control Test Reports.

F. Project Record Documents: Record actual installed locations of meters and final equipment settings.

G. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Enclosure Keys: Two of each different key.
   3. See Section 26 28 13 for requirements for spare fuses and spare fuse cabinets.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.08 FIELD CONDITIONS

A. Maintain field conditions within required service conditions during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Electricity Meters - Basis of Design: Veris Industries as indicated under product description below;

B. Electricity Meters - Other Acceptable Manufacturers:
   1. Veris Industries; E5x Series Enhanced Power and Energy Meter:
   2. Same as manufacturer of electrical distribution equipment used for this project.
      a. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

C. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

D. Source Limitations: Furnish electricity meters produced by a single manufacturer and obtained from a single supplier.

2.02 EQUIPMENT FOR OWNER ELECTRICITY METERING

A. Provide microprocessor-based digital electricity metering systems including all instrument transformers, wiring, and connections necessary for measurements specified.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide electricity metering systems and associated components compatible with the equipment and associated circuits to be metered.

D. Service Conditions: Provide electricity meters suitable for operation under the service conditions at the installed location.

E. Enclosures:
   1. Where not furnished by manufacturer, provide required cabinets and enclosures in accordance with Section 26 05 33.16.
   2. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R or Type 4.
   3. Provide lockable door(s) for outdoor locations.
   4. Finish: Manufacturer's standard unless otherwise indicated.

F. Instrument Transformers:
   1. Comply with IEEE C57.13, where applicable.
   2. Select suitable ratio, burden, and accuracy as required for connected devices.
   3. Current Transformers: Compatible with connected meters; replace meters damaged by connection of incompatible current transformers. Provide shorting terminal blocks for connection of secondaries where applicable.
   4. Potential Transformers: Include primary and secondary fuses with disconnecting means.

G. Interface with Other Work:

1. Interface with electrical power monitoring system.
2. Interface with building automation system.

2.03 SINGLE CIRCUIT ELECTRICITY METERS

A. Single Circuit Electricity Meter - Basis of Design: Veris Industries; E5x Series Enhanced Power and Energy Meter with LCD screen interface; 5-year warranty; utilizes voltage mode CTs that do not require terminal shorting blocks; compatible with solid-core, split-core, and rope CTs.
   1. Accuracy:
      a. Real/Active Power/Energy: Revenue grade; plus/minus 0.2 percent, complying with ANSI C12.20 accuracy and IEC 62053-22, Class 0.2S.
      b. Reactive Power/Energy: Plus/minus 2.0 percent, complying with IEC 62053-23, Class 2.
   2. Measured Parameters:
      a. Real/active energy (kWh); per phase and total of all phases.
      b. Reactive energy (kVARh) and apparent energy (kVAh); total of all phases.
      c. Net present demand over a user-specified interval (block or sliding window); real/active power (kW), reactive power (kVAR), and apparent power (kVA).
      d. Maximum (peak) demand intervals; real/active power (kW), reactive power (kVAR), and apparent power (kVA).
      e. Real/active power (kW), reactive power (kVAR), and apparent power (kVA); per phase and total of all phases.
      f. Models Available with Bi-directional Energy Measurements:
         1) Real/active energy (kWh) and apparent energy (kVAh); imported (from the grid), exported (to the grid), and signed net total.
         2) Reactive energy (kVARh); imported (from the grid) and exported (to the grid), per quadrant as defined by IEEE 1459.
         3) Maximum demand; real/active power (kW), reactive power (kVAR), and apparent power (kVA); imported (from the grid) and exported (to the grid).
      g. Current; per phase and average of all phases.
      h. Voltage; line-to-line and line-to-neutral; per phase and average of all phases.
      i. Power factor; per phase and average of all phases.
      j. Frequency.
   3. Models Available with Data Logging: Logs and retains in non-volatile memory up to 5760 measurement records at time intervals determined by Demand Interval duration setting (up to 60 days of readings at 15 minute intervals).
   4. Alarm capability, with configurable setpoints.
      a. Low power factor.
      b. Current over range.
      c. Voltage over range.
      d. Frequency out of range.
      e. Models available with pulse output overrun.
   5. Models Available with Pulse Contact Accumulator Input(s): Up to two; user-configurable to support measurement of other related energy values (gas, water, steam, etc.) using pulse-output transducers.
   6. Outputs:
      a. Models Available with Phase Loss Alarm Output: One; user-configurable phase loss threshold.
      b. Models Available with Pulse Output(s): Up to two.
   7. Communications: Compatible with connected systems. Provide all accessories necessary for proper interface.
      a. Models available with Serial Communications:

1) RS-485, 2-wire; support for Modbus RTU protocol.
2) RS-485, 2-wire; support for BACnet MS/TP protocol.
3) LON FT, 2-wire; support for LonTalk protocol.

2.04 MULTI-CIRCUIT ELECTRICITY METERS

A. Multi-Circuit Electricity Meter - Basis of Design: Veris Industries; E3x Series Panelboard Monitoring System; 5-year warranty; utilizes voltage mode CTs that do not require shorting terminal blocks.
   1. Metering Capacity: As indicated or as required for circuits to be monitored (configurations available for monitoring up to 84 branch circuits, two 3-phase main devices, and two neutrals with one meter).
   2. Accuracy:
      a. Real/Active Power/Energy (for models that measure this parameter): Revenue grade; plus/minus 1.0 percent (including branch CTs); complying with ANSI C12.1 and IEC 62053-21, Class 1.
      b. Voltage (for models that measure this parameter): Plus/minus 0.5 percent.
      c. Current: Plus/minus 0.5 percent.
   3. Measured Parameters at Main Device:
      a. Current; per phase and average of all phases.
      b. Maximum current; per phase and maximum average of all phases.
      c. Current demand; per phase and average of all phases.
      d. Maximum current demand; per phase and maximum average of all phases.
      e. Models available with measurements for:
         1) Current phase angle.
         2) Real/active energy (kWh); per phase and total of all phases.
         3) Snapshot of total energy as of the completion of the most recent demand interval; per phase and total of all phases.
         4) Real/active power (kW); per phase and total of all phases; available signed to indicate whether energy is being imported or exported.
         5) Apparent power (kVA); per phase and total of all phases.
         6) Power factor; per phase and total, based on three-phase breaker rotation, signed, to indicate leading or lagging current.
         7) Voltage, line-to-line and line-to neutral; per phase and average of all phases.
         8) Voltage phase angle.
         9) Frequency; phase A.
   4. Measured Parameters at Branch Circuits:
      a. Current; per branch and average of all phases for multi-phase logical circuits.
      b. Maximum current; per branch and maximum average of all phases for multi-phase logical circuits.
      c. Current demand; per branch and average of all phases for multi-phase logical circuits.
      d. Maximum current demand; per branch and maximum average of all phases for multi-phase logical circuits.
      e. Models available with measurements for:
         1) Current phase angle.
         2) Real/active power (kW); per branch and total of all phases for multi-phase logical circuits; available signed to indicate whether energy is being imported or exported.
         3) Real/active power (kW) demand; per branch and total of all phases for multi-phase logical circuits.

4) Real/active power (kW) demand maximum; per branch and total of all phases for multi-phase logical circuits.
5) Real/active energy (kWh); per branch and total of all phases for multi-phase logical circuits.
6) Snapshot of total energy as of the completion of the most recent demand interval; per branch and total of all phases for multi-phase logical circuits.
7) Apparent power (kVA); per branch and total of all phases for multi-phase logical circuits.
8) Power factor; per branch and average of all phases for multi-phase logical circuits, signed to indicate leading or lagging current.

5. Alarm capability, with configurable setpoints.
   a. Current over/under range.
   b. Models available with voltage over/under range.
6. Communications: Compatible with connected systems. Provide all accessories necessary for proper interface.
   a. Models Available with Serial Communications:
      1) RS-485, 2-wire or 4-wire; support for Modbus RTU protocol.
      2) RS-485, 2-wire; support for Modbus RTU and BACnet MS/TP protocols.
   b. Models Available with Ethernet Communications:
      1) Without RJ-45 10/100 Mbit; requires Modbus TCP Gateway; support for Modbus TCP protocol.
      2) With RJ-45 10/100 Mbit; support for Modbus TCP, BACnet IP, and SNMP protocols.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that the ratings and configurations of metering systems and associated components are consistent with the indicated requirements.
C. Verify that mounting surfaces are ready to receive meters.
D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).
B. Install products in accordance with manufacturer's instructions.
C. Provide required support and attachment components in accordance with Section 26 05 29.
D. Provide grounding and bonding in accordance with Section 26 05 26.
E. Provide fuses complying with Section 26 28 13 as required.
F. Identify meters and associated wiring in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Meters: Perform inspections and tests listed in NETA ATS, Section 7.11.2.

D. Instrument Transformers: Perform inspections and tests listed in NETA ATS, Section 7.10. The dielectric withstand tests on primary windings with secondary windings connected to ground listed as optional are not required.

E. Correct deficiencies and replace damaged or defective metering system components.

F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 ADJUSTING

A. Program system parameters according to requirements of Owner.

3.05 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.
   3. Instructor: Manufacturer's authorized representative.
   4. Location: At project site.

3.07 PROTECTION

A. Protect installed system components from subsequent construction operations.

END OF SECTION

SECTION 26 28 13
FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

B. Spare fuse cabinet.

1.02 RELATED REQUIREMENTS

A. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

B. Section 26 24 13 - Switchboards: Fusible switches.

C. Section 26 24 16 - Panelboards: Fusible switches.

D. Section 26 24 19 - Motor-Control Centers: Fusible switches.

E. Section 26 25 13 - Low-Voltage Busways: Fusible switches.

F. Section 26 28 16.16 - Enclosed Switches: Fusible switches.

G. Section 26 29 13 - Enclosed Controllers: Fusible switches.

H. Section 26 31 00 - Photovoltaic Collectors: Additional requirements for photovoltaic fuses.

1.03 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

D. UL 248-4 - Low-Voltage Fuses - Part 4: Class CC Fuses; Current Edition, Including All Revisions.

E. UL 248-8 - Low-Voltage Fuses - Part 8: Class J Fuses; Current Edition, Including All Revisions.

F. UL 248-10 - Low-Voltage Fuses - Part 10: Class L Fuses; Current Edition, Including All Revisions.

G. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

H. UL 248-15 - Low-Voltage Fuses - Part 15: Class T Fuses; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
   a. Fusible Switches for Switchboards: See Section 26 24 13.
   b. Fusible Switches for Panelboards: See Section 26 24 16.

c. Fusible Switches for Motor Control Centers: See Section 26 24 19.
d. Fusible Switches for Busway: See Section 26 25 01.
e. Fusible Enclosed Switches: See Section 26 28 16.16.
f. Fusible Switches for Enclosed Motor Controllers: See Section 26 29 13.

2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.
1. Spare Fuse Cabinet: Include dimensions.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Fuses: One set(s) of three for each type and size installed.
3. Fuse Pullers: One set(s) compatible with each type and size installed.
4. Spare Fuse Cabinet Keys: Two.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com/#sle.

B. Littelfuse, Inc: www.littelfuse.com/#sle.

C. Mersen: ep-us.mersen.com/#sle.

2.02 APPLICATIONS

A. Service Entrance:
1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.
2. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.

B. Feeders:
1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.
2. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.

C. General Purpose Branch Circuits: Class RK1, time-delay.

D. Individual Motor Branch Circuits: Class RK1, time-delay.

E. In-Line Protection for Pole-Mounted Luminaires: Class CC, time-delay.

F. Primary Protection for Control Transformers: Class CC, time-delay.

2.03 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.
B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
C. Provide fuses of the same type, rating, and manufacturer within the same switch.
D. Comply with UL 248-1.
E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
F. Voltage Rating: Suitable for circuit voltage.
G. Class R Fuses: Comply with UL 248-12.
H. Class L Fuses: Comply with UL 248-10.
I. Class CC Fuses: Comply with UL 248-4.

2.04 SPARE FUSE CABINET

A. Description: Wall-mounted sheet metal cabinet with shelves and hinged door with cylinder lock, suitably sized to store spare fuses and fuse pullers specified.
B. Finish: Manufacturer's standard, factory applied grey finish unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
B. Verify that mounting surfaces are ready to receive spare fuse cabinet.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.
B. Install fuses with label oriented such that manufacturer, type, and size are easily read.
C. Install spare fuse cabinet where indicated.
D. Identify spare fuse cabinet in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 28 16.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section .

D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

E. Section 26 05 73 - Power System Studies: Additional criteria for the selection of equipment and associated protective devices specified in this section.

F. Section 26 28 13 - Fuses.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

C. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Include dimensioned plan and elevation views of enclosed switches and adjacent equipment with all required clearances indicated.
   2. Include wiring diagrams showing all factory and field connections.
   3. Identify mounting conditions required for equipment seismic qualification.

D. Manufacturer's equipment seismic qualification certification.

E. Field Quality Control Test Reports.

F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

G. Project Record Documents: Record actual locations of enclosed switches.

H. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. See Section 26 28 13 for requirements for spare fuses and spare fuse cabinets.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.08 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

B. General Electric Company: www.geindustrial.com/#sle.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

B. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Seismic Qualification: Provide enclosed safety switches suitable for application under the seismic design criteria specified in Section where required. Include certification of compliance with submittals.

D. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

E. Horsepower Rating: Suitable for connected load.

F. Voltage Rating: Suitable for circuit voltage.

G. Short Circuit Current Rating:
   1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
   2. Minimum Ratings:
      a. Switches Protected by Class H Fuses: 10,000 rms symmetrical amperes.
      b. General Duty Single Throw Switches Protected by Class R, Class J, or Class T Fuses: 100,000 rms symmetrical amperes.
      c. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.
      d. Double Throw Switches Protected by Class R, Class J, or Class T Fuses: 100,000 rms symmetrical amperes.

H. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

I. Provide with switch blade contact position that is visible when the cover is open.

J. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
   1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.

K. Conductor Terminations: Suitable for use with the conductors to be installed.

L. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.

M. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

N. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
   a. Indoor Clean, Dry Locations: Type 1.
   b. Outdoor Locations: Type 3R.
2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

O. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

P. Heavy Duty Switches:
1. Comply with NEMA BS 31047.
2. Conductor Terminations:
   a. Provide mechanical lugs unless otherwise indicated.
   b. Provide compression lugs where indicated.
   c. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
   a. Provide means for locking handle in the ON position where indicated.

Q. General Duty Switches:
1. Conductor Terminations:
   a. Provide mechanical lugs.
   b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
2. Provide externally operable handle with means for locking in the OFF position, capable of accepting two padlocks.

R. Provide the following features and accessories where indicated or where required to complete installation:
1. Hubs: As required for environment type; sized to accept conduits to be installed.
2. Integral fuse pullers.
3. Auxiliary Switch: SPDT switch suitable for connection to system indicated, with auxiliary contact operation before switch blades open and after switch blades close.
4. Viewing Window: Positioned over switch blades for visual confirmation of contact position with door closed.
5. Interlocked Receptacle: Integral pre-wired three phase, three wire, grounded type receptacle interlocked with switch mechanism to prevent insertion or removal of plug with switch in the ON position and to prevent switch from being placed in the ON position without matching plug inserted. Provide receptacle configuration as required to accept plug as indicated on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section .

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 05 26.

H. Provide fuses complying with Section 26 28 13 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

J. Identify enclosed switches in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 43 00
SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surge protective devices for service entrance locations.

B. Surge protective devices for distribution locations.

C. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 23 00 - Low-Voltage Switchgear.

C. Section 26 24 13 - Switchboards.

D. Section 26 24 16 - Panelboards.

E. Section 26 24 19 - Motor-Control Centers.

F. Section 26 25 13 - Low-Voltage Busways.

1.03 ABBREVIATIONS AND ACRONYMS

A. EMI/RFI: Electromagnetic Interference/Radio Frequency Interference.

B. SPD: Surge Protective Device.

1.04 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

C. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 1283 - Standard for Electromagnetic Interference Filters; Current Edition, Including All Revisions.

F. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to ordering equipment.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.

C. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.

D. Certificates: Manufacturer's documentation of listing for compliance with the following standards:
   1. UL 1449.
   2. UL 1283 (for Type 2 SPDs).

E. Operation and Maintenance Data: Include information on status indicators and recommended maintenance procedures and intervals.

F. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

G. Project Record Documents: Record actual connections and locations of surge protective devices.

1.07 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.09 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

C. Exclude surge protective devices from any clause limiting warranty responsibility for acts of nature, including lightning, stated elsewhere.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Field-installed, Externally Mounted Surge Protective Devices - Other Acceptable Manufacturers:
   1. Schneider Electric; Square D Brand Surgelogic Products; _____: www.surgelogic.com/#sle.

B. Factory-installed, Internally Mounted Surge Protective Devices:

1. Same as manufacturer of equipment containing surge protective device, to provide a complete listed assembly including SPD.

C. Substitutions: See Section 01 60 00 - Product Requirements.

D. Source Limitations: Furnish surge protective devices produced by a single manufacturer and obtained from a single supplier.

2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

B. Enclosure Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
1. Indoor clean, dry locations: Type 1.
2. Outdoor locations: Type 3R.

C. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.
2. Provide flush-mounted SPD where mounted in public areas or adjacent to flush-mounted equipment.

D. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.

2.03 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

A. Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.

B. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.

C. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.

D. Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.

E. Repetitive Surge Current Capacity: Not less than 5,000 impulses.

F. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

2.04 SURGE PROTECTIVE DEVICES FOR DISTRIBUTION LOCATIONS

A. Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.

B. List and label as complying with UL 1449, Type 1 or Type 2.

C. Distribution locations include SPDs connected to distribution panelboards, motor control centers, and busway.

D. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.

E. Surge Current Rating: Not less than 80 kA per mode/160 kA per phase.

F. Repetitive Surge Current Capacity: Not less than 3,500 impulses.

G. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

2.05 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

A. Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.

B. List and label as complying with UL 1449, Type 1 or Type 2.

C. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.

D. Surge Current Rating: Not less than 60 kA per mode/120 kA per phase.

E. Repetitive Surge Current Capacity: Not less than 2,000 impulses.

F. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.

C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.

D. Verify system grounding and bonding is in accordance with Section 26 05 26, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Unless indicated otherwise, connect service entrance surge protective device on load side of service disconnect main overcurrent device.

E. Provide conductors with minimum ampacity as indicated on the drawings, as required by NFPA 70, and not less than manufacturer's recommended minimum conductor size.

F. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.

G. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 26 05 26 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.

H. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS Section 7.19.1.

D. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

3.04 CLEANING

A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

B. Poles and accessories.

C. Luminaire accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section .

D. Section 26 05 33.16 - Boxes for Electrical Systems.

E. Section .

F. Section 26 09 23 - Lighting Control Devices: Automatic controls for lighting including outdoor motion sensors, time switches, and outdoor photo controls.

G. Section 26 27 26 - Wiring Devices: Receptacles for installation in poles.

H. Section 26 28 13 - Fuses.

I. Section 26 51 00 - Interior Lighting.

1.03 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices; current edition.

B. AASHTO LTS - Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals; 2013, with Editorial Revision (2025).

C. ANSI C136.10 - American National Standard for Roadway and Area Lighting Equipment - Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing; 2023.

D. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989 (Corrigendum 2019).

E. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.

F. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

G. IES LM-63 - Approved Method: IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information; 2019.

H. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2024.

I. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.

J. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

K. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).

L. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2023.

M. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

N. UL 1598 - Luminaires; Current Edition, Including All Revisions.

O. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits; Current Edition, Including All Revisions.

P. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
   2. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution upon request.
   3. Provide structural calculations for each pole proposed for substitution.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Include IES LM-79 test report upon request.
   2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.
   3. Lamps: Include rated life and initial and mean lumen output.
   4. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

D. Sustainable Design Documentation: Submit manufacturer's product data on lamp mercury content and rated lamp life, showing compliance with specified requirements.

E. Samples:
   1. Provide one sample(s) of each specified luminaire where indicated.

F. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

G. Field Quality Control Reports.
   1. Include test report indicating measured illumination levels.

H. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

I. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.
   3. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.
   4. Extra Fuses: Five percent of total quantity installed for each type, but not less than two of each type.
   5. Touch-Up Paint: 2 gallons, to match color of pole finish.

K. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

H. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

I. LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.
   1. LED Tape - General Requirements:
      a. Listed.
      b. Designed for field cutting in accordance with listing.
      c. Wet Location Applications: IEC 60529, IP 68 (waterproof) rated.
   2. White LED Tape:
      a. Color Rendering Index (CRI): Not less than 90.

J. Exposed Hardware: Stainless steel.

2.03 LED DRIVERS

A. Ballasts/Drivers - General Requirements:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

B. Dimmable LED Drivers:
   1. Dimming Range: Continuous dimming from 100 percent to percent relative light output unless dimming capability to lower level is indicated, without flicker.
   2. Control Compatibility: Fully compatible with the dimming controls to be installed.

2.04 POLES

A. All Poles:
   1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
   2. Structural Design Criteria:
      a. Comply with AASHTO LTS.
      b. Wind Load: Include effective projected area (EPA) of luminaire(s) and associated supports and accessories to be installed.
   3. Material: Steel, unless otherwise indicated.
   4. Shape: Square straight, unless otherwise indicated.
   5. Finish: Match luminaire finish, unless otherwise indicated.
   6. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.

7. Unless otherwise indicated, provide with the following features/accessories:
   a. Top cap.
   b. Anchor bolts with leveling nuts or leveling shims.
   c. Anchor base cover.
   d. Provision for pole-mounted weatherproof GFI receptacle where indicated.
   e. Hinged base.

B. Metal Poles: Provide ground lug, accessible from handhole or transformer base.

2.05 ACCESSORIES

A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.

C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install products in accordance with manufacturer's instructions.

D. Install luminaires in accordance with NECA/IESNA 501.

E. Provide required support and attachment in accordance with Section .

F. Provide required seismic controls in accordance with Section .

G. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

H. Recessed Luminaires:
   1. Install trims tight to mounting surface with no visible light leakage.
   2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.

I. Suspended Luminaires:
1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet in length, with no more than 4 feet between supports.
4. Install canopies tight to mounting surface.
5. Unless otherwise indicated, support pendants from swivel hangers.

J. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

K. Pole-Mounted Luminaires:
1. Maintain the following minimum clearances:
a. Comply with IEEE C2.
b. Comply with utility company requirements.
2. Foundation-Mounted Poles:
a. Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 03 30 00.
1) Install anchor bolts plumb per template furnished by pole manufacturer.
2) Position conduits to enter pole shaft.
b. Install foundations plumb.
c. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
d. Tighten anchor bolt nuts to manufacturer's recommended torque.
e. Install non-shrink grout between pole anchor base and concrete foundation, leaving small channel for condensation drainage.
f. Install anchor base covers or anchor bolt covers as indicated.
3. Embedded Poles: Install poles plumb as indicated.
4. Grounding:
a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
b. Provide supplementary ground rod electrode as specified in Section 26 05 26 at each pole bonded to grounding system as indicated.
5. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
6. Install non-breakaway in-line fuse holders and fuses complying with Section 26 28 13 in pole handhole or transformer base for each ungrounded conductor.
7. Install weather resistant GFI duplex receptacle with weatherproof cover as specified in Section 26 27 26 in designated poles.

L. Install accessories furnished with each luminaire.

M. Bond products and metal accessories to branch circuit equipment grounding conductor.

N. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

E. Measure illumination levels at night with calibrated meters to verify conformance with performance requirements. Record test results in written report to be included with submittals.

3.05 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

B. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated or as directed by Architect.

3.06 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

D. Just prior to Substantial Completion, replace all lamps that have failed.

3.08 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

3.09 ATTACHMENTS

A. Luminaire schedule.

B. Luminaire cut sheets.

END OF SECTION

SECTION 27 00 00
COMMUNICATIONS ADMINISTRATION

PART 1 GENERAL

1.01 SUMMARY

A. The work outlined in this specification section is the general administrative overview for all communications systems installed under Division 27 and Division 28.

1.02 SCOPE

A. Submittals

B. Contractor Installation Shop Drawings

C. Warranty, Testing, and Commissioning

D. Contractor Record Closeout Documents

1.03 RELATED REQUIREMENTS

A. Division 27, Communications

1. Division 27 13 00 – Communications Backbone Cabling

1.04 CODES AND STANDARDS

A. The installed system shall confirm to all California State Codes

1. 2022 California Building Code (CBC)

2. 2022 California Electrical Code (CEC)

3. 2022 California Fire Code (CFC)

4. All equipment connected to the Fire Alarm system shall have California State Fire Marshall listing(s).

B. National Codes

1. 2022 NFPA 70 – National Electrical Code

2. 2022 NFPA 72 – National Fire Alarm Code

3. 2022 NFPA 101 – Life Safety Code

4. Americans with Disabilities Act (ADA)

5. Local building codes

C. All requirements by the authority having jurisdiction (AHJ)

D. Telecommunications Industry Association Standards (TIA)

a. TIA 526-7: Single Mode Fiber Standards

b. TIA 526-17: Multi Mode Fiber Standards

c. TIA-568-D.1: Commercial Building Telecommunications Cabling Standards.

d. TIA-568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standards.

e. TIA-569-E: Telecommunications Pathways and Spaces.

f. TIA-606-C: Administration Standard for Telecommunications Infrastructure.

g. TIA-607-D: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises.

E. Audio-Visual and Integrated Experience Association (AVIXA)

a. A102.01.2017: Audio Coverage Uniformity in Listener Areas (ACU)

b. 10:2013 Audio-Visual System Performance Verification

c. F501.01:2015: Cable Labeling for Audio-Visual Systems

d. V201.01: Projected Image System Contrast Ratio

e. F502.02:2018: Rack Building for Audio-Visual Systems

f. A103.01: Sound System Spectral Balance

g. A104.01: Sound System Dynamic Range

PART 2 PRODUCTS

2.01 N/A

PART 3 EXECUTION

3.01 SUBMITTALS

A. Products Material Submittal:

1. Product data and manufacturer’s installation instructions for information, communications, and technology systems electronically in PDF and XLS format, as required. The PDF shall include bookmarks for each section of the submittal.

2. A Microsoft Excel spreadsheet listing each item submitted as a separate row. The spreadsheet shall, at a minimum, contain the following columns:

a. Submittal #,

b. Item # (tied to PDF cut sheet)

c. Spec section submitted

d. Drawing sheet referenced

e. Manufacturer

f. Part number

g. Description

B. Products Material substitutions

1. If the Contractor desires to use any other brand or manufacturer of equal quality and utility to that specified, they shall make application to the District/Architect/Engineer in writing, and shall submit samples, if requested. Such application constitutes a recommendation that the Contractor:

a. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

b. Will provide the same warranty for equal as for specified product.

c. Will coordinate installation and make other changes, which may be required for work to be complete in all respects.

d. Waives claims for additional costs, which may subsequently become apparent.

e. The Architect/Designer/Engineer will determine whether or not the proposed material is equal in quality and utility to the material specified, and their decision shall be final.

f. Requests for equal materials will only be considered when offered by the Contractor as required by this section

C. Whenever in the Contract Documents any materials, products, processes, or articles are indicated or specified by the name brand of the manufacturer, or by patent or proprietary names, such specifications shall be deemed to be a measure of quality and utility or a standard and shall be deemed to be followed by the words, “or equal.” It is the intent of this article to comply with Public Contract Code Section 3400.

3.02 CONTRACTOR INSTALLATION SHOP DRAWINGS

A. Contractor installation “Shop Drawings” requirements

1. The Contractor Installation Shop Drawings represent the level of system design to be provided to the District/Architect/Engineer. Contractor shall provide all additional system design work required, including:

a. Conduit layout and sizing.

b. Wire and cable layout and sizing.

c. Point-to-point wiring and equipment hook-up information.

d. Equipment mounting details.

1) Design of equipment cabinets, including front rack elevations with accurate equipment rack unit spacing and equipment schedules.

2) MDF / IDF room wall elevations for all systems, junction boxes, wall mounted equipment, power outlets etc., mounted on each wall.

3) MDF / IDF room top view to show placement of equipment racks or cabinets, including required 36” clearance from mounted equipment.

e. Other detailed design work required.

f. Contractor’s design shall conform to all applicable codes and ordinances. All electrical design, including the sizing and placement of conduit, raceways and conductors, shall be in accordance with NFPA 70: National Electrical Code, current version, unless local codes establish more stringent requirements.

g. Contractor’s design work is subject to review and approval by the District/Architect/Engineer, Project Construction Manager.

2. It shall be understood that the drawings, details, and one-lines provided with the design package are diagrammatic and/or performance based. Data presented on design drawings are as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification, of all dimensions, routing, etc., by the contractor is required.

3. Drawings are provided to show the intent of the design and specification and to assist the contractor in submitting a bid. Contractor is directed to make field surveys as part of his work prior to submitting systems installation shop drawings. The contractor shall make allowance in the proposal to cover whatever work is required to comply with the intent of the design and provide a fully functioning complete, operable, and integrated system.

4. In case of doubt of work intended, it is the responsibility of the Contractor to request instructions from the District/Architect/Engineer prior to bid. The contractor shall be responsible for installing a complete, operable, integrated and functioning system to the Districts satisfaction.

5. Installation of the systems shall not be started until detailed contractor furnished shop drawings (in AutoCAD 2020 or similar professional drawing format) and product submittals have been approved by the designer and/or architect and if (a. Applicable, approved by the Division of the State Architect).

6. Any and all design and/or installation discrepancies, change orders, (including labor, materials, and shipping) incurred without contractor shop drawings or after contractor shop drawings have been approved shall be the sole responsibility of the contractor.

7. Any work performed without approved contractor furnished shop drawings and submittals shall not be allowed. If work performed prior to approve shop drawings, contractor will do so at their own risk.

3.03 WARRANTY, TESTING, AND COMMISSIONING

A. Warranty:

1. All components, parts, and installation supplied by the contractor shall be guaranteed against defects in materials and workmanship for one (1) year from date of Notice of Completion or system acceptance, whichever falls later. Labor to repair, reprogram, or replace components shall be furnished by the contractor at no charge during the warranty period.

2. All warranty work of a minor nature shall be performed during hours when site and/or buildings are not occupied, Monday through Friday. Major warranty work, defined as, affecting more than 15% of the system, causing complete operator workstation or server failure, or work involving life safety shall be responded to within four (4) hours. Major warranty work shall be performed regardless of normal work hours or days until corrected.

3. All fiber optic data installs shall carry a Limited Lifetime warranty. This will require the contractor to certify their installers to the manufactures guidelines and submit their certifications with bid documents for the project.

4. Copper (Cat6/Cat6A) network cabling installs for this project shall carry a Limited Lifetime warranty. This will require the contractor to certify their installers to the manufactures guidelines and submit their certifications with bid documents for the project.

3.04 CONTRACTOR RECORD CLOSEOUT DOCUMENTS

A. The Contractor shall provide, at the completion of the project, Project Record Documents and furnish to the District one (1) Electronic Copy set of record drawings. The Contractor Record Closeout Documents shall be prepared in such a manner that each ASI, RFI, CCD, PCO is noted and clouded on the Contractor Record Closeout Documents.

B. The Contractor shall provide an electronic copy of the field redline drawings in PDF format.

C. The electronic Contractor Record Closeout Documents shall follow the following standards:

1. Delivered as an electronic set of documents on a CD-R or a memory stick clearly labeled with Job Number, Bid Number and Name of Project.

2. Drawing standards, such as line-types, line-weights, fonts and symbols shall be consistent with the bid set documents.

3. Include text “Record Drawing” or “As Built” on all sheets.

4. Include all revision deltas and clouds on all sheets.

5. AutoCAD files shall adhere to the following standards:

    a. Full drawing package in AutoCAD (AutoCAD 2020 or most current version), executable .dwg format

    b. Include all fonts and plotting line-weights

    c. Include all cross references

D. The Contractor shall prepare and provide a complete Electronic Cable Book (PDF format), submitted on CD or electronically, as documentation. This cable book shall consist of the following with each section bookmarked within the PDF file:

1. Title of project

2. Index page detailing the sections

3. Site plans (Record set redlined drawings on original full-size bid set plans, hard and soft copy)

4. The drawings shall depict, at a minimum, the following conditions:

    a. Division 27 systems as applicable

E. Final inspection will not be made until drawings are received and approved. Record Drawings shall include “As-Built” one-line and wiring diagrams, with terminations identified, wire color coding schedule, pull box locations, and conduit routing plans.

F. Warranty certificates and documentation.

    a. One (1) Year workmanship warranty

    b. Limited Lifetime manufacturer warranty for Fiber Optic plant.

    c. Limited Lifetime manufacturer warranty for Cat6/Cat6A copper plant.

END OF SECTION

SECTION 27 05 00
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. The work of this Section consists of basic materials and methods for all communications, technology, security, access control pathways work included under Division 27 and Division 28. Additional specification requirements for electrical work are specified under other sections of Division 26 and where those requirements differ from the requirements of this section, the more stringent shall govern.

1.02 RELATED REQUIREMENTS

A. Division 01 00 00 specifications, General Requirements

B. Division 26 specification sections, as applicable

C. Division 27 specification sections, as applicable

D. Division 28 specification sections, as applicable

1.03 CODES AND STANDARDS

A. See specification section 27 00 00 for requirements

PART 2 PRODUCTS

2.01 GENERAL

A. All products used on this project shall bear the label and be approved by Underwriters Laboratories “UL” unless otherwise approved in writing by the District/Architect/Engineer.

B. Any modification that voids the equipment’s UL listing is strictly prohibited (i.e. relocated or oversize knock-outs).

C. Any modified new equipment that voids the UL listing shall be replaced by the Contactor (parts and labor) at their expense.

D. All products shall be new and unused and shall be of manufacturer’s current and standard production.

E. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.

F. Drawings and specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

G. Product Availability:

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

3. Equipment shortages, all equipment and material shall be ordered upon District/Architect/Engineer and design professional approval of product submittals and contractor shop drawings. The contractor shall immediately notify the District/Architect/Engineer of any long lead or backordered items so an alternate substitution may be reviewed for approval prior to ordering.

2.02 RACEWAYS

A. Rigid Steel Metallic (GRC): Full weight with threaded fittings conforming to industry standards. Rigid steel conduit in contact with earth or in concrete slabs must be PVC wrapped.

1. Rigid Steel Conduit: Protected inside and outside by galvanizing or sherardizing. By Triangle, Western Pipe & Tubing, Republic or approved equal. Risers and 90-degree elbows shall be wrapped with 3M Scotchwrap 51 PVC-based tape and 3M pipe primer (cover exposed threads and couplings).

B. Electric metallic tubing (EMT): Protected inside and outside by galvanizing or sherardizing. Minimum diameter size for EMT is ¾" and maximum diameter is 4". Same manufacturers as for rigid steel conduit. All fittings by: Thomas & Betts, Steel City, Raco, OZ/Gedney, or approved equal.

C. Flexible conduit: All Flex, American Flexible Conduit, or approved equal. Where exposed to weather use liquid-tight flexible conduit, type UA complete with waterproof fittings. American Flexible Conduit, Electri-Flex, Sealtite, Anaconda, or approved equal.

D. PVC conduit: Schedule 40 polyvinyl chloride high density, high impact, type two with factory-made bends, couplings and fittings, as manufactured by Carlon, PW Pipe, Cantex, or approved equal. Use of PVC is subject to local utility company having jurisdiction.

E. Raceway Fittings:

1. Rigid Steel Conduit (GRC): Fittings, such as couplings, connectors, conduit bodies, elbows, bends, etc., shall be subject to same requirements as for rigid steel conduit. Couplings and unions shall be threaded type, assembled with anti-corrosion, conductive anti-seize compound at joints, and made absolutely tight to exclude water. Unions shall be equal to Crouse-Hinds UNY, UNF or approved equal.

2. EMT: Fittings for indoor use: couplings and connectors 3/4" and larger shall be steel setscrew type or threaded compression type. 3/4" and larger, and all outdoor applications shall be compression type. All connectors must have insulated throats.

3. Flexible Metallic Conduit: Angle wedge type with insulated throat.

4. Bushings: Metallic insulated type. Weatherproof, liquid-tight, dust-tight installations with sealing ring and insulated throat, Crouse-Hinds, OZ/Gedney type "KR".

5. Expansion and Deflection Fittings: OZ/Gedney, Type "DX" or accepted equal.

F. All multi-channel non-metallic surface mounted raceways shall be three compartment 5500 Wiremold by Legrand or approved equal - color to be ivory or as selected by the District/Architect/Engineer. Provide all components necessary to complete the work.

1. 5500WC- Wire Clip to be installed every 24”

G. All small single or dual channel non-metallic surface mounted raceways shall be 2300 Wiremold by Legrand, type and size specified in the drawings or approved equal - color to be ivory or as selected by the District/Architect/Engineer. Provide all components necessary to complete the work.

1. Components include, but are not limited to:

a. Base

b. Cover

c. Surface mount box

d. Tee fitting

e. 90 flat elbow, inside, outside fittings

f. Entrance End Fitting

g. Blank End Fitting

h. Transition Fitting

i. Cross-over Fitting

j. Wire Clip to be installed every 24”

2.03 BOXES

A. Galvanized one-piece or welded pressed steel type. Boxes for fixture shall not be less than 4" square and shall be equipped with fixture stud. Boxes shall be at least 2-1/8” deep, 4" square for 1 or 2 gang devices, with plaster rings and gang box with gang cover. Boxes mounted in wall or ceiling finished with gypsum board shall be furnished

with plaster rings. Use screws and not nails to support outlet boxes. Boxes in unfinished areas, installed exposed, shall be cast metal type for switches and convenience outlets. Provide blank cover for all boxes without fixture or device.

B. Interior Junction boxes, larger than 8” square, located indoors shall be NEMA rated, with hinged door and an Allen key type lock kit.

C. Exterior Junction boxes, larger than 8” square, located outdoors, or in wet or damp locations shall be rated NEMA-3R, with hinged door and cylinder lock kit keyed to match the site’s master key.

D. Floor boxes shall be one-gang or multi-gang recessed, fully adjustable with lids and cover plates for respective tile or carpet floor finish. For "hard" floors such as tile or wood, the top of the cover shall be flush with the top of the finished floor. Receptacle covers shall have individual flip-lids with screw lock. Junction boxes shall have screwed on plugs.

1. Grade level or below: Watertight and concrete-tight of cast iron construction, FSR FL series, Walker 880CS series or equal.

2. Above grade level: Concrete-tight of stamped steel construction, FSR FL series, Walker 880S series or equal.

E. Provide and install center pin Torx tamper-proof screws for all exterior boxes and conduit bodies (i.e. LB, SLB, RLB, etc.).

2.04 PULL LINE

A. Furnish and install pull line in all new unused (empty) raceways / conduits.

B. Furnish and install replacement pull lines in all raceways if new cables are pulled through them.

C. All pull lines shall be:

1. Permanently tagged with identification at both ends.

2. Minimum 1/8" diameter, or larger if so, designated on plans, braided line of polypropylene or Jet-Line #232, or approved equal line of continuous fiber polyolefin. Minimum breaking strength of 1/8 in. line: 200 lbs.

2.05 PRECAST CONCRETE GROUND BOXES/HANDHOLES

A. Ground boxes shall be size as indicated on the drawings. Design loads shall consist of live, dead, impact, hydrostatic and other loads. Live loads shall be for H-20 and/or H-20-S16-44, or as required, per A.A.S.H.O. standard specifications for highway bridges with revisions. Design loads shall be sixteen KIPS. Concrete shall be per ASTM-C-33-64. Lightweight concrete shall conform to ASTM-C-33-64T. Cement shall be Portland Cement meeting ASTM-C-150 Type II standards. Compressive strength shall be minimum 4,000 psi at 28 days.

B. Ground boxes shall be supplied with steel edging in order to make spot welding cover lid to enclosure an option.

C. Ground boxes (48" x 30" or larger): Pre-cast high-density reinforced concrete with end and side knockouts, pulling-in irons. Minimum 4" wall thickness conforming to utility standards with spring assist traffic rated lids. Coordinate size of thin-wall knockouts with manufacturer for conduit entry. Acceptable manufacturers shall be Old Castle, Christy, Jensen or equal.

D. Ground boxes (smaller than 48" X 30"): Pre-cast high-density reinforced concrete with end and side knockouts, and extension as required. Minimum 1-1/2" wall thickness. Acceptable manufacturers shall be Old Castle, Christy, Jensen or equal.

E. Ground Box Covers: Large ground box covers conforming to utility standards with spring assist traffic rated lids shall be spring assisted traffic rated one or multi piece as required, steel checker plate, galvanized with anti-slip surface rated for parkway loading, with hold-down bolts. All boxes shall use H-20 rated traffic covers. No concrete covers shall be allowed.

1. All Ground Box Covers shall be factory marked “Signal” unless drawings for marking/label indicates otherwise. Covers shall be provided with Penta Head hold down bolts.

F. Utility ground boxes shall be per their requirements. Provide with ground rod as required.

G. All conduits terminating in ground boxes shall be evenly spaced, squarely cut, and bell ends installed.

H. All exterior conduits installed shall be color coded based on project standards. See project details.

I. All new ground boxes shall be located using GPS points (decimal degrees) and documented on the As-Built drawings.

2.06 PENETRATIONS AND SLEEVES

A. All penetrations through fire rated assemblies (walls, ceilings and floors) shall be made with materials and/or sleeves that meet or exceed the fire rating of the assembly.

1. Approved products: Specified Technologies, Inc. EZ-Path series, sealants, putty and pads.

B. All penetration through non-rated partitions shall be made with conduit sleeves (see Raceway/EMT above) and sealed with draft stop material.

PART 3 EXECUTION

3.01 PATHWAYS AND RACEWAY

A. EMT conduit may be used at following locations:

1. In dry in-wall spaces.

2. In partitions other than concrete or solid masonry.

B. In exterior locations, except as noted in 3.01.B.

C. Rigid steel conduit and fittings shall be used for vertical risers and on top of all roofs, overhangs, walkways and canopies.

D. All raceways installed in interior exposed locations shall be surface mounted raceway (Wiremold) by Legrand.

E. Provide flexible connections of short length (4 foot maximum) to equipment subject to vibration or movement and to all motors. Provide a separate bonding conductor in all flexible connections, except as provided for in CEC 250-91 (b) Ex1.

F. Portable buildings shall have weather-proof flex transition from underground to building conduits for both high/low voltage systems.

G. Install exposed conduit run neatly, parallel to or at right angles to structural members. Maintain a minimum of 12 inches of clearance from steam or hot water pipes. All installed unistrut / strut channel supports should allow for future conduit attachments. The width of unistrut / strut channel to match the width of the closest attached junction box. See drawing details for attachment requirements.

H. Supports: Support conduit with two-hole straps or unistrut / strut channel where shown and/or specified. Coordinate supports with architectural details. Secure to wood structure by means of bolts or lag screws, to metal by means of shallow self-tapping screws, to concrete by means of insert or expansion bolts, to brickwork by means of expansion bolts, and to hollow masonry or stucco by means of toggle bolts. Straps, expanders and shields shall be steel or malleable iron.

I. Spacing for all EMT and rigid steel conduit supports shall be as follows unless otherwise specified in drawing details:

1. Surface conduits, roof mounted:

a. Spacing of supports shall comply with CEC Article 344, Table 344-30(B)(2) and 2022 CBC 1603A.

b. Construction of roof supports shall comply with roofing manufacturer's requirements.

c. Roof supports shall be securely fastened to the roof with a gluing system approved by the roof manufacturer.

d. Route conduits parallel with mechanical piping and along building lines.

e. Provide ground wire in conduits.

2. Surface conduit spacing and supports and unless otherwise specified or shown on drawing details:

   a. EMT – Size 3/4” to 1-1/2” – 4’ maximum spacing (3 each supports per 10’ conduit length) and 12” from each end of conduit at coupling, connector or 90-degree bend.

   b. EMT – Size 2” to 4” – 4’ maximum spacing (3 each supports per 10’ conduit length) and 12” from end of conduit at coupling, connector or 90-degree bend.

   c. Rigid steel – Size 3/4” to 1” – 4’ maximum spacing (3 each supports per 10’ conduit length) and 12” from each end of conduit at coupling, connector or 90-degree bend.

   d. Rigid steel – Size 1-1/2” to 2” – 10’ maximum spacing (1 each supports per 10’ conduit length) and 12” from end of conduit at coupling, connector or 90-degree bend.

   e. Rigid steel – Size 3” to 6” – 10’ maximum spacing (1 each support per 10’ conduit length) and 12” from end of conduit at coupling, connector or 90-degree bend.

J. Do not install conduit in the “section” of concrete slabs, except for perpendicular penetrations. Refer to Structural Drawings for specific details.

K. Conduits installed in contact with concrete or earth shall be:

1. Install PVC conduit in a 3” sand or fine earth (passed through 1/8 in. screen) envelope below ground. Provide a minimum of 3” of sand or fine earth at the bottom of the trench before laying conduits.

2. Risers, sweeps, bends greater than 30 degrees, shall be PVC-wrapped, or rigid steel conduit with a minimum inside bend radius as follows unless otherwise specified:

CONDUIT SIZE (INCHES - NOMINAL)	**MINIMUM BENDING RADIU`S (TIMES CONDUIT SIZE)**
2" AND SMALLER	**6” INCH**
2” – 4”	**24” INCH**

1. When installing underground conduits to specified depth, depth shall be taken from the top of the conduit to the finished grade level. Unless otherwise specified, underground conduits shall be installed with top side not less than 24" below finished grade except that utility company primary conduit shall be 30" minimum below finished grade or as required to meet utility company standards. All conduits inside foundation line shall be not less than 2" below sub grade.

2. The minimum size of conduits outside the foundation line shall be 1", 3/4" inside the foundation line.

3. Place two 3" wide fluorescent orange non-biodegradable plastic tapes on both sides of trench at 12" below grade, labeled "CAUTION FIBER OPTIC LINE BURIED BELOW". Tape shall be continuous for full length of trench.

4. Contractor shall install a #10 insulated wire at the same depth as the underground conduits. The #10 insulated wire shall be continuous for full length of trench and terminated on unistrut / strut channel at the riser or grounding strip at ground box.

B. Above ground conduits shall have a minimum inside bend radius as follows unless otherwise specified:

CONDUIT SIZE (INCHES - NOMINAL)	MINIMUM BENDING RADIU`S (TIMES CONDUIT SIZE)
2" AND SMALLER	6” INCH
2” – 4”	24” INCH

A. If conduit is designated for low voltage use, no more than a total of 270 (3 ea. 90-degree bends, max.) degrees of conduit bend radius will be allowed between boxes.

B. All junction boxes shall be connected to conduits using appropriate connecting hardware (i.e. box connectors)

C. The use of conduit body LB, SLB or LBT fittings for information, communication, and technology systems is strictly prohibited.

D. Clean, prepare, and paint all exposed conduit, junction boxes, unistrut, fittings and accessories except rooftop mounted rigid steel conduit to match the surface in which it is installed.

1.02 EXPANSION JOINTS

A. Provide conduit expansion fitting in each conduit run, which is mechanically attached to separate structures to relieve strain caused by shift of one structure in relation to another.

B. Provide conduit expansion fitting in each conduit run wherever it crosses expansion joint in structure to which it is attached.

C. Provide expansion fittings where expansion and contraction are a consideration in long runs of exposed conduits (one inch [1"] or larger conduit in excess of one hundred feet [100']).

1.03 PROOFING

A. Before pulling any conductors into a PVC conduit, the conduit shall be first be proofed by pulling through a mandrel of a diameter ¼ in. smaller than the conduit inside dia., followed by a swab of the same diameter as the conduit inside diameter. Proofing will be done in the presence of Construction Manager for verification.

1.04 SURFACE MOUNTED RACEWAYS

A. Surface mount non-metallic raceways shall be used as required to provide communications cabling services as shown on installation drawings.

B. The Contractor will provide and install all surface mounted non-metallic type raceway and appropriate fittings to provide a safe and complete installation. All installation must meet manufacturers recommended installation procedures.

C. All non-metallic raceway boxes, bases, covers and fittings shall be of the same manufacture.

D. Wire management clips shall be installed in all raceways (vertical and horizontal runs) on maximum of 24” on center spacing. If utilizing existing raceway for new wires, wire management clips shall be installed.

E. The non-metallic raceway components shall meet all of the CEC applicable articles.

F. Multiple channel surface mounted raceways shall be color-coded and marked with a permanent marker on the inside of the channel and across the entire length of the channel blue for data, telephone, and IPTV and red for power. These color-coded channels shall be installed consistently with the same relative position of color on the top and the bottom throughout the site in accordance with CEC Article 352-26.

G. The non-metallic raceway may have a factory-applied adhesive for mounting to the substrate. The contractor shall not use the factory-applied adhesive, instead the Contractor shall fasten raceways every 16" on center to studs wherever possible utilizing appropriate fastening methods by the manufacturer. The contractor shall use pan head type screws, sized in accordance with the manufacturer installation instructions. In addition to the manufactures mounting instructions, mounting hardware and anchor types recommended for any raceway that shall be mounted to the building or structure.

    1. Sheet rock / drywall / wall board: by means of Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.

    2. Concrete / cinder block / solid masonry: by means of expanding compression type lag, expanding compression type bolt, expanding compression type all tread with nuts, or approved equal.

    3. Tile / Stucco / hollow masonry: by means of toggle bolts or approved equal.

    4. Wood: by means of lags, pan head wood screws, or approved equal.

    5. Metal: by means of a clamp, self-tapping pan head screw, or approved equal.

H. The raceway is to be manufactured of rigid PVC compounds. The cover shall have a matte texture.

I. A full complement of fittings must be available including, but not limited to, extension boxes, 90-degree elbows, tees, inside corners, outside corners, fixture boxes, wire clips, and device boxes. All fittings must match the color of the raceway cover.

J. The raceway and all system components must be UL Listed and exhibit non-flammable self-extinguishing characteristics.

K. At locations where raceway is mounted below 48 inches from the finished floor the contractor shall install a device bracket every 30” on center throughout the entire length of the raceway system. Any unused slots on the device bracket shall have a blank plate installed.

L. Do not use pulling means, including fish tape, cable or rope, which can damage the non-metallic surface raceway.

M. Raceway shall not have covers installed until fastening and cabling is approved by the inspector of record.

1.05 POWER AND COMMUNICATION POLE

A. In areas with system furniture and/or office furniture is set up in open areas, the cables shall be routed through an existing power pole, or a contractor supplied and installed power pole from the ceiling space to the floor.

B. Power pole shall be properly anchored to the ceiling and the floor using the recommended mounting instruction from the manufacture.

C. Contractor may utilize an existing power pole provided fill capacities are not exceeded.

D. Project manager or District/Architect/Engineer representative shall determine how system furniture areas will need to be fitted with a power pole device.

E. In the event that a power pole is not in place to serve the specific systems furniture area, the contractor is required to provide and install one.

F. Contractor shall obtain clarification if method of installation is unclear regarding how a power pole will be installed prior to submission of contractor's bid.

G. Where cables pass through a hole in the pole, the contractor shall provide and install a grommet around the hole in the power pole to protect the wire and cable. The grommet will be fitted with either a plastic or rubber shutter device that provides a tight seal around the wire and cable. In addition, the contractor shall provide and install a spiral wrap type plastic device, which shall serve as a protected raceway from the power pole to the system furniture. The contractor shall then route the cables into the systems furniture raceways to the designated point of attachment at each drop location.

H. The contractor will terminate the wire and/or cable on the device outlets, which will be installed in the appropriate manner for the type of furniture being installed.

1.06 FLOOR MONUMENTS

A. Contractor shall provide and install approved floor monuments in those areas that cables are routed below the floor space and or require termination of a drop outlet in an open area that cannot be served either by a fixed wall or power pole.

B. Contractor shall provide all necessary labor and materials to saw cut floor, core holes and patch substrates/surfaces necessary to accommodate the installation of a floor monument.

C. Contractor shall provide and install a floor monument as specified in construction documents.

D. Where cables pass through a hole in the monument, the contractor shall provide and install a grommet around the hole in the power pole to protect the wire and cable. The grommet will be fitted with either a plastic or rubber shutter device that provides a tight seal around the wire and cable. In addition, the contractor shall provide and install a spiral wrap type plastic device, which shall serve as a protected raceway from the monument to the system furniture. The contractor shall then route the cables into the systems furniture raceways to the designated point of attachment at each drop location.

E. The contractor shall then route the cables into the systems furniture raceways and/or office furniture setup in open areas to the designated point of attachment at each drop location. The contractor will then terminate these cables on device outlets which will then be installed in a high-profile box, which will be surface mounted to the underside of the work surface at each location.

1.07 EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

A. Excavating, backfilling and compacting for conduit, underground pull boxes, vaults and other underground electrical and low voltage utilities shall be performed in accordance with Specification Section 31 00 00 (Earthwork) for Utilities and the Geotechnical Engineering Consultant.

1.08 CONDUIT CAPPING

A. Cap conduits during construction with manufactured seals. Swab out conduits before wires are pulled in.

B. Cap all empty conduits below grade and in pull boxes with manufacturer's caps to prevent entrance of debris, attach pull string to cap.

1.09 CONDUIT PENETRATIONS

A. Penetrations through walls, ceilings, or floors.

1. Wood, stucco, drywall, and hallow masonry

2. Scanning for structural members and wall studs:

a. Contractor shall scan the wall for studs and metal using an electronic stud finder to avoid drilling through a structural member.

b. If the contractor is unsure of the building’s structural supports, the contractor shall notify the inspector of record and/or project manager to confirm the location before drilling.

3. Drilling

    a. A pilot hole not exceeding 3/8” diameter shall be drilled through the material for each penetration to confirm placement of penetration on both sides of the wall and before using an auger bit or hole saw to finalize penetration size.

    b. Final penetration sizes shall take into account the size of the conduit to be installed including box connectors if EMT and angular space requirements for fire or draft stopping.

4. Concrete, brick, and solid masonry

    a. X-ray scanning

        1) Contractor shall perform or hire out to have each location of each wall penetration x-rayed to confirm the locations of rebar and other structural steel supports.

        2) If the contractor is unsure of the building’s structural supports, the contractor shall notify the inspector and/or project manager to confirm the location before drilling.

    b. Core boring/ Drilling

        1) Contractor shall notify the inspector and/or project manager of the time the core boring/drilling will be performed.

        2) The contractor shall save all removed material from wall for inspection. Contractor shall take precautions to protect site property from water and debris created by core boring.

        3) Final penetration sizes shall take into account the size of the conduit to be installed including box connectors if EMT and angular space requirements for dry packing.

    c. Filling angular space / dry packing

        1) Contractor shall fill the angular space between the conduit and the wall with structural grout. The grout shall be even and uniform all the way around the conduit with no gaps or voids.

B. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceway mounted to the same wall as the penetration provide rigid steel or IMC conduit treaded on both ends and secured in place with locking rings on both sides. Bend radius requirements shall be maintained where penetrations are made through the back of raceways; junction boxes with adequate depth shall be installed in order to comply with this requirement.

C. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceway not mounted to the same wall as the penetration provide

EMT conduit and secured in place with unistrut / strut channel. Box connectors shall always be used to connect EMT to junction boxes and raceways.

D. Where conduit passes through walls, ceilings, or floors with no connection points to junction boxes or raceway provide rigid steel or IMC conduit treaded on both ends and secured in place with locking rings and large reducing washers on both sides.

E. Where conduit passes through finished walls or ceilings, provide steel escutcheon plates, chrome or painted, as directed. Conduit, which penetrate floor slabs, concrete or masonry walls shall be grouted and sealed watertight at penetrations.

F. Fire stopping:

1. Seal all conduit penetrations through fire rated walls and floors fire and smoke tight in conformance with 2022 CBC Sections 714 & 2022 CEC 300-21.

G. Draft stopping:

1. All non-fire rated walls must be draft stopped and sealed. Submit method to be used for approval by inspector and/or project manager. Mineral wool is one product that may be used.

H. Water stopping:

1. All exterior penetrations shall be sealed watertight. The contractor shall use silicon rubber caulk or other approved methods and materials. Submit method and material with inspector and/or project manager.

I. Provide 12" vertical and horizontal clearance for conduit risers through roofs. Coordinate with roof manufacturer to seal roof.

1.10 DEMOLITION

A. Any existing equipment and cable noted to be removed on design plans or abandoned devices and conduit not being reused by this project shall be removed by the Contractor.

B. Removed equipment shall be inventoried and turned over to the District/Architect/Engineer or disposed of per the project’s instructions.

C. Disturbed surfaces shall be repaired to match original surface condition and prepped for painting.

D. Blank electrical plates colored or painted to match existing surfaces shall be installed over abandoned flush mounted device boxes.

1.11 BOXES

A. Screws shall be used to attach boxes, and must be accurately placed for finish, independently and securely supported by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers. Boxes with metal box hangers shall

be attached to metal studs. Box hangers shall be securely tied or welded (where permitted) to metal studs. Paint weld with rust inhibitor. Boxes installed in masonry tile or concrete block construction shall be secured with auxiliary plates, bars or clips and be grouted in place.

B. Locate outlets at the following heights above floor to the center of the device or handle unless otherwise noted on Drawings, Specifications, 2022 CBC 11B-308 or as required to meet ADA handicap requirements.

1. Convenience Outlets: 18" AFF (6" above counter or splash not to exceed 40” above finished floor).

2. Telephone Outlets: 18" AFF (45 in. for wall phone).

C. Install pull boxes as required in accessible spaces but do not install in finished areas unless approved by the District/Architect/Engineer.

D. Outlet boxes on opposite sides of wall requiring protected openings shall be separated by a horizontal distance of twenty-four (24") inches, Title 24 Part 2, 713.3.2 Exception #1.

E. For sound control, separate outlets on opposite sides of walls 16" minimum. Where outlets are less than 16" or in sound rated walls, seal airtight with fire rated sheet putty pads. Fill gap between junction box and wall with acoustical sealant all around perimeter of junction box. Fill conduits larger than 1 1/4" with fire rated putty.

F. Installation of conduit and outlet boxes in fire-resistive walls and partitions shall comply with Title 24, Part 2, Section 713.

G. Installation of conduit and outlet boxes in fire-resistive floors, floor-ceiling or roof-ceiling assemblies shall comply with Title 24, Part 2, Section 713.

1.12 GROUNDING AND BONDING

A. Ground fittings shall be UL approved for each application as installed, installed and connected to system in accordance with 2022 CEC Code requirements.

B. Neutral conductors and non-current carrying parts of equipment at each installation shall be grounded in accordance with applicable code. Ground conductor shall be copper having a current capacity in accordance with CEC Section 250.

C. All equipment cases, motor frames, etc. shall be completely grounded to satisfy requirements of CEC. Install bond wire in flexible conduit. Install copper bond wire, sized in accordance with CEC, in all nonmetallic raceways and bond to all metallic parts using approved fittings.

D. Service ground conductor shall be connected to a "Ufer" encased ground and bonded to the cold-water pipe system.

E. Ground resistance of made electrodes shall not exceed 25 ohms, per CEC Article 250-84. Perform ground resistance test prior to connection.

F. All connections shall be made with solder less connectors or molded fusion-welding process. Solder less connections shall be made to conform to Code requirements or manufacturers requirements if more stringent.

G. Provide ground wire in all rooftop conduits.

1.13 FIELD TESTING

A. General: Perform field test in the presence of the District's Representative except as otherwise specified. Provide required labor, materials, equipment and connections to perform tests. Document results and submit them to the District's Representative. Repair or replace all defective work.

B. Perform Megger test on all grounding legs:

1. Notify the District/Architect/Engineer when installed cable is ready to be tested.

2. Apply Megger tests. Supply labor, materials and test equipment required to perform continuity checks and Megger tests. Submit test data for approval.

3. If any failure is detected, locate failure, determine cause and, as directed by the District/Architect/Engineer, replace or repair cable or conductor to satisfaction of the District/Architect/Engineer at no increase in Contract Sum.

4. Subject feeder cables rated 600 volts AC to one (1) minute withstand test, or until stable reading is obtained with 1000-volt Megger. Provide written report of Megger test results. Test report to include all test conditions.

5. Do not Megger test any cables after connecting test equipment, unless specifically directed to do so by the District/Architect/Engineer.

1.14 CLEANING, PATCHING, AND PAINTING

A. Brush and clean work prior to concealing, painting and acceptance. Performed in stages if directed.

B. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.

C. Remove debris from inside and outside of material, equipment and structures.

D. All conduit, connectors, j-boxes, and accessories shall be painted white with primer.

E. All mud-rings shall be color code painted for inspection.

1.15 CABLING INSTALLATION AND DISTRIBUTION

A. Cable shall be routed in appropriate conduit by system type as outlined in details. Contractor is to contact District/Architect/Engineer representative when this requirement can't be met.

B. Cable shall not be exposed at any point in the cable path. Contractor is to use appropriate pathway for the situation (i.e. above drop ceiling, inside wall, conduit, or non-metallic surface raceway).

C. Cables shall be protected and sleeved with a conduit in locations where cables need to pass through walls, floors, or hard ceilings. Contractor shall install rigid steel or IMC conduit threaded on both ends and secured in place with locking rings and large reducing washers on both sides. Bend radius requirements shall be maintained where penetrations are made through the back of raceways; junction boxes with adequate depth shall be installed in order to comply with this requirement. The fire rating of the wall must be maintained during and after installation.

D. At solid wall locations such as plaster, brick, concrete, cinder block, tile, reinforced concrete, Contractor will provide and install surface mounted non-metallic raceways or equivalent. The use of different series raceways is required at locations where cable fill capacities are exceeded.

E. Cables will be run vertically inside the wall and into the ceiling space. Terminations on stud walls will be accomplished with cut-in type electrical boxes with a 1" conduit (flex or EMT) extended from the box within the wall to ceiling access space.

F. Cables routed above drop ceilings shall be run in corridors wherever possible in order to avoid furniture and work areas so that access to the cables is unencumbered.

G. The cables are to be as accessible as possible, placed above all other items in the ceiling, including ducts and supports.

H. Service loops:

1. Service loops in Ground boxes and J-boxes shall not be installed unless with prior written approval or to allow for the minimum bend radius specified by the manufacturer:

2. Cables routed above drop ceilings shall be run in corridors wherever possible in order to avoid furniture and work areas so that access to the cables is unencumbered.

3. Fiber feeder cable:

    a. Shall be a minimum of 10' at all MDF and IDF locations.

    b. Shall be routed around the perimeter of the ground box as cable exits and enters each side of the ground box. No visible service loop required. Cable shall be secured to the side of the ground box and not rest on the bottom of the box.

4. Intercommunications feeder cables:

    a. Shall be routed around the perimeter of the backboard in which it is terminated on.

    b. Shall be routed around the perimeter of the ground box as cable exits and enters each side of the ground box. No visible service loop required. Cable shall be secured to the side of the ground box and not rest on the bottom of the box.

5. Twisted Pair Category 6/6A cable:

    a. Shall be a minimum of 6’ at all MDF and IDF locations.

    b. Shall be routed around the perimeter of the ground box as cable exits and enters each side of the ground box. No visible service loop required. Cable shall be secured to the side of the ground box and not rest on the bottom of the box.

    c. Shall be a minimum of 9” behind each station location.

6. Service loops, Intercommunications:

    a. Horizontal cables:

        1) Shall be a minimum of 3’ at all head end termination locations.

        2) Shall be a minimum of 12” behind each speaker.

        3) Feeder/Backbone cables shall be routed around the perimeter of the backboard in which it is terminated on.

I. The cables are to be as accessible as possible, placed above all other items in the ceiling, including ducts and supports.

J. Do not use pulling means, including fish tape, cable or rope, which can damage the non-metallic surface raceway.

K. Use pulling compound or lubricant, with prior District/Architect/Engineer approval, only when necessary.

L. Pulling compound shall be a water base pulling lubricant that will not deteriorate cable or conduit.

M. Cables shall not be pulled across sharp edges. If sharp edges are present a small sleeve, insulating insert, or grommet shall be installed to protect the cable.

N. Cables shall be pulled free of sharp bends or kinks.

O. Cables shall not be forced or jammed between metal parts, assemblies, etc.

P. Cables shall not be pulled across access doors and pull box covers. Access to all equipment and systems shall be maintained.

Q. Manufacturer's specifications for pulling stress and minimum bend radius shall not be exceeded on any cable.

R. Install or replace pull-string after installing cable in any EMT, IMC, Rigid, or PVC conduits.

S. A maximum fill capacity of 40% will be deemed acceptable for conduits and 75% of raceway and surface pathway. Contractor shall inform District/Architect/Engineer / District/Architect/Engineer representative in writing if this requirement cannot be met. If the Contractor fails to inform the District/Architect/Engineer or its representative, any labor involve in rerouting cables in such conduit or raceways shall be the sole responsibility of the Contractor

T. Cable shall be identified with a machine-printed tag identifying the system type, source or head end location, and destination location in all access points (i.e. junction boxes, ground boxes, MDF, IDFs, etc.) and as they enter or exit the conduit pathway.

U. Contractor will assess whether or not the ceiling space is a plenum air return, which shall dictate the use of the listed plenum type or PVC type cable required in the materials specification section. Any cable installations that shall be pulled through underground conduit will require Outside Plant (OSP) cable. OSP cable are limited to a length of 50’ inside a building.

V. Power feeds of greater than 220 volts shall not be run parallel to UTP, Speaker or other system cables. Parallel runs of greater than 20 feet require a minimum separation distance of 3 feet, or 18 inches if cables are contained in a metallic conduit, which is grounded.

W. All power feeds crossing the path of UTP, Speaker or other system cables at right angles shall be a minimum of 6 inches in distance from the UTP cables.

X. There shall be a 6-inch separation between the cables and the light fixtures and motors. Contractor will notify the District/Architect/Engineer or it’s representative in the event this requirement cannot be met.

Y. All cable/cabling shall be kept 6 inches away from any heat source, i.e., HVAC ducting, steam valves, etc.

Z. Fiber Optic cable/cables shall be identified with a tag identifying cable type, destination and origin, and date installed, every 30 feet when installed in open trays or suspension systems in ceilings.

AA. Station Cable (UTP) or (STP) runs are not to exceed 290 feet.

BB. Cable splicing at any point of any cable installed by the contractor is unacceptable without specific District/Architect/Engineer and designer approval.

CC. No cabling is allowed to rest on any ceiling tile or suspension system unless specifically authorized by the District/Architect/Engineer. Strapping or mounting to any existing wires (e.g., lighting, ceiling grid, conduits, etc.) is not permitted.

DD. Cables, regardless of classification, shall not be bundled in larger quantities than 24.

EE. Cables bundled in quantities of 24 or larger shall be securely mounted to building structure (i.e. stud, beam, or other framing member.) with Contractor supplied cable tray unless otherwise specified on design drawings and details.

FF. Cables bundled in quantities less than 24 shall be securely mounted to building structure (i.e. stud, beam, or other framing member.) with Contractor supplied J-hooks every 4 feet unless otherwise specified on design drawings and details.

GG. Cables bundled in junction boxes shall be neatly routed and secured to box with Contractor supplied Velcro straps typically 4 per box.

HH. Cables shall be securely supported to building structure (i.e. stud, beam, or other framing member.) within 12 inches of any conduit or raceway entrance or exit. Cable tray may be required if not noted on plans.

II. Contractor will place all UTP, Speaker and other system cables in the ceiling area on Contractor supplied and installed wire hangers or in floor spaces and raceways. Cable tray may be required if noted on plans.

JJ. Insulation shall be removed to expose shielding and conductors/fibers to the exact length required by manufacturer for proper termination of plugs, pins and fiber terminations.

1. Wires and shielding shall not be nicked or damaged in any way upon termination of pins and closure of plug assembly.

2. Pins and plugs, upon termination, shall not be damaged in any way.

END OF SECTION

SECTION 27 11 00
EQUIPMENT ROOMS AND ENCLOSURES

PART I - GENERAL

1.01 SUMMARY

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install all required components to provide a comprehensive equipment room and / or equipment enclosure, including complete cable ladder system or cable tray system. Cable ladder and tray will be used for cable management inside the equipment rooms, server rooms, and above accessible ceilings. Contractor shall determine product availability and delivery time and shall include such considerations into his proposed Contract Time. Equipment rooms are defined as data MPOE, MDF / IDF, Access Control “ACP”, Intrusion Alarm “ICP” Control panel head end and other communication head end equipment.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:

1. For new construction – provide, coordinate, and install all required components and accessories as outlined in the design documents for a complete and operable system.

2. For existing construction – provide, coordinate, and install all components and accessories as outlined in the design documents to modify the existing system while maintaining compliance and to seamlessly integrate the new components into the existing campus’ system.

3. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District’s standards shall familiarize themselves with the District’s standards and requirements prior to beginning work

4. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

5. Contractor shall furnish and install all new components and hardware (active or passive) as indicated on the project drawings and/or as required to provide a turn-key system to the District.

6. Contractor shall provide and install all required fire-treated 3/4” plywood on all walls of the equipment room.

7. Contractor shall coordinate and arrange to have all required electrical installed and placed as shown on project drawings and / or where required following best practices.

8. Contractor shall coordinate with all trades for all wall mounted equipment, junction boxes and/or or raceway required in the equipment room and provide actual elevations of all components on the required approved to-scale pre-installation shop drawings in order to eliminate any conflicts or clearance issues.

9. Contractor shall coordinate with all trades for all floor mounted equipment and provide actual floor elevations of all components on the required approved to-scale pre-installation shop drawings in order to eliminate any conflicts or clearance issues.

10. Contractor shall provide and install all required installed racks and cabinets.

11. Contractor shall provide a ground bus bar at each MPOE, MDF, IDF room.

12. Contractor to provide all components to furnish complete cable ladder systems. Cable ladder systems are defined to include, but are not limited to straight sections of ladder, type cable ladders, bends, tees, elbows, drop-outs, supports and accessories.

13. Contractor to provide all components to furnish complete tray systems. Tray systems are defined to include, but not limited to straight sections of tray, factory and field bends.”T” fittings, drop-out fittings, supports and accessories.

14. Contractor shall set up a complete wire management system at each MDF/IDF, this includes wire management organizer(s). Contractor shall provide one horizontal wire manager for each new patch panel and one horizontal wire manager for each switch to be installed unless otherwise indicated in design drawings and details.

15. If existing MDF or IDF is in an area where construction will generate dust, the entire rack or cabinet shall be protected from dust. Extra care shall be taken to provide ventilation of the rack / cabinet if it is covered to allow air to circulate through the rack / cabinet in order for the equipment not to overheat.

16. When required per design documents uninterruptable power supplies (UPS) are to be provided, installed and configured by the Contractor.

1.03 RELATED REQUIREMENTS

A. Division 01 00 00 – General Requirements

B. Division 27 00 00 - Communications

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/NFPA 70 - National Electrical Code.

B. ASTM B633 - Specification for Electro-deposited Coatings of Zinc on Iron and Steel

C. NEMA BI 50015 - Metallic Cable ladder Systems.

1.05 QUALIFICATIONS

A. The contractor shall possess a California C7 or C10 license.

B. The Contractor or Subcontractor shall be Leviton certified to provide and install cable plant with 5 years documented experience.

C. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

1.06 SYSTEM REQUIREMENTS

A. Any new installations or existing system modifications shall seamlessly integrate into the site’s existing data cable plan system.

1.07 CONTRACTOR “SHOP DRAWINGS” DESIGN REQUIREMENTS

A. See section 27 00 00 for requirements.

1.08 SUBMITTALS

A. See section 27 00 00 for requirements.

1.09 WARRANTY

A. Refer to Division 01 Warranty section.

B. See section 27 00 00 for additional requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. See Appendix at the end of this document for pre-approved materials.

B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.

C. Contractor shall confirm all equipment part numbers with the District prior to ordering equipment and updating submittals as required.

D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation and operation.

E. Mounting hardware and anchors recommended by the Manufacture of any material that shall be mounted to the building or structure.

F. Sheet rock / drywall / wall board: Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.

G. Concrete / cinder block / solid masonry: expanding compression type lag, expanding compression type bolt, expanding compression type all tread with nuts, or approved equal.

H. Tile / Stucco / hollow masonry: toggle bolts or approved equal.

I. Wood: lags, wood screws, or approved equal.

J. Metal: clamp or approved equal.

K. Product Availability

L. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

M. Subject to compliance with these specifications, products and systems included in this section 27 11 00 are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 REFERENCE STANDARDS

A. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

B. BICSI TDMM - Telecommunications Distribution Methods Manual, 13th Edition; 2014.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

D. NEMA BI 50015 - Metal Cable Tray Systems; 2024.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

2.03 CONDUIT AND RACEWAY

A. See division 27 05 00 for conduit and raceway requirements.

2.04 LADDER RACK

A. In Equipment Rooms, ladder rack shall be installed to support all cable running to racks and cabinets.

B. Ladder rack to be added to all Equipment Rooms in places where cable is run horizontally and vertically.

C. UL Classified and Listed.

D. Furnish and install all connectors and fittings, as required. Where cables drop out of the ladder rack, “drop-out” fittings shall be furnished and installed.

E. Ladder rack shall be bonded and grounded according to NEC, CEC and manufacturer’s recommendations.

F. Finish: Black powder coat

G. Ladder rack tray shall be industry standard with typical rung spacing. Rungs can be removed or repositioned to accommodate specific project or building requirements.

H. Cable shall be bundled in a neat and workmanlike fashion in compliance with each cable type standard.

I. All appropriate ladder rack support hardware including angle brackets, rack-to-runway brackets, wall-to-runway brackets, elevation kits, junction splices, butt splices, and grounding jumpers shall be used for a complete and professional installation.

2.05 WIRE BASKET

A. Wire basket to be constructed with Minimum Wire Diameter of 0.196" (5.0 mm)

B. UL Listed. Finishes are shown in part number suffix as EG (Electroplated zinc galvanized) or BLE (Black powder coat). UL/CSA Classified as an equipment ground conductor when coating has been removed at splice contact points.

C. Wire basket shall be bonded and grounded according to NEC, CEC and manufacturers recommendations. Run appropriately sized ground wire alongside the tray and attach it to each tray section and on both sides of a cut in the tray.

D. Use flush-cutters for cutting and bending of wire basket for smooth burr-free and snag-free cuts. Do not use bolt cutters. Use rubber caps on exposed wire ends as needed.

E. All appropriate support hardware including corner supports, trapeze supports and brackets, splices, grounding jumpers and other parts not provided below, shall be used for a complete and professional installation.

2.06 BACKBOARDS

A. Plywood, fire-retardant treated, 3/4” by 48” by 96” inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry."

B. Mask and protect fire rating stamp if backboard is to be painted.

2.07 RACKS

A. See Appendix A for pre-approved product.

2.08 VERTICAL AND HORIZONTAL CABLE MANAGEMENT, SURGE PROTECTION DEVICES, BUILDING ENTRANCE PROTECTORS

A. See Appendix-A for pre-approved product.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. The components making up the equipment room and enclosures shall only be installed by Contractors who are qualified to install, service and maintain the system.

B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience before the Bid Opening Date.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.

B. The Contractor shall verify the availability of power where required.

3.04 SHOP DRAWINGS

A. The Contractor shall create "Shop Drawings" per section 27 00 00.

B. Submit drawings for review and approval by Project Manager.

3.05 INSTALLATION

A. ENTRANCE FACILITIES

1. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and housing when so directed by service provider.

2. Install underground or aerial pathways complying with recommendations in TIA/EIA-569-A, "Entrance Facilities" Article.

B. UNDERGROUND ENTRANCE PATHWAY

1. Install underground entrance pathway complying with Division 26 Section "Raceway and Boxes for Electrical Systems."

2. Comply with NECA 1.

3. Comply with BICSI TDMM for layout and installation of communications equipment rooms.

4. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

C. EQUIPMENT RACKS AND CABINETS

1. Backboards:

   a. Shall be installed behind the rack or cabinet if the cabinet is not able to be directly attached to two vertical wall studs.

   b. Backboards shall be made of fire retardant or treated materials, squarely cut, routed and sanded edges, void free and painted, leaving the fire-retardant stamp unpainted. Edges shall be sealed with manufacturing fire retardant sealant.

   c. Backboards made from particle or pressed board materials are NOT acceptable.

   d. Backboards shall be a minimum 3/4” thickness and large enough to secure it to two vertical wall studs.

   e. Backboard shall be painted with white fire-retardant paint if it is installed in an occupied area. The “FIRE RATED” stamp shall be visible after painting.

   f. Backboards shall be fastened with 1/4” lag bolt and washer, non-recessed, with maximum spacing of 18" into 2 vertical studs. Backboards mounted on the inside of the cabinets shall be squarely cut, with sanded edges and void free. Inside backboard shall match the inside dimensions of the installed cabinet. Inside backboard shall be a minimum 3/4” thickness.

2. All data and voice communications racks and cabinets shall be anchored in accordance with manufacturer specifications, project specifications and/or drawn details, to walls and floors and grounded to building ground grid (not to water pipes etc.).

3. All floor-mounted racks and cabinets shall have ladder racking from top of rack or cabinet to nearest wall as directed by drawn details.

4. Securely mount equipment cabinet and racks to the building structure. Proper supports such as 3/8" lag screws and expansion anchors shall be used. Proper quantity of supports will be utilized. Dry wall screws and other types of supports not specifically approved to support equipment are specifically prohibited. Submit mounting supports for approval before installation.

5. Equipment cabinet mounted on or against walls shall have 3-foot (36”) clearance in front to nearest wall or equipment.

6. MDF and all IDFs shall have one dedicated 220V/30A outlet (MDF only), and/or one dedicated 120VAC/20A outlet mounted above on ladder rack.

7. Patch Panels: Mount patch panels into the cabinet/rack in top-to-bottom fashion with the first patch panel (Fiber) mounted at the top of the “Active” equipment rack. Uniquely label each patch panel according to the numbering convention outlined in the SECTION on labeling. Each port will also have color-coded identifiers. Refer to details on the Drawings.

8. Cable Management: Secure the cable bundle(s) to the rack strain relief and cable management behind the patch panels and cross connect block panels. Install horizontal cable management panels and brackets for routing and management of patch cables. Maintain TIA/EIA and BICSI standards on bundling, supporting and bend radii.

9. Surge Protected Outlet Strips: Mount surge protected outlet strips per Manufacturer’s directions. Refer to details on the Drawings for mounting location.

10. Contractor to place a large label to ID the rack or cabinet location. It shall be placed on the top left side of the rack or the cabinet, clearly visible from the floor. A label shall also be placed on each of the racks or cabinet’s patch panel on the top left side of the patch panel (i.e. IDF 1.2).

11. If more than one cabinet or rack is located in the MDF/IDF, they will be labeled in alphabetical order (A, B, C, etc.).

D. BONDING AND GROUNDING

1. Refer to Section 27 05 00 Grounding requirements.

2. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

3. Comply with ANSI-J-STD-607-A.

4. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

5. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

6. Retain subparagraph below if screened twisted-pair cables and coaxial cables are in communications equipment rooms.

7. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

3.06 WORKMANSHIP

A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District’s

standards shall familiarize themselves with the District's standards and requirements prior to beginning work

B. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

C. Perform Work with persons experienced and qualified to produce workmanship specified.

D. Maintain quality control over suppliers and Subcontractors.

E. Quality of workmanship is considered important. The District's Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

3.07 CABLE

A. Design, layout, size, and plan new cable runs as required.

B. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.

C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.

D. Neatly dress and tie all cabling.

E. UTP cabling shall conform to a 6-foot separation requirement from the main power panel, transformers, switchgear and/or starter motors adjacent to the MDF, IDF and termination locations.

3.08 CONDUIT AND RACEWAY INSTALLATION, PENETRATIONS, CUTTING AND PATCHING, DEMOLITION, PAINTING AND ADDITIONAL PROJECT CONSTRUCTION REQUIREMENTS

A. See section 27 05 00 for requirements.

3.09 FIELD QUALITY CONTROL AND TESTING

A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.

B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

C. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to inspect wiring, devices and system operation.

D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.

E. Notify District when ready to perform a re-inspection of the installation.

F. AS-BUILT DRAWINGS AND TEST RESULTS

G. See section 27 00 00 for requirements.

APPENDIX-A
(Unless Otherwise Specified on Construction Document Plan Sheets)

DESCRIPTION	MANUFACTURER	PART NUMBER
Cable tray, open bottom, ceiling mounted	Snake Tray	201 series ceiling mounted
Cable tray, open bottom, wall mounted	Snake Tray	501 series wall mounted
Cable tray, solid bottom, center hung style	MonoSystems	RTCX-XX-120-PX
Cable tray, solid bottom, wall mount style	MonoSystems	RTWX-XX-120-PX
Power Pole plates, QuickPort Decora Multimedia Insert	Leviton	41646-I
Blanks to cover any unused port	Leviton	41084-BIB
Wall mount face plates, 6 port. Color to match electrical plate color or raceway to be installed.	Leviton	41091-6XX
2-Port Surface Mount Box, White	Leviton	41089-2WP
2-port angled faceplate	Leviton	41081-2WP
Wiremold Legrand 5500 components include, but are not limited to: a. 500BD-Divided Base b. 5500C- Cover c. 5507C- Device Bracket d. 5507D- Duplex Plate e. 5507B- (2)-Blank Plates f. 5510D- Entrance End Fitting g. 5500WCA- Wire Clip to be installed every 24”	Wiremold Legrand	See column to left
All small single or dual channel non-metallic surface mounted raceways shall be 2300 Wiremold by Legrand, type and size specified in the drawings or approved equal	Wirelmold Legrand	2300
Power and Communication Components include, but are not limited to: a. Rectangular Device Cover b. 6 port QuickPort Decora Multimedia Insert c with blanks	Wiremold Legrand Wiremold Legrand Leviton Leviton	30TP 4*V (*height of pole determined by ceiling height) p/n 30TP-L p/n 41646-W p/n 41084-BW

END OF SECTION

SECTION 27 11 23
COMMUNICATION CABLE MANAGEMENT & LADDER RACK

PART I - GENERAL

1.01 SECTION INCLUDES

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install a complete cable management system / cable tray system. J-Hooks, Wire Basket / Cable tray will be used for cable management inside the MDF/IDF rooms and above accessible ceilings.

B. J-Hooks are used to support low voltage wiring to provide an easy way to manage and identified cable bundles. Cable bundles of less than 25 cables shall use J-Hooks for support.

C. Cable ladder systems are defined to include, but are not limited to straight sections of ladder, type cable ladders, bends, tees, elbows, drop-outs, supports and accessories.

D. Wire Basket and Tray system are defined to include, but not limited to straight sections of tray, factory and field bends.”T” fittings, drop-out fittings, supports and accessories.

E. Cable bundles of more than 25 cables shall use wire basket / tray / cable ladder system to neatly organize and support the cable bundles.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. ASTM B633 - Specification for Electro-deposited Coatings of Zinc on Iron and Steel

C. NEMA BI 50015 - Metallic Cable ladder Systems.

1.03 DRAWINGS

A. The drawings which constitute a part of these specifications indicate the general route of the cable ladder and tray systems. Data presented on these drawings are as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification, of all dimensions, routing, etc., by the contractor is required.

B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings (shop drawings).

1.04 SUBMITTALS

A. Submittal Drawings: Submit elevation drawings of cable ladder and/or tray and accessories including clamps, brackets, hanger rods, splice plate connectors,

expansion joint assemblies, fire stopping, and fittings, showing accurately scaled components.

B. Product Data: Submit manufacturer's data on cable ladder and/or tray including, but not limited to, types, materials, finishes, rung spacing, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of cable ladders / trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number VE1, "Cable ladder Systems".

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable ladder and cable tray systems (Article 318, NEC).

D. UL Compliance: Provide products which are UL-classified and labeled.

E. NFPA Compliance: Comply with NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" pertaining to installation of cable ladder and tray systems.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver cable ladder and/or tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable ladders, tray and accessories in original cartons and in clean dry space; protect from weather and construction traffic.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with these specifications, cable ladder systems to be installed shall be as manufactured by B-Line Systems, Inc., Chatsworth Products, Inc., or engineer approved equal. Cable tray system shall be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 J-HOOKS

A. Shall be pre-galvanized steel with a minimum static load capacity of 30lbs.

B. Shall be installed with J-Hook Color ID clips to designate system wiring.

C. See Appendix A for pre-approved components.

2.03 CABLE LADDER SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide metal cable ladders, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.

B. Materials and Finish: Material and finish specifications for each cable ladder type are as follows:

1. 1-1/2” Tubular Steel: Straight section and fitting side rails and rungs shall be extruded from ASTM A513 steel tube. All fabricated parts shall be finished with a black powder coat.

2.04 TYPE OF CABLE LADDER SYSTEM

A. Ladder shall consist of two longitudinal members (stringers) with transverse members (rungs) welded to the stringers. Rungs shall be spaced 9" inches on center. Rung spacing in radiused fittings shall be 9 inches and measured at the center of the cable ladder's width. Rungs shall have a minimum cable bearing surface of 1” with radiused edges. No portion of the rungs shall protrude below the bottom plane of the side rails.

B. Straight cable ladder sections shall have side rails fabricated as tubular steel channels. All straight sections shall be supplied in standard 10’-foot lengths, except where shorter lengths are permitted to facilitate cable ladder assembly lengths as shown on drawings.

C. Cable ladder widths shall be 12” and/or 18" inches per drawings.

D. Butt Splice kits shall be the bolted type made as indicated below for each cable ladder type. The resistance of fixed splice connections between an adjacent section of cable ladder shall not exceed .00033 ohm. Splice plate construction shall be such that a splice may be located anywhere within the support span without diminishing the cable ladder rated loading capacity.

1. All splice materials shall be made of ASTM A570 structural steel using carriage bolts and serrated flange locknuts. Hardware shall be Yellow Zinc Dichromate.

E. Cable ladder Supports: Shall be placed so that the support spans do not exceed a maximum span of 5’ feet. Supports shall be constructed from formed shape channel members 1 5/8" x 1 5/8" with necessary hardware such as Trapeze Support Kits (9G-55XX-22SH) as manufactured by B-Line Systems or engineer approved equal. Cable ladders installed adjacent to walls shall be supported on wall mounted brackets such as SB-214 as manufactured by B-Line Systems, Inc. or engineer approved equal. Trapeze hangers shall be supported by 1/2" (minimum) diameter rods and a cover shall be installed over the threaded rod.

F. Accessories - special accessories shall be furnished as required to protect, support, and install a cable ladder system. Accessories shall consist of but are not limited to; section splice plates, expansion plates, blind-end plates, specially designed ladder drop-outs, barriers, etc.

2.05 CABLE TRAY SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice connector bolt, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.

B. Materials and Finish: Material and finish specifications for each cable tray type are as follows:

1. Pre-galvanized ASTM B633 SC3 steel wire: Mounting rings or snake eyes are located along the center spine for mounting.

2.06 TYPE OF CABLE TRAY SYSTEM

A. Tray type cable trays shall consist of single spine wire with transverse members (rungs) welded to the spine. Rungs shall be spaced 6 inches minimum on center. Linear single spine tray shall be hand bendable in any direction along any plane. Tray shall be field formed as needed.

B. Splicing of tray shall be accomplished by using a single manufacturer supplied UL classified connector bolt or splice plate.

C. Tray shall be secured to the following, but not limited to: wall, rod, and/or floor; every 4 feet via built-in integrated mounting rings or double rail.

D. Tray sections that are cut to meet installation requirements shall be free of burrs and sharp edges.

2.07 LOADING CAPACITIES

A. Cable ladders shall meet NEMA class designations: 8A.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cable ladders and/or trays as indicated; in accordance with equipment manufacturer's instructions, and with recognized industry practices, to ensure that cable ladder or tray equipment comply with requirements of NEC, and applicable portions of NFPA 70b and NECA's "Standards of Installation" pertaining to general electrical installation practices.

B. Install cabinets, cable ladders and/or cable trays per local codes for earthquake “zone” requirements.

C. Coordinate cable ladder and tray with other electrical work as necessary to properly interface installation of cable ladder and tray work with other work.

D. Provide sufficient space encompassing cable ladders to permit access for installing and maintaining cables.

E. TESTING

F. Test cable ladders and trays to ensure electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance. Refer to NFPA70B, Chapter 18, for testing and test methods.

APPENDIX-A
(Unless Otherwise Specified on Construction Document Plan Sheets)

CABLE MANAGEMENT

DESCRIPTION	MANUFACTURER	PART NUMBER
Cable tray, open bottom, ceiling mounted	Snake Tray	201 series ceiling mounted
Cable tray, open bottom, wall mounted	Snake Tray	501 series wall mounted
Cable tray, solid bottom, center hung style	MonoSystems	RTCX-XX-120-PX
Cable tray, solid bottom, wall mount style	MonoSystems	RTWX-XX-120-PX
Cable Hooks A. ¾” B. 2” C. 4”	B-Line	 A. BCH12 B. BCH32 C. BCH64
J-Hook Color ID Clip: a. Yellow (Fiber/Data) b. Orange (Clock/Intercom) c. Red (Fire Alarm/Intrusion) i. GreenLighting control wiring ii. HVAC control wiring iii. Irrigation control wiring	B-Line	 a. YW b. OR c. RD d. GRN

END OF SECTION

SECTION 27 13 00
COMMUNICATION BACKBONE CABLING

PART 1 – GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, materials, installation, configuration and testing requirements for a complete and operable Communications Backbone Cabling system. The system shall provide highly reliable and high-performance data communication from main distribution frame (MDF) to each intermediate distribution frame (IDF) or end points requiring fiber optic cabling.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:

1. For new construction – provide, coordinate, and install all required components and accessories as outlined in the design documents for a complete and operable system.

2. For existing construction – provide, coordinate, and install all components and accessories as outlined in the design documents to modify the existing system while maintaining compliance and to seamlessly integrate the new components into the existing campus' system.

3. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

4. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system to the District.

5. The Contractor shall terminate all strands of fiber at each fiber enclosure. All cables shall be installed with a minimum 10' service loops at MDF/IDF locations. Fiber will be terminated using LC type connectors.

6. Service loops shall be secured to backboard or rear of cabinet using a pre-manufactured fiber optic wheel with Velcro straps. If installed at rear of cabinet, the wheel shall be placed at a height that will not interfere with equipment to be installed in the cabinet.

7. If applicable, existing systems shall remain operable until new systems are accepted and approved by the District or its representative.

8. The contractor shall complete all required project closeout documentation in a timely fashion.

9. Testing of fiber and connections to insure a complete and operable end-to-end data connection using ANSI/TIA 568-C and ANSI/TIA/526-7 testing guidelines for multi-mode fiber.

10. Fiber installs to carry Leviton Limited Lifetime warranty (see Division 27 05 00 for requirements)

B. VOICE COPPER BACKBONE- This work relates only to sites where the District has not activated a Voice over IP platform or if special circumstances requires an analog copper connection such as a fax machine, intercom connection tie-in, HVAC controller, etc. The work will include but not be limited to the following objectives:

1. MPOE

a. Backbone feeder cables shall be at a minimum Category 5, size and number of pairs as indicated in drawings and Scope of Work documents, but never less than 8 pairs.

b. All pairs are to be terminated as follows:

1) At the MPOE end, on 66-blocks.

2) At the MDF end, individual jack per pair, single pair per RJ45 port, housed in 4-port or larger surface mount quickport box.

2. Buildings requiring an analog fax connection

a. Backbone feeder cables shall be at a minimum Category 5, size and number of pairs as indicated in drawings and Scope of Work documents, but never less than 4 pairs.

b. All pairs are to be terminated as follows:

1) At the IDF end, individual jack per pair, single pair per RJ45 port, housed in 4-port or larger surface mount quickport box.

2) At the MDF end, individual jack per pair, single pair per RJ45 port, housed in 4-port or larger surface mount quickport box.

3. Buildings requiring an analog tie-in to the intercommunications head end unit.

a. Backbone feeder cables shall be at a minimum Category 5 SHIELDED cable, size and number of pairs as indicated in drawings and Scope of Work documents, but never less than 4 pairs.

b. All pairs are to be terminated as follows:

1) At the IDF end, individual jack per pair, single pair per RJ45 port, housed in 4-port or larger surface mount quickport box.

2) At the MDF end, individual jack per pair, single pair per RJ45 port, housed in 4-port or larger surface mount quickport box.

1.03 REQUIREMENTS

A. Division 01 00 00 – General Requirements

B. Division 27 00 00 - Communication

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/TIA-568-1.D: Commercial Building Telecommunications Cabling Standard.

B. ANSI/TIA -568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standard.

C. ANSI/TIA -568-3.D: Optical Fiber Cabling Components Standard.

D. ANSI/TIA/EIA-569-D: Telecommunications Pathways and Spaces.

E. ANSI/TIA -568-0.D: Measurement of Optical Power Loss of Installed Fiber Optic Cable Plant

F. ANSI/TIA -598-D: Optical Fiber Cable Color Coding.

G. ANSI/TIA -606-C: Administration Standard for Telecommunications Infrastructure.

H. ANSI/TIA -607-C: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises.

I. ANSI/TIA -758-B: Customer-Owned Outside Plant Telecommunications Infrastructure Standard.

J. Fiber optic cable, wire and connectors shall be installed as indicated, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended functions. As such, all of the following: National Fire Code (NFPA), National Electrical Code (NEC), California Electrical Code (CEC), California Building Code (CBC) & Local Codes shall be followed.

1.05 QUALIFICATIONS

A. The contractor shall possess a California C7 or C10 license.

B. The Contractor or Subcontractor shall be Leviton certified to provide and install cable plant with 5 years documented experience.

C. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

1.06 REFERENCES

A. See Division 27 00 00.

1.07 SYSTEM REQUIREMENTS

A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data cable plan system.

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

A. See section 27 00 00 for requirements.

1.09 SUBMITTALS

A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 DATA FIBER BACKBONE

A. See Appendix at the end of this document for pre-approved materials.

B. All products shall be new and unused and shall be of manufacturer's current and standard production.

C. Contractor shall confirm all equipment part numbers with the District prior to ordering equipment and updating submittals as required.

D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

E. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.02 CONDUIT AND RACEWAY

A. See division 27 05 00 for conduit and raceway requirements.

2.03 WIRE AND CABLE

A. Refer to Appendix A for Pre-approved manufacturers and part numbers.

B. Provide all new wire and cable required to install systems as indicated on design documents.

C. Fiber optic cables shall be tight buffered laser optimized, 6 strands for Elementary Schools and 12 strands for Middle and High school. Any cable shall not exceed a .30" diameter.

1. Fiber optic cable shall have a minimum effective modal bandwidth of 3500 MHz/Km. See Appendix at the end of this document for approved material.

D. Fiber Optic connectors for multi-mode shall be industry standard LC type connectors. See Appendix at the end of this document for approved material.

E. MDF rack mount fiber optic enclosures (LIU) shall be as outlined in Appendix at the end of this document and completely loaded with Ceramic ferrule Duplex LC Packs unless listed otherwise in drawings and details or approved equal.

F. Furnish one (1)-meter LC to LC duplex cross over fiber patch cord for every two terminations at IDF locations and one (2) meter LC to LC duplex cross over fiber patch cord for every two terminations at MDF location. The patch cords shall have connectors with ceramic ferrules. All patch cords shall be packaged with a factory performance certification report. Verify all lengths before ordering.

2.04 FIBER OPTIC CABLE MANAGEMENT RING

A. Re-closable ring cable management device. Ring should be 24 inches in diameter for Copper Multipair, OSP, or Armored cable, and 12” diameter for Indoor fiber cable.

B. Ring to be mounted on the backboard at the OSP fiber entrance as indicated. Six hook and loop style loops attached.

C. Approved Products

1. Leviton 24” Velcro fiber spool, 48900-OFR

2. Leviton 12” Velcro fiber spool, 48900-IFR

2.05 PATCH CORDS

A. See section 27 16 00 for requirements

2.06 LOW VOLTAGE ENCLOSURES AND PATHWAYS

A. See section 27 05 00 for additional requirements.

PART 3 – EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. The cable plant system shall only be installed by Contractors who are qualified to install, service and maintain the cable plant system.

B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years’ experience before the Bid Opening Date.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the

Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.

B. The Contractor shall verify the availability of power where required.

3.04 SHOP DRAWINGS

A. See section 27 00 00 for requirements

B. Submit drawings for review and approval by Project Manager.

3.05 INSTALLATION

A. See 27 05 00 for additional routing requirements

B. The cables will be routed to their respective Main Distribution Frame (MDF) or Intermediate Distribution Frame (IDF) utilizing the shortest path possible while maintaining right angles to the building structure.

C. Contractor is required to adhere to the parameters in this section whether or not existing equipment has been placed by Contractor and/or others.

D. Contractor will notify the District if any of the requirements cannot be met prior to bid.

E. Voice copper backbone

1. Terminations shall be T568B configuration unless otherwise specified.

2. Labeling

a. Wiring termination locations shall be labeled to corresponding pairs at the MDF and IDF.

b. Cables shall be labeled no more than 3” back from each end of the termination point with a cable label that matches the patch panel labeling.

c. Contractor will provide tags, straps, and adhesive labels. These tags, straps, and adhesive labels shall be of high quality that will endure over time.

d. Handwritten labels are not acceptable.

e. Each pair shall have a unique label throughout the site. This would allow a cable management system to track each cable pair.

f. Labeling Scheme

1) Closet labeling: 66-block or surface-mount quickport box shall be labeled with the destination MDF or IDF #, sequential feeder pair number only. The labeling itself shall be in a white background with black lettering.

F. Data Fiber Backbone

1. The District has standardized on materials that provide component quality and maintainability. Refer to the Appendix A at the end of this specification for pre-approved material.

2. Fiber Optics Cable Installation and Testing.

a. Service loops shall be secured to backboard or rear of cabinet using a pre-manufactured fiber optic wheel with Velcro straps. If installed at rear of cabinet, the wheel shall be placed at a height that will not interfere with equipment to be installed in the cabinet.

b. Fiber cables shall be securely mounted to the fiber enclosure using zip ties in at least two locations around the jacket to prevent cable twisting and movement. In addition, the Kevlar or strength member shall be bolted, tied, or securely fastened to the enclosure.

c. Fibers strands shall be neatly organized in the enclosure with individual bundled paths from each cable to the bulkheads in which they are mounted.

d. Fiber strands shall be made to rest in their final position without tension or stress of any kind.

e. All spare optical ports and connectors shall have a dust cap in place to protect from the environment.

f. Contractor shall provide and install blanks in unused spaces of the fiber enclosure.

g. All unused optical ports on the LIU shall have protective covers that prevents dust and particles to enter the port.

3. Fiber Optics Labeling

a. Fiber termination locations shall be labeled to corresponding fiber strands pairs at the MDF and IDF.

b. The labeling scheme shall be submitted by the contractor for District / District representative approval prior to installation.

c. Contractor is expected to provide tags, straps, and adhesive labels. These tags, straps, and adhesive labels shall be of high quality that will endure over time.

d. Handwritten labels are not acceptable.

e. Labeling requirements

1) Cables shall be labeled approximately 12 inches back from the point where the cable enters the fiber enclosure with a cable label that identifies the origin and destination of the cable.

2) Closet labeling; each connection shall be labeled denoting each strands number, origin and destination.

3) The type (single-mode or multi-mode) of fiber optic cable used shall be clearly labeled on the fiber patch panel per drawn details.

4) Color-coding shall conform to ANSI/TIA specifications.

4. Fiber Optics Testing

a. All optical test equipment shall have current, traceable calibration certification.

b. If fiber is supplied to Contractor by the district shall be tested before installation, while still on the shipping reel, using an optical time domain reflectometer (OTDR). The test results shall be compared to the manufacturers test results. A discrepancy of more than 1 dB on any fiber in either window indicates possible shipping damage and the fiber shall be returned to the supplier. The test results shall be maintained in a file for future reference.

c. All fiber shall be tested after installation according to the Method A procedures described in ANST/TIA-568-C.

d. Power meter test equipment shall produce a machine generated test report containing the minimum of the following test information:

1) Contractor’s Name

2) Operator’s Name

3) Customer’s location

4) Closet Location

5) Cable ID

6) Test Summary – i.e. Pass/Fail

7) Date and Time of test

8) Test Standard

9) Equipment serial numbers

10) Length in Feet

11) Test direction – i.e. MDF to IDF=A-B / IDF to MDF=B-A

12) Wavelength

13) Optical loss in dB

14) Optical loss limit

15) Reference setting

16) Reference setting date and time

(a) (Most bi-directional test sets will meet these criteria providing the operator enters the proper information. Contractor shall notify the project manager before testing if there is any question regarding this requirement)

e. In addition to power meter testing, OTDR testing is to be performed in any location where the fiber is not continuous, i.e. coupled LC connectors (soft splice), fusion splice, and mechanical splice. When testing with an OTDR the contractor shall utilize a test lead or launch cable a minimum of 100 meters in length and a trail test cable a minimum of 100 meters in length. The contractor shall set a marker at the start and end of the tested cable on each test result and the difference in loss between the two markers shall be noted on the test report. The results of these tests (printed OTDR result power meter attenuation results) shall be provided by the installer as documentation of the quality of installation and as a baseline for future troubleshooting. The results shall be compared to the pre-installation test results for significant changes.

f. The multi-mode cable shall comply with maximum individual fiber loss limits in accordance with ANSI/TIA-568-C Multimode, OM4.

g. Aerial fiber cable mounting hardware shall be matched to the all dielectric self-supporting (ADSS) fiber cable exactly and be installed in accordance with mounting hardware and cabling manufacturers specifications.

3.06 WORKMANSHIP

A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the District's standards and requirements prior to beginning work.

B. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

C. Perform Work with persons experienced and qualified to produce workmanship specified.

D. Maintain quality control over suppliers and Subcontractors.

E. Quality of workmanship is considered important. The District's Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

3.07 CABLE

A. Design, layout, size, and plan new cable runs as required.

B. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.

C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.

D. Identify all cables at terminations. Identification shall be made with an approved permanent label, machine generated 1/4" black letters on white tape (Brady or equal.)

E. Underground cable shall be rated for use.

F. Neatly dress and tie all cabling.

3.08 CONDUIT AND RACEWAY INSTALLATION

A. Design, lay-out, size and plan new conduit and raceway systems as required.

B. Install conduit and raceway in accordance with Division 27 05 00 requirements.

3.09 PENETRATIONS, CUTTING AND PATCHING, DEMOLITION, PAINTING

A. A. See section 27 05 00 for requirements

3.10 FIELD QUALITY CONTROL AND TESTING

A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.

B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

C. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to inspect wiring, devices and system operation.

D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.

E. Notify District when ready to perform a re-inspection of the installation.

3.11 EQUIPMENT INSTALLATION CONFIGURATION AND TESTING

A. See section 27 21 00 for requirements

3.12 AS-BUILT DRAWINGS AND TEST RESULTS

A. See section 27 00 00 for requirements.

APPENDIX-A
(Unless Otherwise Specified on Construction Document Plan Sheets)

PATCH PANEL AND WIRE MANAGEMENT

DESCRIPTION	MANUFACTURER	PART NUMBER
48-Port Snap-in Patch Panel, 2U Wire management bar included	Leviton	49255-D48
Horizontal Cable Management	Leviton	49253-LPM

FIBER / COPPER MATERIAL

DESCRIPTION	MANUFACTURER	PART NUMBER
Leviton 2000i SDX Series fiber housing a) 19” rack mounted units completely loaded with Zirconia Ceramic LC fiber adapter plates	Leviton	1U = 5R1UH-S03 2U = 5R2UH-S06 4U = 5R4UH-S12
Fiber Wall Mount Enclosure	Leviton	5WMNT-01C
Leviton SDF fiber adapter plate	Leviton	5F100-2QL
12-strand OM4 LOMM 50um tight buffered plenum indoor/outdoor rated fiber (no loose tube)	Berk-Tek	PDP012FB3010/F5-I/O-C4(AQU)
4-pair or larger copper feeders		See division 27 15 00

END OF APPENDIX A

END OF SECTION

SECTION 27 15 00
COMMUNICATIONS HORIZONTAL CABLING

PART 1 GENERAL

1.01 SUMMARY

A. This section defines equipment, materials, accessories, installation, configuration and testing requirements for a complete and operational Communications Horizontal Cabling system. The system shall provide reliable high-performance data communication from the Main Distribution Frame (MDF) / Equipment Room (ER), Intermediate Distribution Frame (IDF) / Telecommunication Room (TR) or equipment control points to area workstations and communications device locations.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:

1. For new construction – provide, coordinate, and install all required components and accessories as outlined in the design documents for a complete and operable system.

2. For existing construction – provide, coordinate, and install all components and accessories as outlined in the design documents to modify the existing system while maintaining compliance and to seamlessly integrate the new components into the existing system.

3. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the scope of work.

4. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a fully functional system to the District/Architect/Engineer.

5. The Contractor shall install new Category 6A (Cat 6A) data cabling, station outlets at locations as indicated on drawings. Terminations will be ANSI/TIA standard T568B wiring configuration into RJ45 workstation data jacks.

6. The Contractor shall set up a complete wire management system at each MDF / ER, IDF / TR, this includes wire management organizer(s). Contractor shall provide the following:

   a. One (1) vertical wire manager for each equipment rack to be installed (height to match equipment rack overall units)

   b. One (1) 1RU horizontal wire manager for each new Cat 6A patch panel

   c. One (1) 1RU horizontal wire manager for each switch to be installed

7. The Contractor is required to adhere to current industry standards when distributing and terminating cables:

    a. All Cat 6A cables shall be secured to the rear cable management bar that is included with each of the patch panels.

    b. At the rear of the patch panel, 50% of the cables shall enter the patch panel area from the right side and 50% of the cables enter from the left side. Cables shall be bundled in groups no larger than 25 cables. All bundled cabling shall be similar type per cable separation guidelines.

8. Prior to installation, If the length of the cable run appears to be exceeding 275’ from station outlet to patch panel, the Contractor shall review requirement with Engineer.

9. If applicable, existing systems shall remain operable until new systems are accepted and approved by the District/Architect/Engineer or its representative.

10. All Category 6A (Cat 6A) installations shall carry Limited Lifetime warranty (see Division 27 00 00 for requirements).

1.03 RELATED REQUIREMENTS

A. Division 01 00 00 specifications, General Requirements

B. Division 26 specification sections, as applicable

C. Division 27 specification sections, as applicable

D. Division 28 specification sections, as applicable

1.04 CODES AND STANDARDS

A. See specification section 27 00 00 for requirements

1.05 CONTRACTOR QUALIFICATIONS

A. See specification section 27 00 00 for requirements

PART 2 PRODUCTS

2.01 GENERAL

A. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.

B. Contractor shall confirm all equipment part numbers with the District/Architect/Engineer prior to ordering equipment and updating submittals as required.

C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the

operation specified. Contractor shall provide all components needed for complete and satisfactory installation and operation.

D. Product Availability

1. Prior to submitting a project bid, the contractor shall determine product availability, delivery time, and shall include such considerations into the base bid for the communications systems scope of work as defined in the construction documents.

2.02 CONDUIT AND RACEWAY

A. See specification section 27 05 00 for additional information and requirements

2.03 WIRE AND CABLE

A. Provide all new wire and cable required to install systems as indicated on construction documents.

B. Category 6A cable shall meet or exceed IEEE 802.3 for Gigabit Ethernet.

C. Category 6A underground cable shall be rated for the application intended.

D. Cable management system shall be installed to provide a complete management system.

2.04 PATCH CORDS

A. See specification section 27 16 00 for additional information and requirements

2.05 LOW VOLTAGE ENCLOSURES AND PATHWAYS

A. See specification section 27 05 00 for additional information and requirements

PART 3 EXECUTION

3.01 INSTALLATION

A. The cables will be routed to their respective Main Distribution Frame (MDF) or Intermediate Distribution Frame (IDF), to Node Termination Point (NTP) utilizing the shortest path possible while maintaining right angles to the building structure.

B. Data UTP:

1. Data terminations shall be T568B configuration.

2. Patch panels shall be installed in accordance with manufacturer’s installation guidelines.

3. Labeling

a. Handwritten labels are not acceptable.

b. Cables shall be labeled no more than 4” inches back from each end of the termination point with a cable label that matches the station outlet labeling.

c. Wiring termination locations shall be labeled to corresponding pairs at the MDF / ER, IDF / TR, and at each station outlet end.

d. Contractor will provide tags, straps, and adhesive labels. These tags, straps, and adhesive labels shall be of high quality that will endure over time.

4. Labeling Scheme

a. Workstation labeling:

1) The faceplate or surface block shall be labeled with the MDF / ER, or IDF / TR number (#), sequential station outlet number for the MDF / ER, or IDF / TR (ex. 1.1-09).

2) The labeling itself shall be in a white background with black lettering.

b. MDF / IDF labeling:

1) Patch panel shall be labeled with the sequential station outlet number to match station outlet labeling.

2) The labeling itself shall be in a black background with white lettering.

c. Data UTP Testing

1) All data UTP cable shall be tested after installation according to the procedures and acceptability criteria described in ANSI/TIA Standards for Category 6 or Category 6A cable and connecting hardware. Test at level IIIe compliance or higher.

2) Data UTP cable shall meet or exceed requirements for 10Gbps for Cat6A.

3) Test results will be submitted per Section 27 00 00.

C. Manufacturer's specification for pulling stress and minimum bend radius shall not be exceeded on any Category cable.

D. Station Cable (UTP) or (STP) runs shall not exceed 295’ feet (90 meters) on the permanent link.

3.02 CABLE

A. Design, layout, size, and plan new cable runs as required.

B. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.

C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.

D. Identify all cables at terminations. Identification shall be made with an approved permanent label, machine generated 1/4” black letters on white tape (Brady or equal.)

E. Underground cable shall be rated for use.

F. Neatly dress and secure / strap all cabling.

3.03 WARRANTY, TESTING, AND COMMISSIONING

A. Refer to Division 27 00 00 for requirements.

3.04 CONTRACTOR CLOSEOUT DOCUMENTS AND TEST RESULTS

A. Refer to Division 27 00 00 for requirements.

END OF SECTION

SECTION 27 16 00
CONNECTING CORDS

PART 1 – GENERAL

1.01 SUMMARY

A. The Work of this Section shall consist of the labor, materials and equipment required for furnishing and installing telecommunications patch cables and equipment cords as part of a complete and functional telecommunications system.

B. All items specified or included in this section shall be furnished and installed by Telecommunications Contractor, wired and connected by Telecommunications Contractor and tested by Telecommunications Contractor, unless noted otherwise. “Contractor” as used herein shall mean Telecommunications Contractor or Telecommunications Contractor’s sub-contractor.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:

1. For new construction – provide, coordinate, and install all required components and accessories as outlined in the design documents for a complete and operable system.

2. For existing construction – provide, coordinate, and install all components and accessories as outlined in the design documents to modify the existing system while maintaining compliance and to seamlessly integrate the new components into the existing campus’ system.

3. Contractor shall furnish and install all patch and equipment cords for both copper and fiber.

4. Contractor to provide and install one patch cord at the MDF / IDF for each data drop installed. Each data drop installed shall be patched into an active port on the MDF / IDF data switch.

5. Contractor shall, as scope dictates, coordinate with other trades for floor boxes, box covers, straps, above ceiling boxes and covers and all other requirements to install a complete and operable system.

6. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, transportation, and other services necessary for the proper execution, operation and completion of the work.

7. Coordinate cord length, color, Category rating, Quantity, and plenum/non-plenum requirements in advance of ordering and installation.

B. Some patch cords may require advance ordering for manufacturing lead time. Coordinate and place order at earliest opportunity. Manufacturing or procurement delays are the responsibility of the Contractor.

C. The Contractor shall install patch cords at the MDF / IDFs to meet highest industry standards. This includes a complete wire management system as well as minimal patch cord slack as dictated further in this section.

D. If applicable, existing systems shall remain operable until new systems are accepted and approved by the District or its representative.

E. Contractor shall review with project manager proposed patch cord layout.

F. Contractor shall install patch cords in the data switches as indicated on port assignment sheet. If a port assignment sheet has not been provided with the data switches the contractor shall notify the project manager at least 2 weeks prior to scheduled install date.

G. The contractor shall complete all required project closeout documentation in a timely fashion.

1.03 RELATED REQUIREMENTS

A. Division 01 00 00 – General Requirements

B. Division 27 00 00 - Communication

C. Division 27 05 00 – Common Work Results for Communication Systems

D. Division 27 11 00 – Equipment Rooms and Enclosures

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/TIA-568-1.D: Commercial Building Telecommunications Cabling Standard.

B. ANSI/TIA -568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standard.

C. ANSI/TIA/EIA-569-D: Telecommunications Pathways and Spaces.

D. ANSI/TIA -606-C: Administration Standard for Telecommunications Infrastructure.

E. ANSI/TIA -607-C: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises.

F. ANSI/TIA -758-B: Customer-Owned Outside Plant Telecommunications Infrastructure Standard.

1.05 QUALIFICATIONS

A. The contractor shall possess a California C7 or C10 license.

B. The Contractor or Subcontractor shall be Leviton certified to provide and install cable plant with 5 years documented experience.

C. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

1.06 REFERENCES

A. See Division 27 00 00 for requirements.

1.07 SYSTEM REQUIREMENTS

A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data cable plan system.

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

A. See section 27 00 00 for requirements.

1.09 SUBMITTALS

A. See section 27 00 00 for requirements.

1.10 WARRANTY

A. Refer to Division 01 Warranty section.

B. See section 27 00 00 for additional requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. See Appendix A at the end of this document for pre-approved materials.

B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.

C. Contractor shall confirm all equipment part numbers with the District prior to ordering equipment and updating submittals as required.

D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation and operation.

E. Product Availability: Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.02 COPPER PATCH AND EQUIPMENT CORDS

A. GENERAL

1. Patch cord plug shall be a Slimline connector with integrated snag-less plug design made of FCC compliant 94V-0 clear material without incorporating the use of a rubber molded over-boot.

2. Patch cords in Plenum areas shall be Plenum-rated.

3. Patch cords shall meet ANSI/TIA-1096-A requirements to include 50 micro inches of gold plating.

4. The non-plenum patch cord jacket shall meet or exceed UL 444 CM rating and be RoHS compliant.

5. The patch cords shall be available in standard 1, 2, 3, 5, 7 and 10 foot lengths. Custom lengths from 1’ and above shall also be available.

B. Standard copper patch cords for CAT6A UTP and FTP cable systems shall exhibit the following characteristics:

1. Independently tested and verified for CAT 6A component performance.

2. Constructed of shielded 26 AWG stranded conductor cable for maximum flexibility and outside diameter of .240”, for use in shielded and unshielded systems.

3. Power over Ethernet (PoE and PoE+) compatible to 100W PoE

4. See Appendix A for pre-approved established system colors.

C. Standard-diameter copper patch cords for CAT6A UTP user locations shall exhibit the following characteristics:

1. 26-gauge, unshielded, twisted pair, stranded conductor construction with a standard 8-position modular plug on both ends.

2. Maximum Outer Diameter of 0.24”

3. Power over Ethernet (PoE and PoE+) compatible to 100W

4. See Appendix A for pre-approved established system colors.

D. High-flex copper patch cords for CAT6A UTP cable systems used inside Telecom Enclosures, Rooms and racks shall exhibit the following characteristics:

1. 28-gauge, unshielded, twisted pair, stranded conductor construction with a standard 8-position modular plug on both ends.

2. Ultra-narrow diameter, highly flexible cord for less congestion in higher density applications

3. Maximum Outer Diameter of 0.15”, minimum bend radius 0.60”

4. Power over Ethernet (PoE and PoE+) compatible to 60W in unbundled configurations.

5. Support 1 Gigabit applications over 90-meter permanent links with up to 6 meters of cordage

6. To be used at patch panel end of any CAT6 UTP permanent link.

7. Provide and install only factory-assembled patch cords of the same or better Category rating of the permanent link cabling system, in quantities as described in Part 3 of this Specification.

8. See Appendix A for pre-approved established system colors.

2.03 FIBER OPTIC PATCH CORDS

A. Fiber optic LC-LC patch cords, or jumpers, will make LC connections from the rack termination points to the equipment. The jumpers will meet the following requirements:

1. Factory-manufactured using Laser-Optimized Fiber. Field terminations on fiber jumpers are not acceptable.

2. Shall utilize A-B polarity.

3. Shall be available in standard lengths of 1, 2, 3, 5 and 10 meters and custom-orderable up to any length of feet or meters

4. Provide factory assembled patch cords meeting or exceeding all criteria specified in the horizontal cabling standard

5. Verify lengths, quantities, and configuration with actual project requirements prior to ordering and delivery.

PART 3 – EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. The cable plant system shall only be installed by Contractors who are qualified to install, service and maintain the cable plant system.

B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years experience before the Bid Opening Date.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.

3.04 INSTALLATION

A. Contractor to provide and install fiber and copper patch cords in quantities as described below. Neatly install patch cords in lengths as appropriate to keep reduce unnecessary length in wire managers. No more than 12” of slack for the copper patch cords will be allowed.

B. Install patch cords at the equipment cabinet between patch panel and equipment / switches for each patch panel and workstation location. Patch cords shall direct-connect between patch panel and networking switch or other electronics equipment. Dress and bundle patch cords as appropriate for final installation. Provide any unused equipment patch cables to District in original packaging upon completion of project.

C. Provide workstation patch cords to District in original packaging.

D. All fiber patch cords and required workstation/equipment patch cords not installed shall be provided in hand to Districts Representative prior to project closeout.

E. Install all patch cords in accordance with the Districts I.T. Department or the person in charge of the telecommunications infrastructure.

F. Bend radius of cables shall be maintained as recommended by the manufacturer and per BICSI standards.

G. Dress and bundle all patch cords in a neat and workmanlike manner. Do not create patch cord bundles larger than 24 cables. Use Velcro every 12” or less and as needed at turn and entry points to secure and organize cords.

H. Provide strain relief as needed using Velcro straps. Utilize cable managers for routing cords among devices.

I. Use the following guidelines for project bid. Verify all lengths with project requirements / excess slack requirements prior to ordering / purchase:

1. Provide one (1) 10-foot patch cord of the same category rating, at the workstation for each cable terminated at the terminal outlet location

2. Provide one (1) 2-meter patch cord of the same grade of fiber, for each LC connector pair installed at the IDF, MDF, and all other terminal enclosure locations.

3.05 WORKMANSHIP

A. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

B. Perform Work with persons experienced and qualified to produce workmanship specified.

C. Maintain quality control over suppliers and Subcontractors.

D. Quality of workmanship is considered important. The District's Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

APPENDIX-A
(Unless Otherwise Specified on Construction Document Plan Sheets)

CAT 6 / 6A PATCH CORDS / FIBER PATCH CORDS

DESCRIPTION	MANUFACTURER	PART NUMBER
Cat 6 Patch cables, eXtreme High Flex HD6 (O.D. 0.15") (Insert length in feet 6I [6"], 01', 02', 03', 05' 07', 10' instead of XX in part number) Insert color instead of "*" in part number. • Data (includes voice)/UPS – Blue (L) • IP Clock – Gray (S) • Admin – Red (R) • CCTV – Green (G) • Access Control – Green (G) • HVAC – Yellow (Y) • Lighting Control – Yellow (Y) • Audio-Visual - Orange • Switch uplink – Black (E)	Leviton, or equal	6H460-XX*
Cat6 Patch Cables, slim Intrusion Alarm – Pink	Leviton	Cat6 Unshielded (UTP) Slim Ethernet Network Patch Cable-Pink, length as required
Cat6A Patch Cables, slim Wireless AP - Purple	Leviton	Cat6A Unshielded (UTP) Slim Ethernet Network Patch Cable-Purple, length as required
1M or 2M LC to LC OS2 / OM4 cross-over patch cords	Leviton	Length as needed

END OF SECTION

SECTION 27 41 00
AUDIO-VISUAL SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the District's standards and requirements prior to beginning work.

B. For new construction – provide and install all components and accessories as outlined in the design documents for a complete and operable system.

C. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

D. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system.

E. The Contractor shall install wire and cable that is appropriate for the installed environment (i.e., non-plenum, plenum, underground & etc.)

F. The Contractor shall be responsible for all programming, commissioning, and activation the Audio-Visual System.

G. The Contractor shall review the proposed final system programming, functionality and expectations with the project manager, Architect/Engineer/Designer and District prior to final programming.

H. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be performed by the contractor, in the presence of the District and project designer, to demonstrate system functionality and operation.

I. Project Management

1. The Supplier/Installation Contractor will provide the following Project Management:

    a. Attend meetings with the client's technical and contract representative, providing status reports and resolution of questions or issues outstanding.

    b. Develop project schedule and oversight of the installation team.

    c. Stage equipment and materials at supplier's shop.

    d. Facilitate completion of final punch-list items.

e. Assure that the finished system meets the design criteria and functions per the developed concept.

f. Remote Control Programming

g. Contractor Qualification and Training

2. The Contractor shall be fully conversant and capable in the cabling of low voltage applications such as, but not limited to audio-visual, data, voice and imaging network systems. The Contractor shall at a minimum possess the following qualifications:

a. Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.

b. Personnel trained and certified in the design of the approved manufacturer's products.

c. Personnel trained and certified to install the approved manufacturer's products.

d. The Contractor shall show proof of current certification of the approved manufacturer's products.

e. Provide references of the type of installation provide in this specification.

f. Personnel trained in the installation of pathways and support for housing horizontal and backbone cabling.

g. Personnel knowledgeable in local, state, province and national codes, and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.

h. Be in business a minimum of Three (5) years.

i. Must have personnel fluent in the use of Computer Aided Design and possess and operate Autodesk AutoCAD or Autodesk Revit BIM software using .DWG, .RVT, or .DXF format for required contractor shop and record as-build documents.

j. Must possess current liability insurance certificates.

1.02 QUALITY ASSURANCE

A. Conformance:

1. All work shall conform to the applicable requirements of this project. A C-7 licensed Contractor in the State of California shall perform all low voltage work.

2. The A/V contractor shall be a factory direct dealer for, or establish an equivalent relationship with, the major equipment specified herein, suitable to carry out warranty administration and post warranty repair, and provide documentation of same

3. The Contractor shall notify the District, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.

4. If after contract is awarded, minor changes and additions are required by the mentioned authorities, even though such work is not shown on drawings or covered in the specifications, they shall be included at Contractor's expense.

5. The A/V contractor shall have been actively engaged in the installation of projects similar in scope and size for a minimum period of 5 years.

6. The A/V contractor shall be an active certified professional and provide documentation, of one or more of the following associations:

   a. International Communication Industries Association (ICIA)

   b. National Systems Contractors Association (NSCA),

   c. Audio-Visual and Integrated Experience Association (AVIXA, CTS/CTS-I)

   d. National Association of Broadcasters (NAB)

   e. Building Industry Consulting Service International (BICSI)

7. Any subcontractors to the A/V contractor will be allowed provided they comprise no more than 20% of the on-site work force and are under the direct supervision of the Project Manager or Installation Supervisor.

B. Coordination:

1. The Contractor shall become familiar with the existing conditions at the job site if applicable, and with the drawings and specifications and plan the installation of the audiovisual work to conform to the existing conditions to provide the best possible assembly of the combined work of all trades.

2. The Contractor shall work out in advance all "tight" conditions, involving all trades and if found necessary, supplementary drawings shall be prepared by this Contractor, for the Architect's approval, before work proceeds in these areas.

3. No additional cost will be considered for work, which must be relocated due to conflicts with the work of other trades.

1.03 SUBMITTALS

A. Pre-construction material submittals

1. Products Material Submittal:

a. See Division 27 00 00 for Contractor Product Submittal requirements

2. Contractor Installation Shop drawings

a. See Division 27 00 00 for Contractor Shop Drawing Installation requirements.

3. Post construction submittals

a. Provide as-build documentation in accordance with Section 3.

b. Submit District's manual binders of all equipment documentation.

c. Provide a laminated simple operational sheet for end-users of system.

d. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 CONTRACTOR PROVIDED PRODUCTS

A. As indicated on drawings to provide fully functional, integrated, and operational Audio-Visual system.

2.02 CABLE

A. Contractor must provide all cables and connectors from the wall plate to the TVs, projectors, speakers, switchers, amplifiers, and all other associated equipment to provide a fully functional, integrated and operational AV system.

B. Speaker cable shall be minimum 14 awg, 2 conductor cable.

2.03 ENCLOSURES AND PATHWAYS

A. The AV contractor shall install an equipment rack as required to house the equipment to be installed.

B. Use mounting hardware and anchors recommended by the Engineer of any material that shall be mounted to the building or structure.

C. The Contractor shall select the appropriate mounting bracket kits for existing and new construction installations.

1. The Contractor will provide a cable conduit/pathway to accommodate the necessary connections as outlined in the drawings and details.

2.04 POWER

A. The Contractor shall provide and/or repair electrical circuit(s), performed by C-10 licensed electrician), outlet(s) and connections where necessary to install the audio-visual and/or theatrical lighting DMX system.

PART 3 – EXECUTION

3.01 CABLE ROUTING

A. Cable shall be routed in appropriate conduit by system type as outlined in design details. Contractor is to contact District representative when this requirement cannot be met.

B. Cable shall not be exposed at any point in the main cable path. Contractor is to use appropriate pathway for the situation (i.e., inside wall, conduit, or non-metallic surface raceway).

C. Cables shall be protected and sleeved with a conduit in locations where cables need to pass through walls, floors, or hard ceilings. Contractor shall install threaded IMC or rigid conduit with large fender washers, lock rings, and screw on protective bushings on both ends.

D. The fire rating of the wall must be maintained during and after installation.

E. See Section 27 00 00 for additional requirements.

3.02 CABLE INSTALLATION PARAMETERS

A. Cabling

1. Cable shall be installed in a neat and orderly manner. Loose cable shall be bundled, and tie wrapped with Velcro Ties

2. All cables shall be terminated per drawing details provided by manufacturer.

B. Conduit and Raceway

1. A maximum fill capacity of 40% will be deemed acceptable for conduits.

2. Install or replace pull-string after installing cable in any EMT, IMC, Rigid, or PVC conduits.

C. Cables shall be identified with a machine-printed tag identifying the system type, source or head end location, and destination location in all access points (i.e., junction boxes, ground boxes, MDF, IDF, etc.) and as they enter or exit and conduit pathway. Handwritten labels shall not be accepted.

D. All cabling shall be installed with proper stress relief and tied down.

E. Manufacturer's specification for pulling stress and minimum bend radius shall not be exceeded on any cable.

F. See Section 27 00 00 for additional requirements.

3.03 SYSTEM IMPLEMENTATION

A. The installation contractor will fine tune and test the systems for optimal audio and visual performance.

B. Audio Signal:

1. Signal-to-Noise ratio (including crosstalk): 70 dB minimum.

2. Total Harmonic Distortion: 0.05% maximum from 20 Hz. To 18 kHz.

3. Frequency Response: +/- 0.5 dB, 20 Hz to 20 kHz.

C. Audio Reproduction:

1. Signal-to-Noise ratio (including crosstalk): 55 dB minimum.

2. Total Harmonic Distortion: 0.05% maximum from 20 Hz. To 18 kHz.

3. Frequency Response:

a. Speech reinforcement loudspeakers, 4” or 6” dia.: +/- 1 dB 100 Hz to 2.5 kHz rolling off at 6 dB/octave from 125 Hz to 80 Hz and at 2 dB/octave above 2.5 kHz as measured on axis of loudspeaker.

b. Speech reinforcement loudspeakers, 8” or 12” dia.: +/- 1.5 dB 125 Hz to 2.5 kHz rolling off at 6 dB/octave from 100 Hz to 63 Hz and at 2 dB/octave above 2.5 kHz as measured on axis of loudspeaker.

c. Program reproduction loudspeakers: +/- 2 dB, 63 Hz to 6kHz decreasing uniformly from a relative level of 0 dB at 6 Hz to a relative level -5 dB at 20 kHz as measured on axis of loudspeaker.

4. Speech Reinforcement Sound Output Capability: Provide program levels of at least 96 dB and speech reinforcement levels of at least 85 dB everywhere in the seating area without objectionable distortion, rattles or buzzes. Use several different samples of recorded music as test signals.

5. Test microphones at each input.

6. Set master output limiting at -3dB with 10:1 ratio.

7. Hum and Noise: Hum and noise shall be inaudible under normal conditions from anywhere in the seating area.

D. Video Signal:

1. Signal-to-noise ratio (peak to RMS) unweighted DC to 5.5 MHz: 55 dB minimum.

2. Crosstalk unweighted DC to 5.5 MHz: 45 dB minimum.

3. Line and Field tilt: 2% maximum.

4. Differential Gain: 3% maximum.

5. Differential Phase: 2 degrees maximum.

E. Video Timing:

1. System Timing: Sync coincidence within 50 nanoseconds.

2. Color Timing: Within 2 degrees at 3.58 MHz

F. Optical Performance:

1. The light fall-off from the center of the projected image to the four corners as measured at the projected image plane, shall not exceed 50%.

G. The installation contractor will fine tune and test the systems for optimal performance.

H. An District representative will be present to confirm system operation and to sign off on the system being complete.

I. Provide a turnkey audio-visual system to include equipment and materials, submittals, testing, staff training and warranty.

J. Installation shall include, but is not limited to engineering, labor and hardware for display, audio, video, control systems and related equipment rack, equipment mounting, plates, panels, connectors, cables.

3.04 TESTING AND ACCEPTANCE

A. Upon completion of installation, and prior to final acceptance by the District, the A/V Contractor shall demonstrate to the satisfaction of the Consultant and the District, the full operational functionality of all systems, all inputs/output stations, and sub-systems installed.

B. Qualitative performance tests may include, but not be limited to, audio residual hum, noise & distortion, video signal hum, noise, sync quality and color fidelity.

C. Test equipment required for these tests shall be supplied by the contractor and coordinated in advance with the Consultant.

D. This shall not preclude the consultant from utilizing his own test equipment to confirm measurement results.

E. Punch list items must be resolved prior to final acceptance.

3.05 TRAINING

A. The Contractor shall create quick start guides customized to the specific system being installed at each location. Quick start guides shall be prepared in advance of all training sessions so they can be distributed and reviewed with staff at time of initial training. All quick start guides shall be laminated.

B. The contractor shall make a video recording of all training sessions and export to digital medium (USB Drive) for District archive.

C. The Contractor shall provide 16-24 hours maximum of training for all large performance venue (theater, broadcast, gymnasium, stadium) installations. The Contractor shall be present for the first two (2) performances at large performance venue installations. Training shall occur over 5-7 days.

D. The Contractor shall provide 8-12 hours maximum of training for all classroom, office and conference room installations. Training shall occur over 1-2 days.

3.06 CLOSEOUT DOCUMENTATION AND DRAWINGS

A. See section 27 00 00 for requirements.

B. Warranty certificates and documentation

1. Workmanship Warranty - The Supplier/Installation Contractor will concur that the Audio-Visual System furnished to be free from defects in workmanship (i.e., cables, connections, and structures) failure for a period of Two (2) Years from the date of acceptance.

2. Equipment Manufacturer Warranty - The Supplier/Installation Contractor shall aid District in utilizing the benefits of applicable Manufacturer’s equipment warranties.

3. The Supplier/Installation Contractor shall broker or process this equipment for repair or replacement (no additional charge) to the applicable manufacturer for the term established by the manufacturer on a depot basis only.

END OF SECTION

SECTION 27 51 23
INTERCOMMUNICATION PROGRAM SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This section specifies intercommunications equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable system. This system shall provide the ability to communicate bi-directionally with an individual room, announce to defined speaker zones and bell tones on a programmed schedule.

1.02 SCOPE

A. The Contractor shall provide and install all components and accessories as outlined in the design documents for a complete and operable system.

B. For existing construction, the Contractor shall provide and install all components and accessories as outlined in the design documents to modify the existing system while maintaining code compliance and to seamlessly integrate the new components into the existing intercommunications system.

C. Prior to commencement of work, the Contractor shall be responsible for identifying any existing system errors or faults and bring these issues to the attention of the Project Manager.

D. The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

E. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system.

F. The Contractor shall install wire and cable that is appropriate for the installed environment (i.e. non-plenum, plenum, underground & etc.)

G. The Contractor shall be responsible for programming the Intercommunications System.

H. The Contractor shall coordinate with site staff for bell schedule programming requirements.

I. The Contractor shall review the proposed final system programming, functionality and expectations with the project District, Construction Manager, Architect, and Designer prior to final programming.

J. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be made in the presence of the District, Construction Manager, Inspector of Record (IOR), and Designer.

K. The Contractor shall adjust any speaker levels to the appropriate level as determined in system testing.

1.03 CODES AND STANDARDS

A. See Division 27 00 00 for requirements.

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/TIA-568-1.D: Commercial Building Telecommunications Cabling Standard.

B. ANSI/TIA -568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standard.

C. ANSI/TIA -606-C: Administration Standard for Telecommunications Infrastructure.

D. ANSI/TIA -607-C: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises

1.05 QUALIFICATIONS

A. The Contractor shall hold a California C7 or C10 license.

B. The Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

C. The Contractor shall have been actively engaged in the installation of projects similar in scope and size for a minimum period of 5 years.

D. The Contractor shall be a factory direct dealer for, or establish an equivalent relationship with, the major equipment specified herein, suitable to carry out warranty administration and post warranty repair and provide documentation of same.

E. The Contractor shall notify the District, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.

F. If after contract is awarded, minor changes and additions are required by the mentioned authorities, even though such work is not shown on drawings or covered in the specifications, they shall be included at Contractor’s expense.

G. The Contractor shall be fully conversant and capable in the cabling of low voltage, technology applications such as, but not limited to audio-video, data, voice and imaging network systems.

H. The Contractor shall at a minimum possess the following qualifications:

I. Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.

J. Must possess current liability insurance certificates.

K. The Contractor shall show proof of current certification of the approved manufacturer's products.

L. Personnel trained and certified in the design of the approved manufacturer's products.

M. Personnel trained and certified to install the approved manufacturer's products.

N. Personnel trained in the installation of pathways and support for backbone and horizontal cabling.

O. Personnel knowledgeable in local, state, province and national codes, and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.

1.06 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.07 SUBMITTALS

A. See Division 27 00 00 for requirements.

1.08 WARRANTY

A. See Division 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. The approved manufacturers for the project are:

1. Control unit and related accessories: As noted on construction drawings.

2. Speakers: Unless noted otherwise on construction drawings.

a. Wire, cable, and accessories:

B. All products shall be new and unused and shall be of manufacturer's current and standard production.

C. Drawings and Specifications indicate major system components, and may not show all expansion modules, connectors, or accessories that may be required to support the operation specified. The Contractor shall provide all components needed for complete and operable system.

2.02 PRODUCT AVAILABILITY

A. Contractor, prior to submitting a bid, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

B. Certain products specified may only be available through factory authorized dealers and distributors. The Contractor shall verify his ability to procure the products specified prior to submitting a bid.

2.03 CABLING

A. Single speaker cables shall be 4-Conductor, 22AWG, solid, with one pair shielded.

B. Multi-pair speaker cables shall be 24-pair 22AWG solid with an overall shield.

C. Cross-connect wire shall be Telecom Industry standard 22AWG solid twisted pair blue/white in color.

PART 3 – EXECUTION

3.01 EQUIPMENT AND CABINET INSTALLATION

A. Install equipment and cabinets per design documents.

B. Install equipment/cabinets per manufacturer’s installation requirements

C. Communication system equipment shall conform to a 6-foot separation requirement from the main power panel, transformers, switchgear and/or starter motors adjacent to the main Termination Cabinet (TC1), intermediate TCs and termination locations.

D. Install 3/4”-inch fire rated A-C plywood, cut to fit, in back of rack or cabinet.

E. MDF and IDF rooms speaker termination blocks can be installed directly on the plywood walls.

F. Care shall be taken to layout termination blocks in an organized and professional looking manner.

G. Install termination blocks in accordance with manufacturer’s design and installation guidelines.

H. Install cable distribution spool post (“mushroom”) in abundant quantity so cross-connect wire is supported and routed carefully.

3.02 CABLE INSTALLATION PARAMETERS

A. See section 27 0 00 for requirements.

3.03 CABLE ROUTING

A. Single and multi-pair speaker cable shall be routed in compliance with section 27 00 00.

3.04 CABLE TERMINATION

A. Each speaker cable shall be terminated at one speaker using the red (+), black (-) pair with wire nut to the appropriate speaker transformer wires for the wattage indicated in the design documents. Green and white pair are designated for spare.

B. Cut off jacket, shielding and drain wire.

C. Wrap end of speaker cables with white PVC electrical tape to prevent shielding from grounding/shorting.

D. Wrap machine produced label with speaker ID at 4” from jacket end.

E. All labels to be machine generated black letters on white adhesive label stock that is appropriate for the environment (interior/exterior). Handwritten labels are not acceptable.

F. Provide 12” service loop at speaker.

G. At the main terminal cabinet terminate each individual speaker cable on termination blocks in the following top to bottom order: Red, black, white, green and drain.

H. Feeder cables shall be terminated on termination blocks each end.

I. Terminate drains at upstream termination block only.

J. The Contractor shall connect the intercommunications system to the site telephone system.

K. Feeder cables shall be terminated using ANSI/TIA color-coding.

3.05 PROGRAMMING

A. The Contractor shall coordinate with site staff for Bell schedule programming requirements.

B. The Contractor shall review the proposed final system programming, functionality and expectations with the District, Construction Manager, Architect, Designer prior to final programming.

C. The Administrative telephone phone set port shall be 0100

D. The telephone paging port shall be 0101

E. Room speakers, the first digit corresponds to letter equivalent (A=1, B=2 continuing). The following 3-digits shall correspond to the final posted room numbers. Example: building A, room 202 would be: 1202.

F. Exterior speakers shall start at 0501 and be sequential.

3.06 TESTING AND FINAL ADJUSTMENTS

A. Contractor shall test each speaker, cable, termination block combination with an impedance meter and record impedance and wattage readings to verify wiring and

setting of wattage before connecting to the system headend. This record shall be made available for review at final acceptance.

B. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be made in the presence of the District, Construction Manager, Architect, and Designer.

C. The Contractor shall adjust individual speaker tap to the appropriate dB level as identified in system acceptance testing.

3.07 TRAINING

A. From the Administrative Paging phone and user telephone handset.

B. Call a single room speaker

C. Make an “All Interior” announcement

D. Make an “All Exterior” announcement

E. Make an “All Call” announcement

F. Make an “Emergency All Call” announcement

G. From the “administrative user” computer:

H. Set up short-cut in web browser software to controller address

I. Create and modify paging zones.

J. Create and modify bell schedules.

K. Create and modify Holiday schedules.

END OF SECTION

SECTION 27 51 26
ASSISTIVE LISTENING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, materials, installation, configuration and testing requirements for a complete and operable Assistive Listening System. The systems shall be installed in each public meeting area in accordance with ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) section 4.1.3(19); section 4.30 and section 4.33.

1.02 SCOPE

A. The Assistive Listening System shall be an FM (72Hz (short range) 216MHz (long range) wireless system.

B. Each system shall be complete consisting of transmitter, receivers, earphones, microphone, etc. as required.

C. Features:

1. No seating restrictions, 0-500 ft. system range.
2. Single channel receivers are pre-tuned, users control their own volume.
3. Easily expanded, no limit to number of users.
4. Excellent sound quality, inherently free from interference.
5. Automatic Gain Control for stable listening level.
6. High performance frequency synthesized, phase-locked-loop tuning.
7. 8 channels available.
8. Powered by a rechargeable battery for portable operation.
9. Choice of balance or unbalanced inputs.
10. Input attenuator and low frequency attenuator control switches.
11. LED Power and Audio Level Indicators.
12. RF frequency range that meets ADA conformance guidelines.

1.03 RELATED REQUIREMENTS

A. Division 01 00 00 – General Requirements

B. Division 27 00 00 – Common Work Results for Communication Systems

C. Division 27 41 00 - Audio / Video Systems

1.04 CODES AND STANDARDS.

A. The installed system shall conform to all American with Disabilities Act (ADA) requirements.

B. The installed system shall conform to all California State Codes.

1. 2022 California Building Code (CBC)

2. 2022 California Electrical Code (CEC)

1.05 UNDERWRITERS LABORATORY (UL) LISTING

A. All equipment shall be UL listed for its intended purpose.

B. Any modification that voids the equipment's UL listing is strictly prohibited (i.e. relocated or oversize knock-outs).

C. Any modified new equipment that voids the UL listing shall be replaced by the Contactor (parts and labor) at their expense.

1.06 QUALIFICATIONS

A. The Contractor shall possess a California C7 license.

B. The installing Contractor or Subcontractor shall be authorized to provide and install equipment with 5 years of documented experience.

C. The installing company and its subcontractors shall have an office located within 50 miles of the project site.

1.07 REFERENCES

A. See Division 27 00 00

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.09 SUBMITTALS

A. See Division 27 00 00 for requirements.

1.10 WARRANTY

A. Refer to Division 00 Warranty section.

B. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day "burn-in" period shall begin. Any fault shall reset the "burn-in" period to

zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL GENERAL

A. Acceptable Manufacturers: Firms regularly engaged in manufacturer of Assistive Listening Systems and accessory equipment of type and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years. All materials shall comply with applicable standards of the Underwriter’s Laboratories, Inc.

B. All equipment shall be the standard cataloged products of a single manufacturer.

2.02 BASE TRANSMITTER (PROVIDE 1 FOR EACH PERMANENT SOUND SYSTEM).

A. Provide -216MHz base transmitter with rack mount kit. Locate adjacent to the sound system equipment and get power from the equipment. Install where specified in the sound equipment rack and connect to content source.

B. Antenna: Antenna and cabling to be mounted in seating area for Base Transmitter.

2.03 RECEIVERS

A. Adjustable channel receivers. Number of receivers required shall be in compliance with ADA public facility guidelines at time of installation. Current ADA guidelines require total number of receivers to be no less than 4% of total fixed seating capacity.

2.04 EARPHONES

A. Single earphones with cord for normal to moderate hearing loss. (Provide 1 for each receiver).

2.05 NECK LOOPS

A. Provide qty. as required for ADA compliance.

2.06 BATTERIES

A. Provide long life rechargeable batteries, “Energizer”, “Duracell” or equal, for each device requiring batteries such as portable transmitters and receivers.

2.07 WALL PLAQUE

A. Provide sound reinforcement wall plaque per ADA requirements to indicate equipment available for the hearing impaired. Verify location with the architect prior to installation. Submit sample for approval. Use the “international symbol of access for hearing impaired.”

2.08 PORTABLE SYSTEMS

A. If area or space has amplified sound system and no fixed seating an Assistive Listening system shall be required. Specify a 72Hz 2-person minimum, 16-person maximum portable system. All batteries shall be rechargeable type with associated charging case.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The contractor shall supply all labor, equipment, wire, conduit, materials, etc., required a complete and usable assistive listening system.

3.02 TESTS AND ADJUSTMENTS

A. Under completion of the installation of all equipment, and when same is in full operating condition, the Contractor shall perform the initial post completion tests and adjustments as specified hereinafter. Except as otherwise specified, this Contractor shall provide all instruments, equipment, labor and materials necessary to complete the tests.

3.03 FINAL DOCUMENT SUBMITTALS

A. See section 27 00 00, for requirements.

END OF SECTION

SECTION 27 53 13
CLOCK SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable clock system.

1.02 SCOPE

A. The project has standardized on Sapling for the Clock system.

B. The Contractor shall provide and install all components and accessories as outlined in the design documents for a complete and operable system.

C. Existing construction, the Contractor shall provide and install all components and accessories as outlined in the design documents to modify the existing system while maintaining code compliance and seamlessly integrate the new components into the existing Clock system. Prior to beginning any work, the Contractor shall be responsible for identifying any existing system errors or faults and bring these issues to the attention of the Construction Manager.

D. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation, and completion of the Work

E. Contractor shall furnish and install all new conduit, raceway and wire as indicated on the project drawings and/or as required to provide a complete and operable system.

F. The Contractor shall be responsible for all and any programing requirements of the Clock system.

G. Upon completion of the installation of the system, a confirming walk test shall be performed verifying that each clock installed is operating and is displaying the correct time (has corrected as required). The project inspector, and other project representative shall be present.

H. The contractor is responsible for removing decommissioned and/or removed equipment, pathways and repairing any disturbed surfaces to match original surface condition.

1.03 CODES AND STANDARDS

A. See Division 27 00 00 for requirements.

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/TIA-568-1.D: Commercial Building Telecommunications Cabling Standard.

B. ANSI/TIA -606-C: Administration Standard for Telecommunications Infrastructure.

C. ANSI/TIA -607-C: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises

1.05 QUALIFICATIONS

A. The Contractor shall hold a California C7 or C10 license.

B. The Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

C. The Contractor shall have been actively engaged in the installation of projects similar in scope and size for a minimum period of 5 years.

D. The Contractor shall be a factory direct dealer for, or establish an equivalent relationship with, the major equipment specified herein, suitable to carry out warranty administration and post warranty repair and provide documentation of same.

E. The Contractor shall notify the District, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.

F. If after contract is awarded, minor changes and additions are required by the mentioned authorities, even though such work is not shown on drawings or covered in the specifications, they shall be included at Contractor’s expense.

G. The Contractor shall at a minimum possess the following qualifications:

1. Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.

2. Must possess current liability insurance certificates.

3. The Contractor shall show proof of current certification of the approved manufacturer’s products.

4. Personnel trained and certified in the design of the approved manufacturer’s products.

5. Personnel trained and certified to install the approved manufacturer’s products.

6. Personnel trained in the installation of pathways and support for backbone and horizontal cabling.

7. Personnel knowledgeable in local, state, province and national codes, and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.

1.06 CONTRACTOR “SHOP DRAWINGS” DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.07 SUBMITTALS

A. See Division 27 00 00 for requirements.

1.08 WARRANTY

A. See Division 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. The Contractor shall furnish and install all equipment, material, devices, cables, control devices, labor requirement and necessary tooling to provide proper operation of the Clock system.

2.02 CLOCKS

A. Reference construction drawings for manufacturer and model.

2.03 CABLING

A. IP Clock cables shall be 4-pair Cat6 minimum.

B. Analog Clock cables shall be jacketed 3-conductor, 14AWG, stranded.

C. Contractor shall be responsible for installing the proper cable type (underground, riser, or plenum) required by the installation environment.

2.04 SERVICE INVENTORY

A. Projects with over 15 installed clocks provide 3 extra standard clocks.

PART 3 – EXECUTION

3.01 CABLE INSTALLATION PARAMETERS

A. See section 27 00 00 for requirements.

B. For dedicated MDF/IDF rooms clock termination strips can be installed on the plywood walls without the need for a metal cabinet.

C. Care shall be taken to layout termination field in an organized and professional looking manner.

D. Cable:

1. Clock cable to be terminated as follows: white = common, black = run power, red = correction.

a. For transition interior to OSP cable terminate as follows: white -> blue, black -> black, red -> red with OSP brown as spare.

E. Cables shall be labeled with destination description 4” back from jacket end. (i.e. “To TC1.1 Rm.12A”).

F. System Master Clock

1. The Contractor shall configure the master clock system for time synchronization to the PST time server.

2. The Contractor shall configure the master clock system for hourly clock correction at 59th minute of each hour.

3. The Contractor shall configure the master clock system for full clock correction at 11:59 AM and 11:59 PM.

4. The Contractor shall verify that all clocks correct at correction times.

END OF SECTION

SECTION 28 16 00
ACCESS CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, materials, installation, configuration and testing requirements for a complete and operable Access Control system. The system shall provide electronic access control to doors that require the means to either be remotely opened or grant access for credentialed personnel.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:

1. The District has standardized on Lenel S2 Security for projects that require electronic access with proximity cards/fobs.

2. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation, and completion of the Work.

3. The Contractor shall provide and coordinate installation of door hardware with Division 08.

4. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system to the District.

5. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be made in the presence of the District or the District’s representative.

6. Existing systems shall remain operable until new systems are accepted and approved by the District or its representative.

7. The Contractor is responsible for user/operator training.

8. The Contractor shall complete all required project closeout documentation in a timely fashion.

9. All exterior doors shall have electronic card access unless otherwise noted.

10. Any new installations or existing system modifications shall seamlessly integrate into the site’s existing Access Control system.

B. It is the responsibility of the access control integrator or company to generate an exceptions list prior to bidding or installation that itemizes exceptions taken with door

hardware schedules, components or designs being used which may hamper their ability to provide a secure and compliant access control product.

1.03 RELATED REQUIREMENTS

A. Division 26 sections, as applicable

B. Division 27 sections, as applicable

C. Division 28 sections, as applicable

1.04 CODES AND STANDARDS.

A. The contractor shall possess a California a C7 or C10 license.

B. The Contractor or Subcontractor shall be factory authorized to provide and install equipment with 5 years documented experience.

C. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

1.05 REFERENCES

A. See Division 27 00 00 for additional information/requirements.

1.06 CONTRACTOR “SHOP DRAWINGS” DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.07 SUBMITTALS

A. See Division 27 00 00 for requirements.

1.08 WARRANTY

A. See Division 27 00 00 for additional requirements.

B. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day “burn-in” period shall begin. Any fault shall reset the “burn-in” period to zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

PART 2 - PRODUCTS

2.01 GENERAL

A. Door hardware to be coordinated with Division 08.

B. All products shall be new and unused and shall be of manufacturer’s current and standard production.

C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

D. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

2.02 CONDUIT AND RACEWAY

A. See Division 27 05 00 for conduit and raceway requirements.

2.03 WIRE AND CABLE

A. Provide all new wire and cable required to install systems as indicated on design documents.

B. All cables shall be specifically designed for their intended use (plenum, direct burial, aerial, and etc.).

C. Wire and cable shall be sized to provide minimum voltage drop and minimum resistance to the devices being supplied.

D. Comply with design documents and equipment manufacturers recommendations for wire and cable size and type.

E. Comply with all applicable codes and ordinances.

F. No splicing of wire is allowed.

G. All wire junctions are to be at devices and/or terminal strips.

H. Color of conductors shall be consistent throughout the system.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. The system shall only be provided by Contractors who are factory authorized to install, service and maintain the system.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the

Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 INSTALLATION

A. Panel and any network device server will be wired through a dedicated power supply with battery backup.

B. Power is to be access control panels is to be hardwired utilizing EMT or rigid conduit in accordance with Wiring and Conduit section of this specification.
Access control panels are to be installed in network (MDF or IDF) or electrical closets as approved by District / District's representative. All panels and boards must be installed in Life Safety Power enclosure(s) (within the designated location) that are of sufficient size and orientation to include all card access system components. All enclosures must be lockable and located in a manner that the enclosures will be accessible by maintenance personnel.

C. Each panel will be labeled in accordance with District standards. The label for each panel will be posted on the exterior of the panel door.

D. Each panel will have a list of readers (door locations) connected to it located on the inside cover. A detailed door and reader layout drawing will be located on the inside of the panel door in an appropriate sleeve and keeper.

E. Installation of network connection drop is to be coordinated through District / District's representative. Drop termination is to be inside of access control panel to prevent tampering. The MAC address and IP address for each panel/device will be posted on the inside panel door. All panel boxes are to have functioning locking hardware with keys. Keys will be submitted to the Electronics Shop upon completion of install.

F. All low voltage cables shall be kept away from power circuits.

G. All panels and power supplies shall be labeled with 3/8 inch printed black lettering on white labels indicating AC electrical power panel, circuit breaker number and panel location.

H. Labeling material shall be heavy duty and appropriate for the environment in which it is installed.

3.04 WORKMANSHIP

A. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

B. Perform Work with persons experienced and qualified to produce workmanship specified.

C. Maintain quality control over suppliers and Subcontractors.

D. Quality of workmanship is considered important. The District / Architect, and Engineer Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

3.05 CABLE AND CONDUCTORS

A. Design, layout, size, and plan new cable runs as required.

B. All cables shall be installed in accordance with Division 27 15 00 and code requirements.

C. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.

D. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.

E. Identify all cables at terminations and at every junction box. Identification shall be made with an approved permanent label, machine generated 1/4” black letters on white tape (Brady or equal.)

F. Neatly dress and tie all cabling.

3.06 CONDUIT AND RACEWAY INSTALLATION, PENETRATIONS, CUTTING AND PATCHING, DEMOLITION, PAINTING

A. Do not penetrate any roof, flashing, exterior wall, or parapet without prior approval from District’s designated Construction Project representative.

B. When penetrating a fire wall for passage of cables and/or conduit, always provide a UL listed fire-stop system that complies with code and the local authority having jurisdiction.

C. Where conduit penetrates exterior walls, seal opening around conduit in an approved manner to make watertight.

D. Refer to section 27 05 00 for additional requirements.

3.07 FIELD QUALITY CONTROL AND TESTING

A. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

B. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.

C. Submit the Record Drawings (as-builts) to District for review prior to inspection.

D. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to inspect wiring, devices, and system operation.

E. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

END OF SECTION

SECTION 28 20 00
VIDEO SURVEILLANCE

PART 1 – GENERAL

1.01 SUMMARY

A. This section specifies equipment, licenses, accessories, materials, installation, configuration, and testing requirements for a complete and operable video surveillance system.

1.02 SCOPE

A. Furnish and install a surveillance camera system in accordance with the design drawings and specifications.

B. Install conduit and raceways for video surveillance system.

C. Install and configure network video recorder (NVR).

D. Install and configure video management software.

E. Install and configure surveillance cameras at exterior and interior locations.

F. Camera power shall be provided from network PoE switch unless noted otherwise on design drawings.

G. Cable lengths greater than 315’, but less than 1000’ long-range data extenders are permitted.

H. Configure administrative video management software workstations for video monitoring and playback.

I. Training for site personnel on how to operate the system primary and advanced functions as required.

J. Calibration of the video surveillance system, as required. This includes, but not be limited to the following: camera mounting and/or view adjustments, frame rates, video masking, and additional product feature settings as required.

1.03 CODES AND STANDARDS

A. See Division 27 00 00 for requirements.

1.04 INDUSTRY GUIDELINES AND STANDARDS

A. ANSI/TIA-568-1.D: Commercial Building Telecommunications Cabling Standard.

B. ANSI/TIA -568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standard.

C. ANSI/TIA -606-C: Administration Standard for Telecommunications Infrastructure.

D. ANSI/TIA -607-C: Generic Telecommunications Bonding and Grounding (Earthing) Requirements for Customer Premises

1.05 QUALIFICATIONS

A. The Contractor shall hold a California C7 or C10 license.

B. The Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

C. The Contractor shall have been actively engaged in the installation of projects similar in scope and size for a minimum period of 5 years.

D. The Contractor shall be a factory direct dealer for, or establish an equivalent relationship with, the major equipment specified herein, suitable to carry out warranty administration and post warranty repair and provide documentation of same.

E. The Contractor shall notify the District, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.

F. If after contract is awarded, minor changes and additions are required by the mentioned authorities, even though such work is not shown on drawings or covered in the specifications, they shall be included at Contractor’s expense.

G. The Contractor shall be fully conversant and capable in the cabling of low voltage, technology applications such as, but not limited to audio-video, data, voice and imaging network systems.

H. The Contractor shall at a minimum possess the following qualifications:

I. Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.

J. Must possess current liability insurance certificates.

K. The Contractor shall show proof of current certification of the approved manufacturer’s products.

L. Personnel trained and certified in the design of the approved manufacturer’s products.

M. Personnel trained and certified to install the approved manufacturer’s products.

N. Personnel trained in the installation of pathways and support for backbone and horizontal cabling.

O. Personnel knowledgeable in local, state, province and national codes, and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.

1.06 CONTRACTOR “SHOP DRAWINGS” DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.07 SUBMITTALS

A. See Division 27 00 00 for requirements.

1.08 WARRANTY

A. See Division 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. All products shall be new and unused and shall be of manufacturer's current and standard production.

B. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.

C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

2.02 PRODUCT AVAILABILITY

A. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

B. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

2.03 MATERIALS

A. See 27 15 00 Communications Horizontal Cabling for requirements

B. Cameras, network video recorders (NVR), housings and mounts, network switches, LED display/monitor, including all materials and equipment necessary to provide a complete and operable system shall be as shown on design drawings.

C. Surveillance Camera equipment shall be as specified on the design drawings.

D. All exterior weatherproof cameras shall be installed with smoke dome covers.

E. Cameras shall have one (1) each 64Gb microSDXC card properly formatted and installed.

PART 3 – EXECUTION

3.01 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date

3.02 PREPARATION

A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.

B. The Contractor shall bench test all equipment prior to delivery to the job site.

C. The Contractor shall verify the availability of power where required.

D. The Contractor shall verify network PoE switch port availability and provide a new PoE switch when required.

E. The Contractor shall verify network patch panel port availability and provide a new patch panel when required.

3.03 CABLE ROUTING

A. Refer to Division 27 15 00 Communications Horizontal Cabling for cable routing requirements.

3.04 EQUIPMENT MOUNTING PARAMETERS

A. All camera, monitors, recording equipment, racks and cabinets shall be anchored in accordance with manufacture specifications and drawn details, to walls and floors and grounded to building ground grid (not to water pipes etc.). Individual or new ground points are acceptable.

3.05 SYSTEM COMMISSIONING AND CALIBRATION

A. Contractor shall provide necessary time for commissioning and calibrating the entire video surveillance system.

B. Camera views and adjustments:

C. During training the district will shall gather information regarding final camera views and the areas the end user is trying to monitor.

D. The contractor shall adjust cameras after reviewing the collected information with a site designated person. The contractor shall maintain contact with this site designated person via 2-way radio or telephone during final camera adjustments.

E. The contractor, as part of contract documents, shall be responsible to return to the project site up to 60 days after activation to adjust and fine-tune cameras base on site and district staff direction. This 2nd adjustment shall be coordinated by the district authorized project manager or district staff.

F. Head end adjustments, as required:

G. Head end adjustments, including but not limited to frame rates, shall be made by the Contractor.

H. After camera views have been finalized the Contractor shall set up masking of non-essential video for each camera.

END OF SECTION

SECTION 28 31 00
INTRUSION DETECTION

PART 1 – GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, materials, installation, configuration and testing requirements for a complete and operable Intrusion Detection system. The system shall provide intrusion alarm notification, monitoring, command and control and be connected to the District's monitoring station.

1.02 SCOPE

A. For new construction – provide and install all components and accessories as outlined in the design documents for a complete and operable system.

B. For existing construction - provide and install all components and accessories as outlined in the design documents to modify the existing system while maintaining code compliance and to seamlessly integrate the new components into the existing campus' system.

C. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

D. The Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system to the District.

E. Exterior doors (entrance and roll-up) and roof access hatches are to be monitored by the Intrusion Detection system.

F. Preferred mounting location for motion detectors is to be wall mounted 9' AFF with no casework below.

G. The Contractor shall be responsible for programing the Intrusion Detection System.

H. With one-week advance notice the Contractor shall coordinate with the District M&O staff for monitoring connectivity network addressing information.

I. The contractor shall review the proposed final system programming, functionality and expectations with the project manager, Architect, Engineer and District prior to final programming.

J. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be made in the presence of the inspector of record (IOR) and District or the District's representative.

K. Existing systems shall remain operable until new systems are accepted and approved by the District or its representative.

L. The contractor is responsible for District/user/operator training.

M. The contractor shall complete all required project closeout documentation in a timely fashion.

1.03 RELATED REQUIREMENTS

A. Division 01 00 00 - General Requirements

B. Division 26 05 00 – Common Work Results for Electrical

C. Division 27 00 00 - Communications

D. Division 27 05 00 – Common Work Results for Communications Systems

E. Division 28 46 00 – Fire Detection and Alarm.

1.04 CODES AND STANDARDS

A. The installed system shall confirm to all California State Codes.

B. 2022 California Building Code (CBC)

C. 2022 California Electrical Code (CEC)

D. 2022 California Fire Code (CFC)

E. All equipment connected to the Fire Alarm system shall have California State Fire Marshall listing(s).

F. National Codes.

G. 2022 NFPA 70 – National Electrical Code

H. 2022 NFPA 72 – National Fire Alarm Code

I. 2022 NFPA 101 – Life Safety Code

J. Americans with Disabilities Act (ADA)

K. Local building codes

L. All requirements by the authority having jurisdiction (AHJ)

1.05 UNDERWRITERS LABORATORY (UL) LISTING

A. All equipment shall be UL listed for its intended purpose.

B. Any modification that voids the equipment’s UL listing is strictly prohibited (i.e. relocated or oversize knock-outs).

C. Any modified new equipment that voids the UL listing shall be replaced by the Contactor (parts and labor) at their expense.

1.06 QUALIFICATIONS

A. The contractor shall possess a California C10 license.

B. The Contractor or Subcontractor shall be factory authorized to provide and install equipment with 5 years documented experience.

C. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.

1.07 REFERENCES

A. See Division 27 00 00

1.08 SYSTEM REQUIREMENTS

A. Site compatibility:

1. Any new installations or existing system modifications shall seamlessly integrate into the site’s existing Intrusion Detection system.

1.09 CONTRACTOR “SHOP DRAWINGS” DESIGN REQUIREMENTS

A. See Division 27 00 00 for requirements.

1.10 SUBMITTALS

A. See Division 27 00 00 for requirements.

B. Provide copies of certificates listed in section 1.07 Qualifications (above).

1.11 WARRANTY

A. Refer to Division 01 Warranty section.

B. Refer to Division 27 00 00 for additional requirements.

C. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day “burn-in” period shall begin. Any fault shall reset the “burn-in” period to zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

PRODUCTS

2.01 GENERAL

A. All products shall be new and unused and shall be of manufacturer's current and standard production.

B. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer

C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

D. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

2.02 CONDUIT AND RACEWAY

A. See Division 27 05 00 for conduit and raceway requirements.

2.03 WIRE AND CABLE

A. Provide all new wire and cable required to install systems as indicated on design documents.

B. Approved wire and cable manufacturer is West Penn, substitutions requires prior approval.

C. Cable jacket color shall be white (OSP cable excluded)

D. All cables shall be specifically designed for their intended use (plenum, direct burial, aerial, and etc.).

E. Wire and cable shall be sized to provide minimum voltage drop and minimum resistance to the devices being supplied.

F. Comply with design documents and equipment manufacturers recommendations for wire and cable size and type.

G. Comply with all applicable codes and ordinances.

H. No splicing of wire is allowed.

I. All wire junctions are to be at devices and/or terminal strips.

J. Color of conductors shall be consistent throughout the system.

2.04 BATTERIES

A. Approved manufacturer is PowerSonic or approved equal.

B. Shall be 12-volt, sealed lead acid type

C. Shall be sized per design documents or approved shop drawings.

D. For extended run-time 2 batteries shall be provided.

2.05 EXTRA STOCK

A. For projects with less than 5 new Intrusion alarm devices – no extra stock required.

B. For projects with 6 or more intrusion devices - provide extra stock of 2 (ea.) motion detector (current model) and 1 (ea.) monitor module (current model) per 100 project devices.

EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. The system shall only be provided by Contractors who are factory authorized to install, service and maintain the system.

B. The Contractor (or subcontractor listed at time of bid) must have been a factory authorized with the proposed manufacturer for a period of at least five (5) years before the Bid Opening Date.

C. The Contractor’s installers and technicians must also be factory trained and certified to perform such tasks.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to the District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.

B. The Contractor shall bench test all equipment prior to delivery to the job site.

C. The Contractor shall verify the availability of power where required.

D. The Contractor shall arrange for obtaining all programming information required including network addressing information and existing site device numbering scheme.

3.04 SHOP DRAWINGS

A. See Division 27 00 00 for requirements

B. Submit drawings for review and approval by Project Manager.

3.05 INSTALLATION

A. Utilize information gathered from Section 3.03-D-1&2 above.

B. Installation shall be in accordance with applicable codes (i.e. NEC, ((NFPA 72))) local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

C. Perform all Work as indicated in the design documents and specifications.

D. All low voltage cables shall be kept away from power circuits

E. Any new or modified electrical power circuits shall be made by a licensed electrician.

F. Where applicable – panel to be connected to the existing dedicated circuit for the Fire Alarm Panel.

G. Double-pole, double-through (DPDT) recessed door contacts are to be installed at the top of the door frame for all exterior doors. Second contacts to be used and coordinated with HVAC system provider.

H. All exterior roll-up doors are to have a floor mounted ruggedized door contact and a monitor module. Secure armored cable to prohibit being a trip hazard.

I. All roof access hatches are to have ruggedized door contact and a monitor module. Secure armored cable to prohibit being a snag hazard.

J. Motion detectors are to be mounted on single-gang back boxes (surface or flush) near the room corner aimed towards middle of the room. Install height shall be from 8’ to 10’ AFF and should not have casework below – to prevent the placement of material that blocks detector field of view. Detectors near window shall be located and aimed to minimize false activation.

K. Monitoring modules are to be located at 10’ AFF or less to allow for regular maintenance and shall not require special tools and/or equipment (i.e. scissor lift).

L. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram and/or approved shop drawings for specific system requirements. The design drawings shall be enforced when more stringent requirements are noted.

M. All equipment shall be fastened firmly in place to walls or ceiling/floor assemblies. Fasteners and supports are to be of type and sized in accordance with drawings and specifications

N. All panels and power supplies shall be labeled with 3/8 inch printed black lettering on white labels indicating AC electrical power panel, circuit breaker number and panel location.

O. All detection devices shall be labeled with 1/4 inch printed black lettering on white labels indicating zone and/or point ID per design documents or approved shop drawings.

P. Labeling material shall be heavy duty and appropriate for the environment in which it is installed.

3.06 WORKMANSHIP

A. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

B. Perform Work with persons experienced and qualified to produce workmanship specified.

C. Maintain quality control over suppliers and Subcontractors.

D. Quality of workmanship is considered important. The District's Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

3.07 CABLE

A. Design, layout, size, and plan new cable runs as required.

B. All cables shall be installed in accordance with Division 27 15 00 and code requirements.

C. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.

D. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.

E. Identify all cables at terminations and at every junction box. Identification shall be made with an approved permanent label, machine generated 1/4" black letters on white tape (Brady or equal.)

F. Underground cable shall be rated for use.

G. Neatly dress and tie all cabling.

3.08 CONDUIT AND RACEWAY INSTALLATION

A. Design, lay-out, size and plan new conduit and raceway systems as required.

B. Install conduit and raceway in accordance with Division 27 requirements.

3.09 PENETRATIONS

A. Do not penetrate any roof, flashing, exterior wall, or parapet without prior approval from District's designated Construction Project representative.

B. When penetrating a fire wall for passage of cables and/or conduit, always provide a UL listed fire-stop system that complies with code and the local authority having jurisdiction.

C. Where conduit penetrates exterior walls, seal opening around conduit in an approved manner to make watertight.

D. Refer to section 27 05 00 for additional requirements.

3.10 CUTTING AND PATCHING

A. The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work. Disturbed surfaces shall be returned to a paint ready condition.

3.11 DEMOLITION

A. See section 27 05 00 for additional requirements

3.12 PAINTING

A. See section 27 05 00 for requirements.

3.13 FIELD QUALITY CONTROL AND TESTING

A. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

B. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.

C. Submit the Record Drawings (as-builts) to District for review prior to inspection.

D. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to inspect wiring, devices and system operation.

E. The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with required codes

F. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

G. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.

H. Notify District when ready to perform a re-inspection of the installation.

I. The District and the inspector of record (IOR) shall perform all system functions as required by code to ensure proper and complete operation.

J. When testing has been completed to the satisfaction of both the District and the IOR, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the District.

K. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day “burn-in” period shall begin. Any fault shall reset the “burn-in” period to zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

3.14 INITIAL PROGRAMMING AND CONFIGURATION

A. Contractor shall provide programming and configuration of the Intrusion Detection system for full functionality and ready to communicate with monitoring stations.

B. Contractor to coordinate with the District or the District’s representative one week prior to final cutover for connectivity to monitoring stations. See section 3.03 for contact information.

C. Contractor shall maintain hard copy worksheets which fully document the system program and configuration. Worksheets shall be kept up to date on a daily basis by Contractor until final Acceptance by District. Worksheets shall be subject to inspection and approval by District. Provide final copies to District prior to Project Close-out.

3.15 TRAINING

A. Contractor shall provide complete system operator and/or user training to insure adequate operator/user understanding.

B. Training sessions to have an agenda, sign-in sheet and written instructional materials for all training attendees.

3.16 FINAL DOCUMENT SUBMITTALS

A. See section 27 05 00 for requirements.

1. APPENDIX-A

2. (Unless Otherwise Specified on Construction Document Plan Sheets)

APPENDIX-A
(Unless Otherwise Specified on Construction Document Plan Sheets)

INTRUSION ALARM COMPONENTS

DESCRIPTION	MFG/MODEL	
Door Contact	GRI 195-12WG	
Roll-up Door Contact	INTERLOGIX/2202A-L	
Bosch Wall motion detector	BOSCH/ZX935Z	
Wall-mount gimbal	DSC/DM-W	
Ceiling-mount gimbal	DSC/DM-C	
Terminal/Barrier Strip	IDEAL INDUSTRIES 89-608	

END OF APPENDIX-A

END OF SECTION

SECTION 28 46 00
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping: Materials and methods for work to be performed by this installer.

B. Section 23 33 00 - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

F. UL 268 - Standard for Smoke Detectors for Fire Alarm Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Drawings must be prepared using AutoCAD Release 2018.
   1. Owner will provide floor plan drawings for Contractor's use; verify all dimensions on Owner-provided drawings.

C. Evidence of designer qualifications.

D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
   4. System zone boundaries and interfaces to fire safety systems.

5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
7. List of all devices on each signaling line circuit, with spare capacity indicated.
8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.

E. Evidence of installer qualifications.

F. Evidence of instructor qualifications; training lesson plan outline.

G. Evidence of maintenance contractor qualifications, if different from installer.

H. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
2. Submit documentation of satisfactory inspections and tests.
3. Submit NFPA 72 "Inspection and Test Form," filled out.

I. Operating and Maintenance Data: See Section 01 78 00 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
1. Complete set of specified design documents, as approved by authority having jurisdiction.
2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
4. List of recommended spare parts, tools, and instruments for testing.
5. Replacement parts list with current prices, and source of supply.
6. Detailed troubleshooting guide and large scale input/output matrix.
7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

J. Project Record Documents: See Section 01 78 00 for additional requirements; have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
2. "As installed" wiring and schematic diagrams, with final terminal identifications.
3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

K. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer , with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
   1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
   2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
   3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.

D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

1.06 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units and Accessories - Basis of Design: Gamewell-FCI E3 Series.

B. Initiating Devices and Notification Appliances:
   1. Same manufacturer as control units.
   2. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
   1. Provide all components necessary for a complete operational fire alarm system,, regardless of whether shown in the contract documents or not.
   2. Protected Premises: Entire building shown on drawings.
   3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
      a. ADA Standards.
      b. The requirements of the local authority having jurisdiction , which is DSA.
      c. Applicable local codes.

d. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.

4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
6. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones.
7. Program notification zones and voice messages as directed by Owner.
8. Main Fire Alarm Control Unit: New, located at in existing building "A".

B. Supervising Stations and Fire Department Connections:
1. Public Fire Department Notification: By remote supervising station.
2. Remote Supervising Station: UL-listed central station under contract to facility.
3. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.

C. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
3. Signaling Line Circuits (SLC) Between Buildings: Class A, Style 2.
4. Notification Appliance Circuits (NAC): Class B, Style W.

D. Power Sources:
1. Primary: Dedicated branch circuits of the facility power distribution system.
2. Secondary: Storage batteries.
3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
4. Each Computer System: Provide uninterruptible power supply (UPS).

2.03 FIRE SAFETY SYSTEMS INTERFACES

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:

C. HVAC:
1. Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2.04 COMPONENTS

A. General:
1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.

C. Addressable Fire Alarm Control Unit - Basis of Design: Gamewell-FCI E3 Series.

D. Remote Annunciators: E3-LOC.

E. Initiating Devices:
1. Addressable Systems:
a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.

b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.

2. Manual Pull Stations: MS-7AF.
3. Smoke Detectors: ASD-PL3.
4. Heat Detectors: ATD-L3H.
5. Addressable Interface Devices: AMM-2F, AOM-2RF.

F. Notification Appliances:
1. Speakers/Strobes: System Sensor.
2. Strobes: System Sensor.

G. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.

H. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.

I. Locks and Keys: Deliver keys to Owner.

J. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
2. Provide one for each control unit where operations are to be performed.
3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain Owner's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. Notify Owner 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

3.03 OWNER PERSONNEL INSTRUCTION

A. Provide the following instruction to designated Owner personnel:
1. Hands-On Instruction: On-site, using operational system.

2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.

B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
   1. Initial Training: 1 session pre-closeout.

C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
   1. Initial Training: 1 session pre-closeout.

D. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

3.04 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
   5. Repeat demonstration until successful.

3.05 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
   1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
   2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
   3. Record keeping required by NFPA 72 and authorities having jurisdiction.

C. Provide trouble call-back service upon notification by Owner:
   1. Provide on-site response within 2 hours of notification.
   2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
   3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

D. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

E. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.

F. Comply with Owner's requirements for access to facility and security.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and grubbing of the site, including the removal of debris, vegetation, foreign objects, concrete slabs and foundations, asphalt paving, portland concrete paving and curbs, site lighting and bases, site walls, area drains and catch basins, unwanted existing underground utilities and drain lines, conduits, trees, and other site construction as indicated and as required for grading the site suitable for constructing the proposed project.

1.02 RELATED REQUIREMENTS

A. Section 31 23 23 - Fill: Material for filling holes, pits, and excavations generated as result of removal operations.

1.03 REFERENCE STANDARDS

A. ANSI A300 Part 6 - Tree, Shrub, and Other Woody Plant Management--Standard Practices (Planting and Transplanting); 2012 (Reapproved 2018).

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: Per Section 312323 and as approved by the Geotechnical Engineer.

PART 3 EXECUTION

3.01 PREPARATION

A. Erect barriers, fences, guard rails, enclosures, and shoring to protect personnel, structures, the public, and site improvements and utilities to be maintained intact.

B. Protect and maintain benchmarks and survey control points from disturbance during construction.

C. Locate and clearly flag trees and vegetation to remain or be relocated.

D. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.02 SITE CLEARING

A. Comply with additional requirements specified in Section 01 70 00 - Execution and Closeout Requirements.

B. Fill depressions caused by clearing and grubbing operations with material satisfactory to the geotechnical engineer unless further excavation or earthwork is indicated.

C. Place fill material in horizontal layers in accordance with the recommendations in the project geotechnical report and compact each layer to a density satisfactory to the geotechnical engineer.

3.03 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths is encountered in a manner to prevent intermingling with underlying subsoil or other waste.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.04 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with local requirements; obtain required permits.

B. Protect existing utilities, utility structures, and associated appurtenances to remain from damage.

C. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Owner's Representative written permission.

D. Do not disrupt public utilities without permit from authority having jurisdiction.

E. Protect existing structures and other elements that are not to be removed. Remove unwanted existing utilities as indicated or as uncovered by work, and cap in a manner conforming to Code. Determine status of utility lines encountered that are not shown on the Contract Drawings. If abandoned, remove and dispose of in proper manner.

F. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
   1. Arrange with utility companies to shut off indicated utilities.
   2. Check with local jurisdiction for any needed inspection permits.

3.05 CLEARING AND GRUBBING

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by structures, paving, lawns, and planting areas. Remove rootballs and all exposed roots greater than 1/2 inch in diameter.

B. Clear site after relocating vegetation in accordance with ANSI A300 Part 6.

C. Stripped materials may be reused on the site in landscaped areas, provided that they are kept a minimum of 5 feet from flatwork or pavement areas, and are moistured conditioned and compacted in accordance with the Project Geotechnical Engineer's recommendations.

D. Preservation of existing vegetation: The construction schedule shall consider the amount and duration of soil exposed to erosion by wind, rainfall, and vehicle tracking and seek to minimize disturbed soil during the rainy season. A schedule shall be prepared that shows the sequencing of construction activities with installation of maintenance of soil stabilization and sediment control BMPs.

E. Do not remove or damage vegetation beyond limits indicated on drawings.

F. Install substantial, highly visible fences at least 6 feet high to prevent inadvertent damage to vegetation to remain:

1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
2. Around other vegetation to remain within vegetation removal limits.
3. See Section 01 50 00 for fence construction requirements.

G. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum subsoil disturbance.

3.06 REMOVED VEGETATION PROCESSING

A. Do not burn, bury, landfill, or leave on-site, except as allowed by the Owner.

3.07 SITE IMPROVEMENTS

A. Remove existing above and below grade improvements as indicated and as necessary to facilitate new construction.

B. Demolish and completely remove existing construction as indicated from the site, including subsurface conditions designated to be removed or required to be removed to facilitate the work of the proposed project.
1. Demolish asphalt, concrete, and masonry in small sections. Continuously wet down debris to prevent creation of dust or fire hazard.
2. Fragments: Remove from the site asphalt and concrete fragments exceeding 6 inches in maximum dimension.

3.08 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and windblown debris from public and private lands.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough grading.

B. Fine grading.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Project Geotechnical Report: "Geologic Hazards and Geotechnical Engineering Report" for Elkhorn Elementary School New Classroom Building and Remodeling", prepared by Mid Pacific Engineering (MPE No. 06317-03), dated June 6, 2025.

C. "Supplemental Recommendations Letter" for Elkhorn Elementary School New Classroom Building and Remodeling", prepared by Mid Pacific Engineering (MPE No. 06317-03), dated April 8, 2026.

D. Standard Specifications for Public Works Construction (Greenbook); current edition.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with the Standards Specifications for Public Works Construction (Greenbook); current edition.

B. Perform work in accordance with Project Geotechnical Report.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: Per Section 312323 and as approved by the Geotechnical Engineer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify survey bench mark and intended elevations for grading areas are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect above- and below-grade utilities to remain.

D. Provide temporary means and methods to remove standing or ponding water from areas prior to grading.

E. Protect site features to remain, including but not limited to bench marks, survey control points, and fences.

3.03 ROUGH GRADING

A. Excavate and fill subgrade material to elevations indicated on plans.

B. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
   1. Remove sod, grass, and any other vegetation before stripping top soil.
   2. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
   3. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
   4. Strip topsoil to depth indicated by the Project Geotechnical Engineer.

C. Horizontally bench existing slopes greater than 1:4.

D. Replace displaced subgrade in accordance with Section 31 23 23.

E. Remove and replace unsuitable materials as specified fill.

3.04 FINE GRADING

A. Scrape and spread subgrade material uniformly smooth and without disruptions as indicated on drawings.

3.05 SOIL REMOVAL

A. Stockpile topsoil to be re-used on site; remove remainder from site.
   1. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water and other erosion control measures.
      a. Limit height of topsoil stockpiles to 72 inches.
      b. Do not stockpile topsoil within plant protection zones.
      c. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or resued.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Soils below building pads should be over-excavated to 5 feet beyond the perimeter of the building, and to a depth equal to the bottoms of proposed foundations or 2 feet below existing site grades (whichever is deeper), and subgrades below excavations and sub-excavations should be prepared as required per Subsection "Site Preparation and Over-Excavation" per the Project Geotechnical Report.

3.06 TOLERANCES

A. Top Surface: Plus or minus 1/2 inch.

3.07 FIELD QUALITY CONTROL

A. Compaction density testing shall be as described in the Project Geotechnical Report and as approved by the Geotechnical Engineer.

3.08 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
B. Remove unused stockpiled subsoil. Grade stockpile area to prevent standing water.
C. Leave site clean and raked, ready to receive work.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for footings, slabs-on-grade, paving, site structures, and utilities within the building.

B. Trenching for utilities outside the buildings.

1.02 RELATED REQUIREMENTS

A. Project Geotechnical report; bore hole locations and findings of subsurface materials.

B. Section 01 57 13 - Temporary Erosion and Sediment Control: Slope protection and erosion control.

C. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.

D. Section 31 22 00 - Grading: Grading.

E. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

F. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

D. Protect plants, lawns, rock outcroppings, and other features to remain.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.05 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 31 23 16.13
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Project Geotechnical Report; bore hole locations and findings of subsurface materials.
B. Section 31 22 00 - Grading: Site grading.

1.03 DEFINITIONS

A. Finish Grade (FG) Elevations: Indicated on drawings.
B. Finish Surface (FS) Elevations: Indicated on drawings.
C. Subgrade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2022, with Errata .
B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.
E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)); 2012 (Reapproved 2021).
F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017, with Editorial Revision (2020).
H. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).
I. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.
J. Standard Specifications for Public Works Construction (Greenbook); current edition.
K. Project Geotechnical Report.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: 10 pound sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where allowed by owner.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. As specified in Section 312323 and by the Project Geotechnical Engineer.

2.02 ACCESSORIES

A. Geotextile: See Section 312323.

B. Trace Wire and Detectable Warning Tape: Install detectable warning tape during the installation of proposed utilities on contract drawings. Acid- and alakli-resistant, polyethylene film warning tape manufactured for making and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 5 mils (0.1mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep, colored as follows:
   1. Red: Electric and cathodic protection.
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone, fiber optic, and other communications.
   4. Blue: Potable water and fire protection service systems.
   5. Green: Sewer and storm drainage systems.
   6. Purple: Non-potable reclaimed water.

2.03 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

D. Protect plants, lawns, rock outcroppings, and other features to remain.

E. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove excavated material that is unsuitable for re-use from site.

H. Stockpile excavated material to be re-used in area designated in Section 31 22 00.

I. Remove excess excavated material from site.

J. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

K. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.04 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use engineered fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At Landscaped areas: 90 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Utility Piping and Conduits:
   1. Bedding: Use clean sands or clean crushed rock in accordance with Greenbook requirements and as per the contact drawing trenching details.
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 6 inch lifts to 95 percent of maximum dry density.

3.07 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.08 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: As required by the Project Geotechnical Engineer.

3.09 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 23 23
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for paving, site structures, and utilities within the building.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Project Geotechnical report; bore hole locations and findings of subsurface materials.

B. Section 01 57 13 - Temporary Erosion and Sediment Control: Slope protection and erosion control.

C. Section 03 30 00 - Cast-in-Place Concrete.

D. Section 31 22 00 - Grading: Site grading.

E. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.

F. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2022, with Errata .

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).

D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)); 2012 (Reapproved 2021).

F. Standard Specifications for Public Works Construction (Greenbook); current edition.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site.
   1. Free of debris, organics, lumps larger than 3 inches, rocks larger than 1/2 inches, rubble, and debris.
B. Engineered Fill: Conforming to Greenbook Section 200-1.4, and recommendations as stated in the Project's Geotechnical Report.
C. Imported Fill: Well-graded granular soils or aggregates with a Plasticity Index of 15 or less, an Expansion Index of 20 or less, with no particles graded than 3 inches in maximum dimensions, as per the Geotechnical Report requirements.
D. Concrete for Fill: Lean concrete conforming to Greenbook Section 200-4, and recommendations as stated in the Project's Geotechnical Report.
E. Granular Fill: Crushed rock, conforming to Greenbook Section 200-1.2, and recommendations as stated in the Project's Geotechnical Report. Gravel use is acceptable only when used in conjunction with filter fabric.
F. Sand: Conforming to Greenbook Section 200-1.5, and recommendations as stated in the Project's Geotechnical Report.

2.02 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable, woven Mirafi ; 140N manufactured by Mirafi, or approved equal.

2.03 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
C. If tests indicate materials do not meet specified requirements, change material and retest.
D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.
B. Identify required lines, levels, contours, and datum locations.
C. See Section 31 22 00 for additional requirements.
D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
E. Verify structural ability of unsupported walls to support imposed loads by the fill.
F. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Subgrade below building pads and exerior pavements should be prepared as required per Section "Recommendations", Subsection "Engineered Fill Construction", of the Project Geotechnical Report.

B. Scarify and proof roll subgrade surface to a depth of [12] inches to identify soft spots.

C. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

D. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Fill placed below buildings should consist of non-expansive, imported soils, and should extend at least 5 feet beyond outer edge of building foundations and at least 2 feet beyond adjacent exterior pavements as required per Section "Recommendations", Subsection "Engineered FIll Construction", of the Project Geotechnical Report.

D. Employ a placement method that does not disturb or damage other work.

E. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

H. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 100 percent of maximum dry density.
   2. Other areas: Use engineered fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

I. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At landscaped areas: 90 percent of maximum dry density.

J. Reshape and re-compact fills subjected to vehicular traffic.

K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Over Buried Utility Piping and Conduits
   1. Refer to Section 312316.13 and the contract drawing trenching details.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: As required by the Project Geotechnical Engineer.

E. Proof roll compacted fill at surfaces that will be under slabs-on-grade and paving.

3.07 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 01 90
LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Furnish all labor, material, equipment and services required to maintain landscape in a healthy growing condition and in a neat and attractive appearance throughout the maintenance period.

1.02 RELATED REQUIREMENTS

A. Division 32 Section Landscape Irrigation

B. Division 32 Section Landscape Work

1.03 QUALITY ASSURANCE

A. The Maintenance Contractor shall be experienced in horticulture and landscape maintenance, practices and techniques, and shall provide sufficient number of workers with adequate equipment to perform the work during the maintenance period.

1.04 MAINTENANCE PERIOD

A. Continuously maintain the entire project area during the progress of the work and during the ninety (90) calendar-day maintenance period until final acceptance of the project by the Landscape Architect,
   1. Maintenance Period begins after all punchlist and corrective items have been accepted by the Landscape Architect and owner.

B. Maintenance period shall not start until all punch list items are addressed, when all elements of construction, planting and irrigation for the entire project are in accordance with Plans and Specifications. A prime requirement is that all lawn and landscape areas shall be planted and that all lawn areas shall show an even, healthy stand of grass seedlings which shall have been mown twice. If such criteria are met to the satisfaction of the Landscape Architect, a written notification shall be issued to establish the effective beginning date of maintenance period.

C. Any day of improper maintenance, as determined by the Landscape Architect, shall not be credited as an acceptable maintenance period day. The maintenance period shall be extended on a daily basis if the work is not in accordance to the Plans and Specifications. Project shall not be segmented into maintenance areas or phases, unless authorization of the Landscape Architect is obtained.

D. Maintenance shall continue beyond the ninety (90) day maintenance period, as required, until final acceptance is given by the Landscape Architect.

E. Contractor shall provide protection to the project site during the maintenance period.

F. A phased maintenance period will not be accepted.

1.05 GUARANTEE AND REPLACEMENT

A. Guarantee: All plant material and other materials installed under the Contract shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship or improper maintenance, as determined by the Landscape Architect, and shall be replaced by the Contractor at his expense. Warranty periods are as follows:

1. Trees, vines, and shrubs: One Year
2. Groundcover and Turf: One year.

B. Replacement: Any materials found to be dead, missing, declining or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Landscape Architect shall be sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the Contractor within five (5) days of written notification by the Landscape Architect or owner. All replacement materials and installations shall comply with the Plans and Specifications. Any plant missing due to suspected theft shall be replaced by the Contractor. If the Contractor suspects that theft may be a problem, the Contractor shall provide written documentation to the owner that security on this site needs to be intensified.

C. The Contractor may relieve himself of theft responsibility if after the security notice, with no result, a written notice to the owner shall be given that plant material will not be replaced for theft or vandalism due to lack of site security being maintained. This procedure may take place only during the Landscape Maintenance Period.

1.06 OBSERVATION SCHEDULE

A. Normal progress observations shall be requested by the Contractor from the Landscape Architect as per observations listed in specifications Division 32 Section "Landscape Work."

1.07 FINAL ACCEPTANCE OF THE PROJECT

A. Upon completion of all project work, including maintenance period, the Landscape Architect will, upon proper written request, make an observation to determine final project acceptability. Provide minimum a 14 business day notice for final observation.

B. Where observed work does not comply with the Plans and Specifications, replace rejected work and continue specified maintenance period until reinspected by the Landscape Architect and determined to be acceptable. All replacement materials and installations shall be in accordance with the Plans and Specifications. Remove rejected work and materials immediately from project. Prior to the date of final observation, Contractor shall provide the Landscape Architect with all Record Drawings and close out documents in accordance with the Plans and Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials used shall either conform to Specifications in other sections or shall otherwise be acceptable to the Landscape Architect. The Landscape Architect shall be given a monthly record of all herbicides, insecticides and disease control chemicals used and irrigation scheduled. The amendments listed herein are for Bidding purposes only. The final amendment types and rates shall be determined by the Agronomic Soils Test.

B. Turf maintenance fertilizer: shall be "Best Turf Supreme 16-6-8":
1. 16% nitrogen
2. 6% phosphoric acid
3. 8% potash

C. Slow Release maintenance fertilizer: shall be "Best Superturf 25-5-5 with Polyon" and shall consist of the following percents by weight:
1. 25% nitrogen
2. 5% phosphoric acid
3. 5% potash

PART 3 - EXECUTION

3.01 GENERAL MAINTENANCE

A. General: Proper maintenance, including watering, weeding, mowing, edging, fertilization, rolling of turf, replacement and infill of mulch replacement of jute mesh, infill of settled areas, repairing and protection shall be required until entire project is finally accepted, but in any event for a period of not less than the specified maintenance period after planting.

B. Watering: Thoroughly water to insure vigorous and healthy growth until work is accepted. Water in a manner to prevent erosion due to application of excessive quantities of water. When hand watering use a water wand to break the water force. Supplemental hand water as required to maintain and encourage the proper growth of new and existing plant material.

C. Weeding:
   1. Keep plant basins, turf areas and areas between plants free of weeds. Control weeds with pre-emergent herbicides. If weeds develop, use legally approved herbicides and hand remove. Avoid frequent soil cultivation that destroys shallow roots. Weeding also shall be included in all paved areas including public or private sidewalks.
   2. Hand weed as required in addition to the application of weed control herbicides and pre-emergent to maintain all areas free of weeds including turf species other than the specified species. Periodic or predetermined weeding schedules may not be adequate and should be supplemented.
   3. Apply a final application of pre-emergent herbicide at the end of the maintenance period, just prior to final acceptance.

D. Tree basins in turf areas: Remove turf from around each tree to create a 4'- 0" diameter basin depending on tree size.

E. Pruning
   1. Trees: Prune trees to select and develop permanent scaffold branches; to eliminate narrow V-shaped branch forks that lack strength; to reduce toppling and wind damage by thinning out crowns; to maintain a natural appearance and to balance crown with roots. All trees shall be maintained and pruned in accordance with the accepted practices of the American Society of Consulting Arborists (ASCA). Prune only as directed by the Registered Consulting Arborists and Landscape Architect.
   2. Shrubs: Same objectives as for trees. Shrubs shall not be clipped into balled or boxed forms unless such is required by the landscape plans. All pruning cuts shall be made to lateral branches, buds or flush with the trunk. Stubbing and heading shall not be permitted.
   3. Only skilled workers shall perform pruning work in accordance with standard horticultural pruning practices. Remove from the project all pruned branches and material. Remove and replace any plant material excessively pruned or malformed resulting from improper pruning practices at no additional costs to the owner.
   4. Improperly pruned plant material as determined by the Landscape Architect is to be replaced at no cost to the owner.

F. Staking and Guys: Stakes and guys shall remain in place through the guarantee period and shall be inspected and adjusted to prevent rubbing that causes bark wounds. Remove nursery stake from all trees that are staked with lodgepole stakes per specifications. Provide supplemental staking or guying as required during high wind events to prevent damage to trees. Any damaged tree caused by high winds must be replaced by the contractor at no cost to the owner.

G. Insect, Animal, Rodent and Disease Control: Maintain proper control with legally approved materials as required as part of the Contract.

H. Protection: The Contractor shall maintain protection of the planted areas. Damaged areas shall be repaired or replaced at the Contractor's expense.

I. Trash: Remove trash weekly in all planted areas, pedestrian walkways and parking areas. Maintain all areas free of trash, clippings, and debris at all times.

J. Replacement: As per Guarantee and Replacement Specifications of this Section.

K. Fertilization: Fertilize all planting areas, during and just prior to end of maintenance period with the slow release maintenance fertilizer as indicated in the agronomic soils report.

L. Watering: Planting areas shall be watered at such frequency as weather conditions require to replenish soil moisture below root zone and to establish healthy plant material.
   1. Contractor is responsible for water audits and payment of any local penalties by local water districts at no additional cost to the Owner.

3.02 LAWN AND TURF MAINTENANCE

A. Mowing and Edging
   1. Initial mowing of turf will commence when the grass has reached a height of two and one-half (2-1/2) inches. The height of cut will be two (2) inches. After initial establishment maintain Bermuda and creeping grasses at 1½" and fescues or rye grass at 2". Mowing will be at least every 4-6 days for the second through fifth cuttings, and at least once per week after that for fescue. Bermuda grass is to be mowed minimum twice a week. Bent grass is to be mowed daily. Turf must be well established and free of bare spots and weeds to the satisfaction of the Landscape Architect prior to final acceptance.
   2. Excess grass clippings shall be picked up and removed from the site and premises. Let turf areas dry out enough so that mower wheels do not skid, tear or mark the lawn. Edges shall be trimmed at 90 degrees to pavement, at least weekly or as needed for neat appearance. Clippings shall be removed from paved and planting areas, etc. and disposed of from the site.

B. Watering: Lawns shall be watered at such frequency as weather conditions require to replenish soil moisture below root zone and to establish healthy strands of grass.
   1. Contractor is responsible for water audits and payment of any local penalties by local water districts at no additional cost to the Owner.

C. Disease control: Control turf diseases throughout the maintenance period with legally approved fungicides and herbicides. Replace any damaged or infected grass.

D. Weed Control:
   1. Control broad leaf weeds with selective, legally approved herbicides throughout maintenance period.
   2. A final application of selective herbicide shall be applied at the end of the landscape maintenance period, acceptance, just prior to final acceptance.
   3. Hand weed as required in addition to the application of weed control herbicides and pre-emergent to maintain all areas free of weeds including turf species other than the specified species. Periodic or predetermined weeding schedules may not be adequate and should be supplemented.

E. Fertilization:
   1. During maintenance period an application of turf maintenance fertilizer, as specified, shall be made at thirty (30) day intervals from the date of maintenance period start at a rate of five (5) pounds per 1,000 square feet, and as required by the agronomic soils report.
   2. Final application (just prior to final acceptance) shall be made with the slow-release maintenance fertilizer as required by the agronomic soils report.

3. Replacement: At conclusion of maintenance period a final observation of lawn and turf areas shall be made. Remove diseased areas and unhealthy strands of grass from the site; do not bury into the soil. Replant areas with material and in a manner as specified on the Plans and Specifications at no additional cost to the Owner. All grass is to be fully grown with 100% coverage with a suitable thatch layer prior to turnover and final acceptance.

F. Arborist: Provide a written report and recommendations as required by the landscape architect if any plant material is in the sole opinion of the landscape architect, declining, stressed, infested, or otherwise not growing at the anticipated growth rate. The report is to include Agronomic Soils Test Data and recommendations and be provided at no cost to the owner.

3.03 IRRIGATION SYSTEM

A. System Observation: The Contractor shall check all systems for proper operation. Lateral lines shall be flushed out after removing the last sprinkler head or two at each end of the lateral. All heads are to be adjusted as necessary for unimpeded head to head coverage.

B. Valves: Contractor shall set, and verify that all pressure regulating valves to the operating pressure specified on the drawings.

C. Controllers: Set and program automatic controllers for seasonal water requirements. Give the Owner's Representative instructions on how to turn off system in case of emergency.

D. If the irrigation system is designed and specified to be operable from a central irrigation computer controller located off site, or a standard controller on site. The contractor shall demonstrate to Landscape Architect, Owner's Representative and future maintenance contractor that the central irrigation system is fully installed and operational from this off site control system as described and specified. Contractor shall make all adjustments as necessary to insure this operation prior to final acceptance.

E. Contractor shall set up and coordinate training for the Maintenance Contractor (Provider) on the irrigation controller, and pump with the manufactures representative. Maintenance period shall not end, and the project will not be accepted until this training has been completed.

F. Repairs: Repair all damages to irrigation system at the Contractor's expense. Repairs shall be made within twenty-four (24) hours or sooner to prevent damage to site improvements.

3.04 CLEANING

A. During maintenance work, keep pavements clean and work area in an orderly condition. Haul away and remove all debris from landscape areas, and do not leave any clippings, fertilizer, amendments and / or other material from landscape planting and/or maintenance period.

B. Powerwash all pavement and flatwork as necessary to remove all staining and tire marks on surfaces caused by maintenance or construction vehicles, prior to final acceptance.

END OF SECTION

SECTION 32 11 20
SUBBASE AND AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading.
B. Section 31 23 16.13 - Trenching.
C. Section 31 23 23 - Fill.

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil–Aggregate Subbase, Base, and Surface Courses; 2017 (Reapproved 2021).
B. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2022, with Errata .
C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
E. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.
F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)); 2012 (Reapproved 2021).
G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017, with Editorial Revision (2020).
I. ASTM D3665 - Standard Practice for Random Sampling of Construction Materials; 2024.
J. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).
K. ASTM D5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test; 2020.
L. ASTM D6693/D6693M - Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes; 2025.
M. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Base Course:
   1. Type Class 2 aggregate base, 3/4-inch maximum size : Comply with State of California Highway Department (CALTRANS) standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, and gradients and elevations are correct and dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and recompacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

C. Grade excavated and filled substrate; see Section 31 22 00.

D. Backfill and compact trench excavations; see Section 31 23 16.13.

E. Backfill and compact subgrade fill; see Section 31 23 23.

3.03 PLACEMENT

A. Under Bituminous Concrete Paving:
   1. Aggregate Base Compacted Thickness: According to contract drawings.

B. Under Portland Cement Concrete Paving:
   1. Aggregate Base Compacted Thickness: According to contract drawings.

C. Place course in maximum 4 inch layers and roller compact to specified density.

D. Level and contour surfaces to elevations and gradients indicated.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Variation From Design Elevation: Within 1/2 inch.

B. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.

C. Scheduled Compacted Thickness: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Subbase Compaction Density Testing: In accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

C. Aggregate Base Compaction Density Testing: In accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

D. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").

E. Frequency of Tests: In accordance with ASTM D3665.

F. Remove, replace, and retest work that does not meet specified requirements.

G. Proof roll compacted aggregate at surfaces going underneath flexible paving.

3.06 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Stockpile unused materials neat and compact.

C. Remove unused materials and grade areas to prevent standing surface water.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single course bituminous concrete paving.

B. Surface sealer.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of site for paving and base.

B. Section 32 11 23 - Aggregate Base Courses: Aggregate base course.

C. Section 32 13 13 - Concrete Paving: Concrete substrate.

D. Section 32 13 13 - Concrete Paving: Concrete curbs.

E. Section 321723 - Pavement Markings

F. Project Geotechnical Report.

1.03 REFERENCE STANDARDS

A. AI MS-2 - Asphalt Mix Design Methods; 2015.

B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

D. ASTM D3549 Standard Test Method for Thickness of Height of Compacted Asphalt Mixture Specimens (2018).

E. ASTM D2950 Standard Test Method of Density of Bituminous Concrete in Place by Nuclear Methods (2020).

F. California Department of Transportation Standard Specifications; current edition.

G. Standard Specifications for Public Works Construction (SSPWC,Greenbook); current edition.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with Standard Specifications for Public Works Construction (SSPWC) and the California Department of Transportation (Caltrans), latest editions and supplements for asphalt paving work.

B. Obtain materials from same source throughout.

1.05 **SUBMITTALS**

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1.06 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 50 degrees Fahrenheit and rising, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Concrete: Type A 1/2-inch hot mix asphalt (HMA) per Caltrans Standard Specifications, Division 39 Asphalt Concrete.

B. Aggregate Base Course: Section 321123.

C. Slurry Seal: Per Caltrans Standard Specifications, Division 37-3 Slurry Seals.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Parking lots including drive aisles and parking spaces:
   1. Type A HMA, 1/2-inch aggregate, PG 64-10 binder.

B. Playgrounds/Hardcourts/Playcourts.
   1. Type A HMA, 1/2-inch aggregate, PG 64-10 binder.

C. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 AGGREGATE BASE COURSE

A. See Section 32 11 23.

3.03 PREPARATION - TACK COAT

A. Apply tack coat in accordance with Caltrans Standard Specifications requirements.

B. Apply tack coat to existing pavement including planed surfaces, between hot mix asphalt layers, and to vertical surfaces of curbs, gutters, construction joints and milled pavements.

3.04 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install work in accordance with Caltrans Standard Specifications.

B. Place asphalt within 24 hours of applying primer or tack coat.

C. Place to a maximum thickness per Caltrans Standard Specifications.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.05 SEAL COAT

A. Apply seal coat to asphalt surface course and asphalt curbs in accordance with Caltrans Standard Specifications.

3.06 SLURRY SEAL

A. Apply slurry seal to asphalt surfaces as shown in the contract drawings, and in accordance with Caltrans Standard Specifications.

3.07 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.08 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for quality control.

B. Provide final surfaces of uniform texture, conforming to required grades and cross sections.
   1. Test in-place asphalt concrete courses for compliance with requirement for density, thickness, and surface smoothness.
      a. Density:
         1) Field test density of compacted asphalt surface course shall be determined by a properly calibrated nuclear test gage in accordance with ASTM D2950.
      b. Thickness:
         1) Thickness of compacted paving shall conform to ASTM D3549 based on core test.
         2) In-place compacted thicknessess shall conform to the dimensions indicated on the contract drawings. Variation from indicated thicknesses shall not exceed plus-or-minus 1/4-inch.

C. Flood Testing
   1. Flood Test: Before acceptance, all pavements in the presence of the project inspector shall be water tested to ensure proper drainage. The contractor shall provide water for this purpose. The flooding shall be conducted with a water tank truck. Depressions where the water ponds to a depth of more than 1/8-inch shall be filled or the slope corrected to provide proper drainage. The edges of the fill shall be feathered and smoothed so that the joint between the fill and the original surface is invisible. No standing water shall remain 1-hour after test.

3.09 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Curbs and gutters.
B. Walks.
C. Stairs and ramps.
D. Mow strips.
E. Wheel stops.
F. Pavement marking paint.
G. Detectable warnings.

1.02 RELATED REQUIREMENTS

A. Divison 00 Section Available Project Information (Geotechnical Report)
B. Division 03 Section Cast-in-Place Concrete
C. Division 05 Section Metal Fabrications
D. Division 05 Section Pipe and Tube Railings.
E. Division 05 Section Decorative Metal Railings
F. Division 31 Section Grading
G. Division 32 Section Architectural Site Concrete
H. Division 32 Section Concrete Paving Joint Sealants
I. Division 32 Section Chain Link Fences and Gates

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: Fly ash and other pozzolans, and ground granulated blast-furnace slag, subject to compliance with requirements.

1.04 PREINSTALLATION CONFERENCE

A. Conduct conference at Project site two weeks prior to start of work of this section. Required attendance of all affected installers.
    1. Review methods and procedures related to concrete paving, including but not limited to, the following:
    2. Concrete mixture design
    3. Testing and inspection procedures.
    4. Concrete finishes and finishing.
    5. Cold- and hot-weather concreting procedures.
    6. Curing procedures.
    7. Construction joints.
    8. Forms and form-removal limitations.

9. Reinforcement accessory installation.
10. Concrete repair procedures.
11. Protection of cast-in-place architectural site concrete.
12. Review special testing and inspection procedures.
13. Placement sequence and schedule.
14. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
    a. Contractor's superintendent.
    b. Ready-mix concrete manufacturer.
    c. Concrete paving subcontractor.
    d. District's or Client's Representative
    e. Architect's Representative
    f. Inspector of Record
    g. Provide meeting minutes for pre-installation conference

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Proprietary admixtures, pigments, curing compounds, hardeners, sealers, form-release agents, etc.: Indicate compatibility with other materials used.
   2. Stenciling material

B. LEED Submittals:
   1. Product Data for Credit MR credit 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.

C. Samples for Initial Selection: For each type of product, finish, ingredient, or admixture requiring color selection.
   1. Submit full range of manufacturer’s standard and custom range of colors and products for review and selection. Provide custom colors on samples as required. Upon selection of color, submit 12”x12” sample of material in the specified color finish for review by Landscape Architect in addition to the specified mock ups.
   2. Stencil Shop Drawing submittal to Architect for approval is required before mock up work for stenciling is to begin.
   3. Wheel Stops: 6 - 7 inches wide in cross section; with fasteners.
   4. Preformed Traffic-Calming Devices: 6 inches long showing cross section; with fasteners.

D. Design Mixtures: Submit proposed mix designs and test data for each class of concrete and for each method of placement.
   1. Prepare mix designs on the basis of field experience (preferred) and/or trial mixes, in compliance with California Building Code (CBC), Chapter 1903A.
   2. Mix designs shall be prepared, stamped and signed by a structural or civil engineer registered in the State of California.
      a. Mix designs shall be reviewed by the Architect (AOR) and Structural Engineer of Record (SEOR).
   3. Identify for each mix design submitted the method by which proportions have been selected.
      a. For mix designs based on trial mixtures, include trial mix proportions, test results, graphical analysis and show required average compressive strength f'c results. Provide gross weight and yield per cubic yard of trial mixes.
      b. Indicate quantity of each ingredient per cubic yard of concrete and percentages.
      c. Indicate type and quantity of admixtures proposed or required.
      d. Indicate water to cement ratio by weight.

e. Measured slump.
f. Measured air content.
g. Provide shrinkage test results.

4. Multiple mix designs or multiple manufacturers shall not be permitted for the same application.

E. Provide maximum 5% fly ash; ground granulated blast-furnace slag, and/or silica fume content as Portland cement replacement in all concrete.

F. Submit proposed alternate design mixtures for review by the Architect and SEOR when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

G. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Shop drawings should include details such as reveals, recessed lights, handrails, or other elements requiring steel coordination.
1. Coordinate with and identify the details of the Contract Drawings on the shop drawings.
2. Comply with ACI 315, part B and CRSI requirements.

H. Construction Joint Layout: Indicate proposed construction joints required to construct the structure. Submit dimensioned drawing indicating layout of construction joints, contraction (control) joints, dowelled joints, decorative scoring and placement sequence of concrete if different than layout indicated on plans.
1. Location of construction joints are subject to approval of the Architect.
2. All form seams are to align with construction joints or reveals.

I. Placement Schedule: Submit concrete placement schedule before start of placement operations. Include locations of all joints including construction joints.

J. Pavement-Marking Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

K. Stencil Shop Drawings: Indicate size, font, height, length, of each required image or text. Drawings shall reflect a plan, which denotes the location of the stenciled image or text.

L. Qualification Data: For qualified ready-mix concrete manufacturer (batch plant) and installer of detectable warnings.

M. Welding Certificates: Submit certifications signed by AWS Certified Welding Inspector of prequalified welding procedures, qualifications of welding procedures unless prequalified, qualifications of welding operators and qualifications of welders.

N. Material Certificates: For the following, submit manufacturer data, test results, and technical information for aggregate, sand and cement, submit ½ cubic foot physical sample. For sealant submit manufacturer color standard and custom palette together with physical samples:
1. Cementitious materials.
2. Aggregates and sand.
3. Steel reinforcement and reinforcement accessories.
4. Fiber reinforcement.
5. Admixtures.
6. Curing compounds.
7. Applied finish materials.
8. Bonding agent and epoxy adhesives.
9. Joint fillers.
10. Sealer
11. Sealant.

12. Pigments.

O. Material Test Reports: For each of the following:
   1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

P. Detectable Warning Device Warranty: Submit copies of manufacture's five year warranty for each of these products and manufacturer custom and standard color palette.

Q. Field quality-control reports.
   1. Submit copies of delivery tickets complying with ASTM C 94 for each load of concrete delivered to the site. Tickets shall include all information required by the referenced standard.

R. Minutes of pre-installation conference.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with CBC Chapter 19A.
   1. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.
   2. Comply with requirements of local, State and other authorities having jurisdiction for work performed within public right-of ways.

B. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.

C. Comply with requirements of local, State and other authorities having jurisdiction for work performed within public right-of ways.

D. Industry Standards: Comply with the following unless modified by requirements in the Contract Documents.(Plans and specifications)
   1. ACI 301, "Specifications for Structural Concrete".
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
   3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction".
   4. ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete".
   5. ACI 305R, "Hot Weather Concreting".
   6. ACI 306.1, "Standard Specification for Cold Weather Concreting".
   7. ACI 318, "Building Code Requirements for Structural Concrete".
   8. ACI 347, "Guide to Formwork for Concrete".
   9. ACI SP-66, "ACI Detailing Manual".
   10. CRSI, "Manual of Standard Practice".
   11. CRSI, "Placing Reinforcing Bars".

E. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of cast-in-place, surface-applied unit-paver-type detectable truncated dome products.

F. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

G. Source Limitations for Concrete Paving: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties. Secure all material required for the duration of the project as needed to ensure consistent quality in appearance.

H. Welding Qualifications: Comply with CBC Chapter 17A.

1. Qualify welding procedures and welding personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel" prior to performing any welding.
2. Qualify welding inspection personnel according to AWS QC1, "Standard for AWS Certification of Welding Inspectors."

I. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

J. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

K. ACI Publications: Comply with ACI 301 unless otherwise indicated.

L. Mockups: Before casting concrete paving, build mockups to verify selections made under Sample submittals and to fully demonstrate typical joints (including expansion and saw cut joints), surface finish, texture, color tolerances, standard of workmanship and completed product. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
    a. Paving Modules: Construct at least one 4 ft. x 4 ft. mockup of each color, finish, and mix design of special paving module, including stenciled areas, banding and curbs
    b. Radial Paving Patterns: Construct at least one 180 sq. ft. mockup of curved or radial paving patterns.
    c. Mow Strip: minimum 6’ long for each specified width and color.
    d. Stenciled Letters or Graphics: minimum 4 letters and one full size graphic for each size, font setting and finish. Mock up to be set on concrete pavement or wall matching conditions of final install.
2. Build mockups full-size, matching site concrete components indicated on the Drawings. Mock-ups shall be complete in every detail, including joints, reveals, edges, chamfers, etc. Include complex joinery conditions where necessary to integrate to other Project components as indicated including multiple pour conditions. Mockups should be provided for each finish, color, joint and detail specified.
3. Maintain accurate records of variables associated with each mockup to facilitate the matching of accepted mockups during actual construction.
4. Demonstrate curing, cleaning, and protecting of cast-in-place concrete paving, finishes, and contraction and expansion joints, as applicable.
5. Mockup Acceptance: Obtain Architect's approval of mockups before casting architectural site concrete and paving.
    a. The Architect may reject mockups that, in the Architect's sole judgment, do not demonstrate an acceptable completed product, including, but not limited to, color, joint work, surface finish, texture, tolerances, and standard of workmanship
    b. The Architect may require removal and reconstruction of mockups to obtain acceptable results. Multiple mock ups maybe required.
    c. Contractor shall provide additional mockups as required to obtain results acceptable to the Architect at no additional cost to the Owner.
6. Mockup Disposition: Accepted mockups shall not become part of the completed Project. Maintain mockup onsite for the duration of construction and until all work has been accepted. Remove and legally dispose mockups after acceptance of final installed work. prior to Project Completion. If sufficient permanent concrete paving work has been completed, Contractor may submit a written request to Architect to transfer quality control for concrete paving from the accepted mockups to one or more designated portions of the permanent work.
7. Provide written meeting minutes for each mock up review indicating items reviewed, approvals, rejections, connections, or other action items.

1.07 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending, damage, and rust.
   1. Label bundles with durable identification tags. Maintain reinforcement identification after bundles are broken.
   2. Store reinforcement to avoid excessive rusting or fouling with grease, oil, dirt or other bond-weakening contaminants.
   3. Avoid damaging applied coatings, if any, on steel reinforcement.

PART 2 - PRODUCTS

2.01 FORMS

A. Formwork: / Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth surfaces.
   1. Set forms to alignment, grade and required dimensions. Formwork shall not deviate more than 1/4 inch from required vertical positions and 1/4 inch from required horizontal positions. Exposed Surfaces: Provide faced plywood panels complying with, or equivalent to, DOC PS 1, Structural I. Provide minimum 7-ply plywood and provide balance sheets for panels coated one-side only. Furnish in largest practicable sizes to minimize number of joints. Provide Medium-Density Overlay (MDO) panels or high density overlay (HDO) panels, with mill-applied release agent and edge sealant. Provide one of the following panels, or comparable substituted product:
      a. Olympic Panel Products, "B-Matte 333 MDO Concrete Form." Overlay Color: Brown.
      b. Pacific Laminate Products, "ProFace MDO." Overlay Color: Black.
      c. Sylvan Products, LLC, "Armor Ply MDO" Overlay Color: Brown.
   2. Hold forms rigidly in place by stakes, clamps, spreaders, and braces at 3 feet on centers, and where required to ensure rigidity.
   3. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
   4. Place joint filler or backer rod on vertical surfaces in contact with concrete paving.
   5. Benders or thin plank forms may be used on curves, grade changes, or curb returns. Back forms for curb returns may be made of ½-inch thick benders cleated together for full depth of the curb.
   6. Keep forms in place until concrete is sufficiently hard to prevent damage to concrete.
   7. Reuse of Forms:
      a. Do not reuse forms if there is any evidence of surface wear or defect which would impair quality of surface or edge.
      b. Thoroughly clean and properly coat forms before reuse.
      c. Do not use forms from previous projects.
   8. Provide new forms specifically purchased for this project. Reuse of forms from past projects or contractors stock will not be accepted.

B. Curved Work: Kerf back of plywood form-facing panels, or use accepted flexible or curved forms for curved work with a radius of 100 feet or less.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
   1. Obtain written acceptance of form release agent from integral colored concrete pigment manufacturer.
   2. Form-release agents shall be non-staining and can cause no visual effect to the finish.
   3. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.02 STEEL REINFORCEMENT

A. Recycled Content: Provide steel reinforcement with an average recycled content of steel so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 60 percent.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.

E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

F. Low-Alloy-Steel Reinforcing Bars (for Welding): ASTM A 706/A 706M, Grade 60, deformed, unless otherwise indicated.

G. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
   1. Provide two-component "Speed Dowel System" manufactured by Greenstreak.

H. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

I. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

J. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

K. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

L. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

M. Zinc Repair Material: ASTM A 780.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C 150, Type II/V, Type I/II or Type IV, gray, unless white cement is required to achieve colors indicated.
      a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, complying with building code. Provide aggregates from a single source. All aggregates shall be free of materials with deleterious reactivity to alkali in cement when tested in accordance with ASTM C 289.
   1. Comply with CBC section 1903A.
   2. Maximum Coarse-Aggregate Size: 3/8 inch nominal.
      a. Source: Reliance, Vulcan, San Gabriel, or Carrol Canyon
      b. Hard rock mix; no pea gravel will be accepted.
   3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
      a. Source: Reliance, Foster, Corona
      b. Color to be white to light no dark material.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Shrinkage-Reducing Admixture: Commercially formulated, shrinkage inhibitor capable of reducing initial shrinkage by 80% and long-term shrinkage by 50%. Provide product suitable for use with either air-entrained or non-air-entrained concrete as appropriate to structural member and project location.
   1. Products: Subject to compliance with requirements, provide the following(as required):
      a. Meet ASTM C494 requirements
         1) Euclid Chemical Company (The), an RPM company; EUCON SRA, SRA+.
         2) Grace Construction Products, W. R. Grace & Co.; Eclipse Floor, Eclipse Plus.
         3) Sika Corporation; Control 40.

2.04 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry or cotton mats.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete. Provide products with not more than 100g/L volatile organic content.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. BASF Construction Chemicals, LLC; Confirm.
      b. Conspec by Dayton Superior; Aquafilm.
      c. Nox-Crete Products Group; MONOFILM.

E. Clear, Waterborne, Membrane-Forming Curing Compound (Colored Concrete): Provide products that are acceptable to concrete color pigment manufacturer complying with ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of sealers with no glossy finish and compatible with specified sealer. Provide products with not more than 100g/L volatile organic content.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Sinak Corporation; The Cure WCE or Lithium Cure 1000.
      b. L. M. Scofield; Cureseal-W.
      c. Butterfield Color; Clear Guard H2O.

F. All curing materials should be dissipating without leaving a shiny, cloudy, or glossy finish. Curing material does not substitute requirement of a sealer.

2.05 STENCIL MATERIALS

A. Stencils: Manufacturer's standard, moisture-resistant paper or reusable plastic stencils, designed for use on plastic concrete.

B. Stencils: Manufacturer's standard, moisture-resistant paper or reusable plastic stencils, designed for use on concrete.

C. Shop drawings for all stencils.

D. Products: Subject to compliance with requirements.

2.06 HARDENERS AND SEALERS

A. Penetrating Liquid Floor and Horizontal Surface Treatment (Sealer): Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate water-based lithium quartz materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces. Materials hsall be compatible with concrete admixtures and shall be recommended by manufacturer for intended use. Provide product with 0g/L volatile organic content.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Sinak Corporation; Concrete Sealer HLQ 125.
      b. L. M. Scofield; Cureseal-W.
      c. L&M Construction Chemicals, Inc.; Seal Hard.

2.07 AGGREGATE BASE

A. Granular Fill: Class II crushed aggregate per Section 26 of Cal-Trans standards. Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm), 20 to 10 / 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 0-5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.08 RELATED MATERIALS

A. Joint Fillers:
   1. Ceramar by W.R. Meadows. A closed cell isomeric polymer synthetic foam ASTM D 5249, Type 2 .
   2. Deck-O-Foam polyethylene by W.R. Meadows. A closed cell expansion joint fille ASTM D 4819
   3. Asphalt-saturated cellulosic fiber in preformed strips, ASTM D 1751
   4. 1/4" thickness.

B. Bonding Agent: ASTM C 1059, Type II, non-re-emulsifiable. Provide proprietary products composed of latex polymers.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. W. R. Meadows, Inc.; “Acry-Lok”.
      b. Grace Construction Products, W. R. Grace & Co.; "Daraweld C".
      c. Larsen Products Corp., "Weld-Crete".

C. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
   1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete, and for anchoring dowels to hardened concrete.

2.09 DETECTABLE WARNING MATERIALS

A. General: All detectable warning systems shall comply with Americans with Disabilities Act (28 CFR Part 36 ADA Standards for Accessible Design, Appendix A, Section 4.29.2 Detectable Warnings on Walking Surfaces), and CBC requirements (Section 11B-24, 11B-705 and others). All detectable warning materials shall have raised truncated domes with a base diameter of nominal 0.90 inch (22.9 mm), tapering to a top diameter of 0.45 inch (11.4 mm),a height of nominal 0.20 inch (5.08 mm), and a center-to-center spacing of 2.35 inches (59.7 mm) nominal. The orientation of the dome pattern for all panels shall be parallel with the panel edges. Detectable warning materials shall visually contrast with surrounding areas.
   1. California Compliance Warranty: All detectable warning systems shall be approved by DSA-AC. If not approved, DSA will accept a written five (5) year product warranty provided by the manufacturer of detectable warning products and directional surfaces. Such warranty shall indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicate that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five (5) years after initial installation. As defined by the State, "not degrade significantly" means that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.

B. Concrete Paver Detectable Dome Warning System: Provide standard size precast architectural concrete paving units for installation in sand or mortar beds.
   1. Basis-of Design Product: Provide the following, or comparable substitute product:
      a. Wausau - ADA-2 Truncated dome pavers.
         1) 12 inches by 12 inches, with 2 3/8 inches thickness.
         2) Color A-40 Yellow (Federal Yellow No. 33538)

2.10 PAVEMENT MARKINGS

A. Color: [As indicated].

B. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.
   1. Color: White, green, unless otherwise indicated. Use for non-accessible striping, directional arrows, numbering, and lettering.
   2. Accessibility Color: Paint accessibility lines and markings blue color equal to Color No. 15090 per Federal Specification 595C.

2.11 WHEEL STOPS

A. Wheel Stops: Precast, air-entrained concrete, 3000 to 4000 -psi minimum compressive strength, 5-1/2 to 6 inches high by 6 to 7 inches wide by 48 inches long at singles stalls and 72 to 96 inches long at shared stalls. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
   1. Dowels: Galvanized steel or rebar, 1/2 inch in diameter, 18-inch minimum length.

2.12 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
   2. Proportioning:

a. The proportioning of ingredients shall be such that the concrete can be readily worked into forms and around reinforcement under the conditions of placement to be used, without segregation or excessive bleeding.
b. When proportioning by weight of loose, dry material, 94 pounds of cement shall be considered 1 cubic foot.
1) Float/Broom Finish: Coarse aggregate 50 percent-50 percent fine aggregate.
c. Total water content shall not exceed 35 gallons per cubic yard of concrete.
d. Weighing equipment shall be accurate within 1 pound and shall be adjustable for varying aggregate moisture content.
e. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.

3. Prepare compressive strength data for both 7-day and 28-day strengths.
a. The 7-day compressive strength shall be at least 60 percent of the required 28- day strength.
b. The 28-day compressive strength shall be as indicated.
c. Provide drying shrinkage test data at 28 days, from not less than 3 test specimens.

B. Proportion mixtures to provide normal-weight concrete with the following properties:
1. Typical Compressive Strength (28 Days): Provide the following minimum compressive strength (28 days) for concrete paving unless otherwise indicated: 3000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50-0.60.
3. Slump Limit: 4 inches, plus or minus 1 inch, unless indicated otherwise.
a. Slump Limit (High-Range Water-reducing Admixture): 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture, plus or minus 1 inch, unless indicated otherwise.

C. Air Content, Exterior Exposed Concrete: Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having the following air entrainment for all exposed concrete with a weathering probability of severe or moderate per ACI-318-19, ACI 305R, and ACI 306R.
1. Provide air entrainment of 6.0 percent, plus or minus 1.5 percent at point of delivery for 1-inch and 3/4-inch nominal maximum aggregate size, if required unless indicated otherwise.

D. Limit "drying shrinkage" after 28 days of curing hardened concrete to 0.045 percent of the original concrete volume.

E. Limit water-soluble, chloride-ion content in hardened concrete to [0.15] [0.30] [1.00] percent by weight of cement.

F. Chemical Admixtures: Admixtures may only be used if they are incorporated into the accepted concrete mix designs. Use admixtures according to manufacturer's written instructions.
1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
2. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
3. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M [or ASTM C 1116/C 1116M when fiber reinforcement is used]. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg. F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg. F (32 deg. C), reduce mixing and delivery time to 60 minutes.

B. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Grading."

C. Proceed with concrete paving installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

C. Slope stair and step treads at not less than 1.0 percent and not more than 2.0 percent cross slope to drain.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.05 JOINTS

A. General: Form construction, isolation or expansion joint, and saw cut / contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
   1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Isolation (Expansion) Expansion Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
   1. Locate expansion joints at intervals of 20 feet maximum unless otherwise indicated.
   2. Extend joint fillers full width and depth of joint and recess 1 inch from finish surface where no joint sealant is indicated.
   3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
   4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
   5. Break steel at expansion joints.
   6. Dowels- provide prefabricated ‘speed dowel’ assemblies.

C. Saw Cut (Control) Joints: Form weakened-plane saw cut joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth plus 1/4 inch of the concrete thickness, as follows, and to match jointing of existing adjacent concrete paving:
   1. Continue steel reinforcement across sawcut joints unless otherwise indicated.

D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/8-inch radius unless otherwise noted. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.06 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in. Notify other trades as necessary to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, and side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
   1. When air temperature has fallen to or is expected to fall below 40 deg. F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg. F (10 deg C) and not more than 80 deg. F (27 deg C) at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

M. Hot-Weather Placement: Comply with ACI 305R (ACI 305R M) and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 deg. F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

N. Provide sand and base materials as indicated.

3.07 **FLOAT/BROOM FINISHING**

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
   2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture. Required to meet slip coefficient requirement.
   3. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with **CBCSections 11B-302** and **11B-403**.

3.08 DETECTABLE WARNINGS

A. Detectable Warnings, General: Install detectable warnings as part of the concrete paving placement sequence. Set true to line and elevation. Comply with maximum slope and cross-slope requirements for accessible walkways.

1. Blockouts: Form blockouts in concrete and asphalt pavements for installation of detectable paving units.
   a. Tolerance for Opening Size: Plus 1/4 inch, no minus.

B. Detectable warnings surfaces shall comply with **CBC Section 11B-705.1.**

C. Detectable warning surfaces shall be yellow conforming to **FS 33538 of Federal Standard 595C,** except for locations at curb ramps, islands, or cut through medians where color used shall contrast visually with that of adjacent walking surfaces, either light-on-dark or dark-on-light. **CBC Sections 11B-705.1.1.3 and 11B-705.1.1.5.**

D. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. **CBC Section 11B-705.1.1.4.**

E. Provide 5 year minimum warranty per **DSA Bulletin 10/31/02, revised 04/09/08.**

F. Precast Concrete Detectable Warning Tiles: Comply with approved plans and details along with manufacturer's written instructions.

3.09 CONCRETE PROTECTION, CURING AND SEALING:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306R for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

F. Seal Concrete: Apply specified sealer in accordance with manufacturer’s recommendations.
   1. Apply full strength in two coats with airless sprayer at the manufacturer’s recommended rate.
   2. After the first coat is completely dry, apply second coat at right angles to the first coat.

3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117, the Americans with Disabilities Act, the CBC and as follows:
   1. Elevation: 1/8 inch.
   2. Thickness: Plus 3/8 inch, minus 1/4 inch.

3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/8 inch. Surface must properly drain.
4. Surface Discontinuities: Maximum 1/4 inch, subject to further limitations of accessible routes.
5. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
6. Lateral Alignment and Spacing of Dowels: 1/4 inch.
7. Vertical Alignment of Dowels: 1/8 inch.
8. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/8 inch per 12 inches of dowel.
9. Joint Spacing: 3 inches, except joint position shall be within 1/4 inch of objects in alignment with joint such as benches, light poles, pull boxes, etc.
10. Sawcut Joint Depth: Plus 1/4 inch, no minus.
11. Joint Width: Plus 1/16 inch, no minus.

B. Ramps: Ramps shall shed water away from the path of travel. Maximum ramp slope in direction of travel: 8.33 percent. Maximum ramp cross-slope perpendicular to direction of travel: 1.8 percent, plus 0.2 percent, minus 1.0 percent or as required to shed water.

3.11 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils. Provide markings with a minimum width of 3 inches.
1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb./gal.

E. Accessible parking spaces serving a particular building or facility shall be located, and dispersed if serving more than one accessible entrance, on the shortest accessible routes to an entrance or to mulitple accessible entrances. **CBC Section 11B-208.3.1.**

F. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. **CBC Section 11B-208.3.1.**

G. Minimum number of required accessible parkng spaces shall be provided in accordance with **CBC Table 11B-208.2** for each parking facility provided.

H. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. **CBC Section 11B-208.3.1.**

I. Accessible parking spaces and access aisles shall comply with **CBC Section 11B-502** and shall be dimensioned to the cenerlines of the marked lines as follows:
1. Parking spaces and access aisles shall be mareked according to **CBC figures 11B-502.2, 11B-502.3, and 11B-502.3.3**. Their surfaces shall comply with **CBC Section 11B-302** and shall be at the same level with the slopes not steeper than 1:48 in any direction. **CBC Section 11B-502.4.**

2. Parking spaces shall be 9'x18' minimum and van parking spaces shall be 12'x18' minimum with an adjacent access aisle of 5'x18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9'x18' minimum where the access aisle is 8'x18' minimum.
3. Access aisles shall be marked by a blue painted borderline around their perimeter. The areas within the blue borderlines shall be mareked with hatched lines a maxiumum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum requied length. **CBC Section 11B-502.3.3**
4. Access aisles(parking spaces as well- similar application) shall not overlap the vehicular way. **CBC Section 11B-502.3.4**
5. A verticle clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. **CBC Section 11B-502.5**

J. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with **CBC Section 11B-209 and 11B-503** as follows:
1. Vehicle pull-up spaces shall be 8' x 20' minimum. Access aisles shall be 5' x 20' minimum and shall be adjacent and parallel to the vehicular pull-up spaces. They shall be the same level with slopes not steeper than 1:48 in any direction. **CBC Section 11B-503.4.**
2. Access aisles for passenger drop-off and loading zones shall be marked with a painted borderlines around their perimeter. The areas within the borderlines shall be marked with hatched lines a maxiumum of 36" on center in a color contrasting with that of the aisle surface. **CBC Section 11B-503.3.**
3. A vertical clearance of 9'-6" minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. **CBC Section 11B-503.5.**

3.12 WHEEL STOPS

A. Securely attach wheel stops to paving with not less than two #4 galvanized steel dowels or rebar, minimum 18 inches long, located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 20 cu. Yd., or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg. F and below and when it is 80 deg. F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Owner, Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.14 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, cracked, chipped, stained or defective or that does not comply with requirements in this Section as determined by Landscape Architect. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude all but pedestrian traffic from paving for at least 28 days after placement. When construction traffic is permitted, maintain paving as clean as possible by providing adequate surface protection and by removing surface stains and spillage of materials as they occur.
    1. Rubber tire marks are unacceptable in the completed construction.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Project Completion inspections.

E. Repair of damaged, defective or rejected concrete is not permitted. Remove all concrete from expansion joint to expansion joint or greater as required to provide a constant continuous finish.

3.15 FINAL CLEANING

A. Remove all excess concrete, form materials, over pours, waste, etc., and legally dispose off-site.

B. Provide a final acid and power wash for all concrete paving surfaces. Do not use any material that will affect the appearance of the concrete.

C. All over pours in planting areas should be removed prior to landscape operations.

D. Clean concrete paving to remove stains, markings, dust, and debris.

END OF SECTION

SECTION 32 13 73
PAVEMENT JOINT SEALERS

PART 1 - GENERAL

1.01 SECTION INCLUDES: RELATED DOCUMENTS

A. Exterior joint sealant for non-traffic surfaces.

1.02 RELATED REQUIREMENTS

A. Division 32 Section Concrete Paving.

1.03 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- (13-mm-), and 1/4-inch (6.4-mm) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

D. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

B. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

C. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

D. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

E. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

F. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

B. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).

C. When joint substrates are wet or covered with frost.

D. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

E. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Landscape Architect from manufacturer's full range.

2.03 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Multicomponent Pourable Urethane Sealant (Sealant #1):
   1. Available Products:
      a. Pecora Corporation; Urexpan NR-200.
      b. Sika Corporation, Inc.; Sikaflex - 2c SL.
   2. Type and Grade: M (multicomponent) and P (pourable).
   3. Class: 25.
   4. Use Related to Exposure: T (traffic).
   5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

D. Multicomponent Nonsag Urethane (Sealant #2):
   1. Available Products:
      a. Pecora Corporation; Dynatred.
      b. Sika Corporation, Inc.; Sikaflex - 2c NS
   2. Type and Grade: M (multicomponent) and NS (nonsag).
   3. Class: 25.
   4. Use Related to Exposure: T (traffic).

5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

2.04 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.05 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of backer materials.
   2. Do not stretch, twist, puncture, or tear backer materials.
   3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

F. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

3.06 SCHEDULE

A. Horizontal Joints, less than 5 percent slope; Sealant No. 1.

B. Horizontal Joints, grades steeper than 5 percent; Sealant No. 2

C. Vertical Joints; Sealant No. 2

END OF SECTION

SECTION 32 17 40
STREETBOND SB150 (FLAT SURFACE)

PART 1 - GENERAL

1.01 DESCRIPTION

A. StreetBond® Advanced Coatings for Asphalt are specifically formulated for application to asphalt pavement and have been confirmed by a certified testing facility to possess a balance of performance properties for a durable and color-fast finish.

B. A variety of StreetBond® coating colors are available. Please refer to gaf.com to view these. Custom colors are available upon request.

C. Certain colors of the StreetBond® coatings have been independently verified to have an SRI greater than 29 and therefore can help projects qualify for points in the LEED® program under Heat Island Effect: Non-Roof. Please refer to gaf.com for further information.

D. Qualifications. Only Accredited StreetBond® Applicators may bid for and perform the imprinted portion of this work. Please refer to Section 1.03 DEFINITIONS.

E. StreetBond® products are manufactured in ISO 9001:2008 / ISO 14001:2004 facilities to ensure quality products produced in legally-responsible and environmentally-

F. conscious manner

G. StreetBond® coatings are only available from GAF.

1.02 REFERENCES

A. A. ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester.

B. B. ASTM D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

C. C. ASTM D2697 Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings.

D. D. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings.

E. E. ASTM D1653 Standard Test Method for water vapor transmission through organic film coatings.

F. F. ASTM G154 QUV Accelerated Weathering Environment. Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

G. G. ASTM D2369 Weight Solids Standard test method for Volatile Content of Coatings.

H. H. ASTM D1475 Standard Test Method for Density of Paint, Varnish, Lacquer, Other related products

I. I. ASTM D2240 (2000) Standard Test Method for Rubber property - Durometer hardness.

J. J. ASTM D5895 Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders.

K. K. ASTM D570 Standard Test Method for water absorption of plastics.

1.03 DEFINITIONS

A. “Accredited StreetBond® Applicator” has valid Certification for both Textured (stamped) and Non - Textured (flatwork) as offered by GAF and are reviewed on an annual basis. All Accredited StreetBond® Applicators have been qualified by GAF to perform the Work and offer a product Warranty.

B. “Approved Applicator” has valid Certification for non - textured (flatwork) application ONLY as offered GAF and are reviewed on an annual basis. Product Warranties may be available to Approved Applicators but require approval and supervision by a GAF Technical Sales Representative.

C. “Applicator” means the installer of the StreetBond® coatings.

D. “Owner” means the Owner and refers to the representative person who has decision making authority for the Work.

E. “TSR” is a GAF Technical Sales Representative who manages the StreetBond® product in a given territory.

F. “Stamped asphalt pavement” is asphalt pavement that has been subjected to imprinting or texturing in a specific pattern.

G. “Non - Stamped asphalt pavement” is asphalt pavement that is unstamped and is sometimes referred to as “flatwork”.

H. The “Work” is the asphalt pavement texturing work contemplated in this bid submission and specification.

I. “Scuffing” is a “tear” of the asphalt pavement caused by an external force - for example turning the steering wheel of a stationary vehicle. Scuffing is generally the result of poorly designed or improperly installed asphalt and would most - commonly be seen on weaker residential asphalt.

J. “Layer” is a signal thin pass of coating, applied with a texture spray gun, which is allowed to dry before the next layer is applied.

K. “Warranty” is a guarantee to the property owner that StreetBond® SB150, when properly applied will not peel, delaminate or show abnormal wear over specific period of time depending on the traffic volumes and number of layers applied. Please contact your local TSR for more details.

1.04 1.4 SUBMITTALS

A. A copy of the Accreditation Certificate, available from the Applicator, is required with submittal. Independent product test results available upon request.

PART 2 - PRODUCTS

2.01 **MATERIALS - STREETBOND® COATINGS**

A. StreetBond® coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long - lasting color and textured finish to asphalt pavement surfaces. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties. StreetBond® coatings are environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

B. StreetBond® SB150 is a two part premium epoxy - modified, acrylic, waterborne coating specifically designed for application on asphalt pavements. It has a balance of properties to ensure good adhesion and movement on flexible pavement, while providing good durability. StreetBond® SB150 is durable in both dry and wet environments.

C. StreetBond® Colorant is a highly concentrated, high quality, UV stable pigment blend designed to add color to StreetBond® SB150 coatings. One unit of Colorant shall be used with one pail of StreetBond® coating material.
   1. Custom Colors
      a. Match RAL colors noted on plans/details.

2.02 PROPERTIES OF STREETBOND® COATINGS

A. The following tables outline the test results for physical and performance properties of the StreetBond® coatings as determined by an independent testing laboratory.

B. TABLE 1: Typical Physical Properties of StreetBond® Coatings

Characteristic	**Test Specification**	**SB150**
Solids by Volume	ASTM D2697	59.17%
Solids by Weight	ASTM D2369	71.60%
Density	ASTM D1475	13.27 lbs./gal. (1.59 kg/l)

C. TABLE 2: Typical Performance Properties of StreetBond® Coatings
   1. Characteristic
   2. Dry time (To re-coat)
      a. Test Specification - ASTM D5895 23 C; 37% RH
      b. SB150 - 35 min.
   3. Taber Wear Abrasion Dry H-10 wheel
      a. Test Specification - ASTM D4060 1 day cure
      b. SB150 - 0.33g/1000 cycles
   4. Taber Wear Abrasion Wet H-10 wheel
      a. Test Specification - ASTM D4060 7 days cure
      b. SB150 - 0.15g/1000 cycles
   5. QUV Accelerate Weathering Environment
      a. Test Specification - ASTM G - 151 deltaE 1,500hrs.
      b. SB150 - 0.53 (Brick)
   6. Hydrophobicity Water Absorption
      a. Test Specification - ASTM D570
      b. SB150 - 7.89%
   7. Shore A Hardness
      a. Test Specification - ASTM D2240
      b. SB150 - 80.8
   8. Mandrel Bend
      a. Test Specification - ASTM D522 - 93A
      b. SB150 - 1/8” @ 23 C
   9. Permeanc
      a. Test Specification - ASTM D1653
      b. SB150 - 5.6 perm
   10. VOC
      a. Test Specification - per MSDS
      b. 19 g/l
   11. Adhesion
      a. Test Specification - ASTMD4541
      b. SB150 - >300psi (692psi)
   12. Friction Wet
      a. Test Specification - ASTM E303 British Pendulum Tester
      b. SB150 - Wet=77.3 Dry=81.3

D. Certificates of Analysis are available upon request for each of these properties.

2.03 **EQUIPMENT FOR STREETBOND® APPLICATION**

A. The equipment described has been designed specifically for optimal application of StreetBond® coatings. Other equipment may or may not be suitable and could compromise the performance of the StreetBond® coatings and/or reduce crew productivity.
   1. The SB Flex Sprayer is a proprietary coating sprayer supplied by Intech Equipment and is capable of applying the StreetBond® coatings to the asphalt pavement surface in a thin, controlled film which will optimize the drying and curing time of the coating. A Graco RTX and RapidSprayerII sprayer may also be used.
   2. The StreetBond® Coatings Mixer is a motorized mixing device designed to ensure efficient and thorough blending of the StreetBond® components.
   3. Backpack or Hand - Held sprayer to apply the diluted StreetBond® Adhesion Promoter Concentrate.
   4. The RapidFinisher II is an electric powered broom produced by HUB Surfaces Systems which can be used in the application of StreetBond® coatings to improve productivity. It is especially useful on larger projects.

PART 3 - EXECUTION

3.01 **GENERAL**

A. StreetBond® coating shall be supplied and applied on non - textured paving surface by an Accredited StreetBond® Applicator in accordance with the plans and specifications or as directed by the Owner. Do not begin installation without confirmation of an Accreditation Certificate. Specifications for the execution of the StreetPrint® system can be found at gaf.com .

3.02 **PRE-CONDITIONS**

A. The condition of the paving substrate will impact the performance of the StreetBond® coatings. A highly stable asphalt pavement free of defects is recommended.

B. Prerequisites for New Pavement
   1. A durable and stable asphalt pavement mix design installed according to best practices over a properly prepared and stable substrate is a pre - requisite for all long - lasting asphalt pavement surfaces. The application of StreetBond® does not change this requirement.

C. Pavement Marking Removal: recommended guidelines
   1. Pavement markings may be removed by sandblasting, water - blasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface.
   2. The Owner shall determine if the removal of the markings is satisfactory for the application of StreetBond® coatings. Work shall not proceed until this approval is granted.

D. Surface Preparation
   1. The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.03 **APPLICATION OF STREETBOND® COATINGS**

A. Coating Application Guidelines

1. The Applicator shall use the SB Flex Spray System or suitable texture coatings sprayers to apply the StreetBond® coatings.
2. The pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.
3. The coating application shall proceed as soon as practical upon completion of the imprinting of the asphalt pavement where applicable.
4. For polished asphalt, StreetBond® Adhesion Promoter should be applied directly to the asphalt and allowed to dry completely prior to the first layers of coating.
5. For concrete surfaces, StreetBond® WB Concrete Primer or StreetBond® QS Concrete Primer should be applied and allowed to cure prior to the first layers of coating. Please consult Technical Data sheets for more details on applications.
   a. Both new and existing concrete should be acid etched prior to the primer application.

B. The first layer of coating shall be spray applied then broomed to work the coating material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. Each application of coating material shall be allowed to dry to the touch before applying the next layer.
   1. Airless sprayers cannot be used due to high aggregate content of StreetBond.

C. The Applicator shall apply the StreetBond® coatings only when the air temperature is 50°F / (10°C) and rising and will not drop below 50°F / (10°C) within 24 hours. No precipitation should be expected within 24 hours.

D. Follow manufacturers Application and Specifications Manual for process and procedures on the application of StreetBond. (www.gaf.com)

E. Use equipment that is designed specifically for the application of StreetBond.
   1. Refer to GAF information in the StreetBond Application and Specifications Manual. (www.gaf.com)

3.04 **COATING COVERAGE & THICKNESS**

A. Coating coverage and thickness is as outlined in TABLE 4 below. Actual coverage may be affected by the texture of the asphalt pavement substrate and the imprint pattern selected. There will be less coverage with the first layer and higher coverage with subsequent layers.

B. TABLE 4: Coating Coverage & Thickness

Use	Min # of Layers	App. Rate/Layer	Total App./rate for system	Dry Film Thickness (DFT) mils
No vehicular traffic(pedestrian)	3	1 unit/600 sf	3 units/600 sf	18
Low vehicular traffic(<5 cars/day residential drives/medians/plazas	3	1 unit/600 sf	3 units/600 sf	19
Medium vehicular traffic (<2000 cars/day)	4	1 unit/600 sf	4 units/600 sf	26
Heavy vehicular traffic (2000-3000 cars/day)	4	1 unit/600 sf	4 units/600 sf	26
Vehicular Traffic - Turn Lanes (<3000 cars/day)	6	1unit/600 sf	6units/600 sf	38

C. Additional layers of StreetBond® SB150 coatings may be used to provide additional build thickness in high wear areas such as vehicle wheel paths and turning areas.

D. *1 unit is a nominal 5 gallon pail comprising Part A, Part B and Colorant (approximately 4.12 gallons). 1 unit when sprayed as a single layer covers approximately 600sqft (55.7 sqm), with an approximate thickness of 6.3mil (0.16mm) dry.

E. No warranty is provided for traffic levels above 3000 cars per day per lane.

3.05 **OPENING TO TRAFFIC**

A. Minimally, StreetBond® SB150 coating must be 100% dry and sufficient curing time must be allowed before traffic is permitted on the surface.

B. If StreetBond® coatings are applied when moisture cannot evaporate, then the coating will not dry. The drying and curing of StreetBond® coatings have a direct impact on performance.

3.06 **MEASUREMENT**

A. The measured area is the actual area of asphalt pavement where StreetBond® has been applied, measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

END OF SECTION

SECTION 32 18 14.30
PERMEABLE BASE SYSTEM - NORTHERN CA

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Crushed aggregate permeable base for use under synthetic turf.
B. Drain rock aggregates, drainage systems and permeable base system components.
C. Subdrain piping and flat drains.
D. Geotextile fabrics.
E. Perimeter edge nailer.

1.02 RELATED REQUIREMENTS

A. Section 01 35 13 - Special Project Procedures - Design Presentation: Requirements for attendance at mandatory preconstruction and design presentation meeting.
B. Section 31 22 00 - Grading: Preparation of site for subbase.
C. Section 31 23 16.13 - Trenching: Compacted fill over utility trenches under base course.
D. Section 31 23 23 - Fill: Compacted fill under base course.
E. Section 32 12 16 - Asphalt Paving: Finish and binder asphalt courses.
F. Section 321313 - Concrete Paving: Finish concrete surface course.
G. Section 321815 - Synthetic Turf Surfacing.
H. Section 321839 - Base and Surfacing: Adjacent track surfacing.
I. Section 32 84 00 – Landscape Irrigation: Irrigation appurtenances in the fields.
J. Section 33 05 13 - Manholes and Structures: Manholes including frames.
K. Section 33 41 00 - Subdrainage: Filter aggregate and filter fabric for foundation drainage systems.

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil–Aggregate Subbase, Base, and Surface Courses; 2017 (Reapproved 2021).
B. AASHTO M 294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter; 2025.
C. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2022, with Errata .
D. ASTM C88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate; 2013.
E. ASTM C131/C131M - Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine; 2020.
F. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
G. ASTM D3385 - Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer; 2018.

H. ASTM E2583 - Standard Test Method for Measuring Deflections with a Light Weight Deflectometer (LWD); 2020.

I. ASTM F2898 - Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-confined Area Flood Test Method; 2011 (Reapproved 2019).

J. BSI 7044 - Artificial Sports Surfaces; 2024.

K. CT 227 - Standard Test Method for Cleanness of Coarse Aggregate; 2012.

L. CTM 229 - Standard Test Method for Durability Index; 2011.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal requirements.

B. Product Data:
   1. Aggregate Material: manufacturer’s contact information, source location, qualification data, and manufacture’s testing reports for gradation and material composition.
   2. Nailer material.
   3. Drainage Component: Manufacturer's descriptive product data for geotextile fabrics, liners, subdrain piping, flat / panel drains, connections, and drainage system components for use under synthetic turf fields.

C. Installation schedule.

D. Mock up plan, identifying the location.

E. Samples:
   1. Aggregate: Submit in a one-quart heavy duty plastic bag a sample of each aggregate to be used under synthetic turf fields. Clearly label material information on bag. Representative material is not acceptable; submit the material intended for application on this site only.
   2. Nailer: 12 inches long sample and representative fasteners of material proposed to be utilized as nailer for the project.

F. Certificates: Products to meet or exceed specified requirements.

G. Preconstruction Testing Reports: As specified in Part 1 of this Section.

H. Source Quality Control Reports: As specified in Part 2 of this Section.

I. Preinstallation Testing Reports: As specified in Part 3 of this Section.

J. Conformance survey.

K. Field Quality Control Reports: As specified in Part 3 of this Section.

L. Surface string line planarity testing.

M. Qualification Statement: For installer.

N. Acceptance of subgrade, nailer, surface planarity and project conditions by the Synthetic Turf installer. Note: The acceptance by the Synthetic Turf installer does not change or supersede the requirement for any and all other testing and requirements of the Contract Documents.

O. Warranty.

P. Project Record Documents: See Section 01 78 39 - Record Documents. Accurately record location of all underground utilities, landscape irrigation system piping and control wiring, and changes in finish elevations and gradients as well as any condition which materially affect drainage or deviates from the contract documents.

1.05 QUALITY ASSURANCE

A. Qualifications: See Section 01 45 00 - Quality Control.

1. Installer:
   a. Possess all necessary Contractor's Licenses required by the jurisdiction in which the project is located.
   b. Have prior direct experience in preparing a drainage base for synthetic turf sports fields.
   c. Existing Installations: Submit a list of exterior synthetic turf permeable base, system installations previously installed in California, for the ten (10) most recent installations of over 70,000 s.f., per synthetic turf field, under the same name and ownership utilizing a similar permeable base system to those noted in these Contract Documents.
   d. The Contractor's Project Manager and Superintendent on this project have directly installed a minimum of ten (10) synthetic turf fields of over 70,000 s.f. per synthetic field, in California within the last five (5) years, using a similar permeable base systems to those noted in these Contract Documents. Company qualifications cannot be submitted in place of Project Manager and Superintendents qualifications.
   e. The Contractor's Project Manager and Superintendent must remain on the project during the entire course of construction.
   f. Submit qualifications at or prior to the time of Bid. Qualifications submitted after Bid will not be accepted.

B. Preinstallation Meetings: See Section 01 31 19 - Project Meetings.
   1. Convene minimum 2 weeks before starting work of this Section.

C. Preconstruction Testing: See Section 01 45 00 - Quality Control.
   1. Owner to engage a qualified testing agency to perform tests and inspections.
      a. Aggregate material will be considered defective if it does not pass tests and inspections.
      b. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
         1) Do not install product on the Project until passing test is achieved.
      c. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
      d. Submit preconstruction testing reports to Architect.
   2. Tests:
      a. Samples of aggregate material under synthetic turf to be used specifically for this project shall be tested by an independent third-party geotechnical sports field testing lab specifically familiar with the requirements, materials, means and methods and construction of synthetic fields and permeable base material.
      b. Coordinate access for the testing agency to obtain at their discretion samples directly from the manufacturer's source for a minimum of two (2) separate five (5) gallon buckets of ASTM #57 and ASTM #8 aggregate material or quantities as specified by the testing agency.
      c. Samples must represent the full range of materials possible and cannot be limited to a select sample. Representative, historical test data or material not specifically procured for this project will not be accepted.
      d. Passing test results from the testing lab shall be included in the synthetic turf permeable base submittal for review by the Architect. Preconstruction testing of aggregates shall include:
         1) Sieve Analysis: ASTM C136/C136M. Refer to Materials article below for gradation requirements for each type of aggregate.
         2) Abrasion: ASTM C131/C131M, not to exceed 40.
         3) Soundness of Aggregate: ASTM C88, material testing results equal to or greater than 12 percent loss shall not be accepted for use under synthetic turf. Note this test takes several weeks.
         4) Durability: CTM 229, 40 minimum.

5) Cleanness: CT 227, 80 minimum.

e. The Owner at their discretion may waive and / or perform any and all of the testing noted in this section, as well as additional testing as they deem appropriate, in addition to the contractor's required testing. Any test results must meet the requirements of this section and any Owner testing supersedes any testing by the contractor, even if the test results are in conflict or contrary to results provided by the Contractor.

1.06 INSTALLATION SCHEDULE

A. Provide a permeable base and synthetic turf installation schedule, which includes, but is not limited to:
   1. Preinstallation meeting.
   2. Submittal schedule.
   3. Laboratory testing.
   4. Deliveries.
   5. Access.
   6. Stockpile(s).
   7. Mock-up review.
   8. Subgrade prep
   9. Subgrade conformance survey.
   10. Permiter trench drain installation.
   11. Impermeable liner or fabric installation.
   12. Permeable base installation.
   13. Perimieter nailer installation.
   14. Conformance survey.
   15. String line.
   16. Synthetic turf installation.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 66 00 - Product Delivery, Storage, and Handling.

B. Aggregate Materials shall be transported in a manner to prevent degradation, contamination and / or material segregation of course and fine aggregate.

C. Aggregate material shall be transported in clean containers or trucks without other materials or products.

D. Prevent contamination at delivery.

E. Protect materials from ultraviolet rays and deterioration of materials.

F. Stockpiles shall be located atop an impermeable liner or impermeable surface to eliminate contamination. Stockpiles may be exposed to Ultraviolet rays for a maximum of twenty-four hours, after which the stockpiles must be covered. Stockpiles shall not be exposed to rain events, cover as necessary. Stockpiles may be present onsite for a maximum of fourteen days, at which time the material must be re-tested for compliance or disposed of.

G. It is the contractor's responsibility to maintain the integrity of the material throughout the course of procurement, transportation, delivery, installation, storage and testing. It is the contractor's responsibility to procure material that considers and mitigates any potential change in material or characteristics as a result of transportation, installation, storage or construction including but not limited to segregation, contamination, degradation or changes in sieve. All finished work must comply with the requirements of the Contract Documents and Materials article below after installation.

1.08 WARRANTY

A. See Section 01 78 36 - Warranties and Section 01 78 39 - Record Documents for additional warranty requirements.

B. Provide Supplier's standard warranty for each product.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
   1. Provide materials of each type from same source throughout the work.
   2. Permeable base material to be used under synthetic turf shall come from one supplier, and one quarry source. Changes in material during construction will not be accepted. It is the contractor’s responsibility to secure adequate material for the duration of construction and as needed for the project.
   3. Contractor to confirm the grading sections and dimensions based on the supplier's data for the drainage system and the synthetic turf surfacing.
   4. Changes and Substitutions will only be accepted in accordance with the requirements of the Contract Documents and prior to Bid. Any variance or approved change cannot change or impact the synthetic turf warranty. Contractor is to submit, in writing certification that the proposed modifications will not affect the synthetic turf warranty.

B. Crushed Aggregate Permeable Base System:
   1. Crushed aggregate permeable base system consisting of washed, open graded, angular, fractured friction course that provides adequate mechanical stability and compaction for athletic field applications.
   2. Material to be clean with minimal to no fines as described in the gradation tables below.
   3. Material to be minimum 100 percent fractured with at least one mechanical fracture per particle greater than 1/4 inch sieve size, appropriate for the utilization of base material for the specified surfacing, and meeting all the percolation and testing requirements.
   4. Rounded rock is not acceptable.

C. Base Stone: Complying with testing requirements for ASTM #57 Stone, and the following gradation:

Sieve Size	Percentage Passing by Weight
1-1/2 inches	100
1 inch	95 - 100
1/2 inch	25 - 60
No. 4	0 - 10
No. 8	0 - 5

D. Topping Stone: Comply with the testing criteria for ASTM #8 Stone and the following gradation:

Sieve Size	Percentage Passing by Weight
1/2 inch	100
3/8 inch	85 - 100
No. 4	10 - 30
No. 8	0 - 10
No. 16	0 - 5

Sieve Size	Percentage Passing by Weight
No. 50	0 - 2

E. Leveling Fines: Coarse Manufactured Sand per the following gradation:

Sieve Size	Percentage Passing by Weight
3/8 inch	100
No. 4	90 - 100
No. 8	50 - 75
No. 16	25 - 40
No. 30	10 - 25
No. 50	5 - 15
No. 100	0 - 8
No. 200	0 - 2

1. Contractor shall allocate funds for a full 1/2 inch layer of leveling fines atop the entire permeable base system.
2. Leveling fines shall only be used for improving compaction, filling in low spots or meeting conformance tolerances. The product shall not be utilized if all compaction and conformance tolerances can be met with the 3/8 inch topping stone.
3. Half the mock-up shall have the 1/2 inch layer of leveling fines installed.

F. Subdrain Fill Drain Rock: For bedding and backfill around the Perforated Perimeter Collector pie system shall be ASTM #57 Crushed Stone angular washed aggregate drain rock for encasing perforated drainage piping consisting of clean, virgin, well-graded, crushed stone, free of shale, clay, organic materials, and debris. Comply with the testing requirements of aggregate material under synthetic turf and gradation as shown:

G. Subdrain Topping Stone: For Perforated Perimeter Collector pipe planarity layer system shall be ASTM #8 Crushed Stone consisting of clean, virgin, well-graded, crushed stone, free of shale, clay, organic materials, and debris. Use of this material is limited to minor leveling of select deviations as a result of the string line test only and only as permitted by the Architect and Geotechnical Engineer to a maximum depth of 2 inches. This material cannot be used for general adjustment of grades or as a substitution of the permeable base. Use of this material cannot change the compaction or percolation rates of the permeable base. Comply with testing requirements of aggregate material under synthetic turf and gradation as shown:

H. Soft lime stones, clay and shale materials are not acceptable.

I. Geotextile Fabrics:
1. Permeable Filter Fabric: Mirafi 140N Non-woven polypropylene fabric manufactured by TenCate USA, Phone 1 (805) 482-1722. Drainage performance of 130 gallons per minute per square-foot minimum.
2. Non-Permeable Membrane Fabric: TITAN RCG-30; 30mil HDPE textured geomembrane 30 mil reinforced woven fabric liner manufactured by Titan Environmental Containment, phone: 1 (281) 731-2027 email: robert.west@titanenviro.com. All seams to be heat welded/thermally fused and certified by the manufacturer.

J. Subdrain Piping:
1. Subdrain Solid Drain Piping: Dual wall smooth interior HDPE, manufactured by Advanced Drainage Systems, Inc. (ADS), Phone: +1-800-821-6710; model no. N12-WTIB (Watertight) complying with AASHTO M 294.

2. Perimeter trench Perforated pipe: HDPE corrugated pipe with AASHTO Class II perforation, manufactured by Advanced Drainage Systems, Inc. (ADS), Phone: +1-800-821-6710; model no. N12-WTIB.
3. Perforated Flat Drains: 3- Dimensional Rigid Multi-Flow 1-inch by 12-inch HDPE flat drain system with filter fabric manufactured by Multi-Flow P.O. Box 131 Prinsburg, MN 56281, www.varicore.com, service@varicore.com, Phone: 800- 978-8007, 320-978-8007.
4. Fittings: Factory-manufactured couplings, wyes, caps and outlets to suit piping and project conditions.
5. Flat Drain Tape: Manufacturer recommended fitting and joint tape to secure flat drain fittings/pipe as needed.

K. Perimeter Edge Nailer:
1. Provide continuous 2-inch by 4-inch x 16’ long polymer composite lumber molding suitable for direct attachment of synthetic turf fabric manufactured by Trex or equal.
2. Attachments shall be ceramic head 1/4 inch x 4 inches long zinc plated and ceramic coated masonry screws, product shall be Titen HD as manufactured by Simpson Strong Tie or equal at 12 inches on center and in accordance with the manufacturer's recommendations.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Supplier to perform tests and inspections, prior to shipment of aggregate material to Project site.
1. Aggregate material will be considered defective if it does not pass tests and inspections.
2. Supplier to prepare reports and deliver to Contractor.
3. Submit source quality control reports to Architect.

C. Tests:
1. Test materials to show conformance with requirements specified. If tests indicate materials do not meet specified requirements, at any time, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Verify that survey benchmarks and intended elevations for the work are as indicated.

C. Furnish subgrade conformance survey of compacted subgrade and finished compacted permeable base.

D. Verify subgrade has been inspected and approved by the geotechnical engineer, Owner and Architect, and grades and elevations are correct, and surface is dry and stable after approval of conformance survey but prior to placement of liner, drainage and permeable base.

E. Provide a written 10-day notice to the Owner and Architect for a request for observation of the subgrade, prior to placement of the liner, liner, drainage, and finished compacted permeable base. Verify the subgrade, liner, flat drains, header and drain lines have been inspected and approved by the geotechnical engineer, Owner and Architect prior to placement of permeable base.

F. Comply with 31 22 00 - Grading and recommendations of project geotechnical report.

G. Preinstallation Testing:
1. Owner to engage a qualified testing agency to perform tests and inspections.

a. Aggregate material will be considered defective if it does not pass tests and inspections.
b. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
c. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
d. Submit preinstallation testing reports to Architect.

2. Tests:
   a. Lab testing during construction upon delivery to site: The following testing shall be performed on aggregate material to be used under synthetic turf upon delivery to site, prior to spreading and compaction per 15,000 s.f. of material prior to use; Contractor shall coordinate access for the testing agency to obtain at their discretion a minimum two (2) separate five (5)-gallon buckets of aggregate material or quantities as specified by the Geotechnical Engineer or Owner Testing Lab. Once passing test results from the Contractor's and Owner's testing agency are reported the material can be installed:
      1) Sieve Analysis: ASTM C136/C136M. Refer to Materials article above for requirements.
      2) Cleanness: CT 227, 80 minimum.
      3) If the material is deemed to be different, by the geotechnical engineer, than the material tested in Preconstruction Testing above, Preconstruction lab testing, additional testing for LA Abrasion, Soundness, Durability, or any other item, may be required at the discretion of the Owner, Architect and testing agency.

3.02 PREPARATION

A. See Section 01 76 00 - Alteration Project Procedures.

B. Correct irregularities in subgrade gradient and elevation, prior to placement of liner, drainage and permeable base by scarifying, reshaping, and re-compacting.

C. Do not place geotextiles or aggregate on soft, muddy, or frozen surfaces.

D. Do not apply permeable base or perform grading operations in rain or inclement weather.

E. Repair or replace all imperfections, tears or defective work prior to placement of permeable base.

F. Verify that all subgrade leveling is complete and compacted and the subgrade Conformance Survey has been approved by the Architect prior to installation of geotextiles and base.

G. Prepare subgrade and base material in accordance with the Geotechnical Report.

H. Conformance Survey: Licensed surveyor to verify the compacted and finished subgrade, prior to placement of the liner, as well as the compacted and finished permeable base surface.
   1. Documents must show conformance to the design grades as indicated on the Drawings.
   2. Conformance survey to demonstrate compliance with spot elevations taken a maximum 25-foot grid and at all visible deviations in planarity; provide 10 foot spacing on perimeter curbs / walls / nailer / edge of paving.
      a. Finished subgrade under permeable base shall have a maximum deviation to 0.04 feet from design grade.
      b. Finished synthetic turf permeable base surface, perimeter curbs / walls / nailer / edge of paving shall have a maximum deviation of 0.02 feet from design grade.
   3. Submit results of survey for Project Record with Surveyor' s certification stamped and signed.

3.03 INSTALLATION

A. Perform grading under control of precision laser-controls.

B. Spread aggregate over prepared substrate to a total compacted thickness as indicated on Drawings and to the rate as required in the Geotechnical Report. Limit spreading of material as required to prevent degradation or segregation of material. Do not spread material in any direction greater than 50 feet, or less as may be required. Maintain adequate moisture level with material application.

C. Place permeable base in lifts as required by the Geotechnical Engineer.

D. Place permeable base in the direct location where it will be used to limit required spreading and prevent segregation or degradation of the material.

E. Level and contour surfaces to elevations and grades indicated on Drawings utilizing laser-controlled equipment to avoid over compaction. Surface stability shall be such that equipment can fine grade to the required tolerances leaving behind no wind row, tire tracks or indentations and meet the requirements of the geotechnical engineer.

F. Refer to drawings and project geotechnical recommendations and all supplementary reports if applicable for compaction requirements. In the event no compaction information is provided in the geotechnical report and/or plans, compact base material to meet the owners onsite geotechnical engineer requirements providing adequate stability and percolation for the specified surfacing. In the event of conflicting information, the contractor is to submit an RFI to the Architect for review and approval. In any event, the most stringent requirement shall apply at the discretion of the Owner, Architect and Geotechnical Engineer.

G. No pumping or yielding of the compacted permeable base system will be acceptable.

H. Use vibratory compaction equipment in areas inaccessible to roller compaction equipment. Compaction operations shall be performed in accordance with the geotechnical engineers recommendations. The owner’s geotechnical engineer shall be present to observe the compaction operations.

I. Apply broad spectrum herbicide to finished base.

J. Prevent all degradation and segregation of material.

K. Install turf nailer around all perimeter concrete curbs, and at all penetrations through the synthetic turf, including goal post footing boxes, valves and communication boxes. Comboxes and valves are to be combined in straight lines, installed flush to the perimeter curb and surrounded with reinforced concrete curbs per details in the drawings; no floating boxes in the turf area will be acceptable. Attach nailer with specified masonry screws 4 feet maximum on center and no further than 6 inches from each end.

L. Protect all storm water infrastructure and improvements during construction.

M. Any irrigation equipment, valve boxes, utility boxes, or other boxes located within the synthetic turf shall abut a perimeter curb per the Contract Documents. No freestanding or “floating” boxes or utilities will be accepted. Backfill around filed boxes with crushed aggregate permeable base material in lifts not to exceed six (6) inches in loose depth and compact backfill using methods approved by the Geotechnical Engineer. Required compaction percentages around field boxes shall match requirements as outlined for the remaining permeable base areas. Contractor is to prevent settling or grade variations around utilities and boxes.

N. All trenches are to be pre-compacted and settled prior to installation of surfacing to prevent settling or deviations in the surface grading. Compacting of trenches cannot reduce required percolation rates. Place permeable base material in layers not more than six (6) inches in loose depth for material compacted by heavy compaction equipment and not more than four (4) inches in loose depth for material compacted by hand-operated tampers.

O. Minimum nominal compacted thickness of base material per plans.

P. Roller marks, tire tracks, footprints or other impressions on the finished surface shall be raked out where they are equal to or greater than the tolerances specified. If corrections are not possible to meet the specified tolerances, remove the full section of base material and install new material in conformance with the Contract Documents. Following the long and short axis of the field, checking and corrections, the Contractor shall notify the Owner and Architect, that the finished surface is ready for review.

3.04 TOLERANCES

A. Gradient: Finished surface gradients and contours after installation of permeable aggregate base, shall be as indicated on the Drawings but not less than 0.02 feet in 10 feet.

B. Compacted subgrade gradient of slope, below the permeable base and impermeable liner: Within 0.04 feet in 10 feet.

C. Compacted Permeable Base Thickness: Within 0.02 feet of design depth.

D. Grade breaks and ridgelines shall be within 0.02 of the design grades.

3.05 REPAIR

A. Protect all work, including the subgrade, liner, drainage, and aggregate base material at all times. Any tears or penetrations of the liner must be replaced and thermally fused to prevent any water penetration.

3.06 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for additional requirements.

B. Owner to engage a qualified testing agency to perform tests and inspections.
   1. Aggregate material will be considered defective if it does not pass tests and inspections.
   2. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
      a. Contractor shall replace, repair and refinish to a finished state all base and aggregate materials from all on-site testing locations.
      b. All material not meeting the specifications, at any point prior to or after installation, shall be removed from the site at the Contractor’s expense.
      c. If the material is deemed to be different than the material tested under Quality Assurance article above, by the testing agency, additional testing for LA Abrasion, Soundness, Durability or any other item, will be required at the discretion of the Owner, Architect and Testing Agency.
   3. Testing and inspecting agency to prepare reports and deliver to Owner or Contractor.
   4. Submit field quality control reports to Architect.

C. Tests:
   1. Test aggregates, after placement and compaction, per the specified schedule. Test shall not be conducted on material that is not fully finished, graded and string lined to the grades specified on the plans. On-site and in place testing shall include:
      a. Permeability: ASTM F2898. Perform in a minimum of six (6) locations, per field and as approved by the Architect. If the field exceeds 80,000 square feet or for areas outside the typical limits of the field, provide two (2) additional tests per 20,000 square foot of synthetic turf area. Minimum percolation rate of 12 inches per hour.
         1) At its sole discretion, the Owner may elect to perform additional permeability testing, including ASTM F2898 meeting a minimum percolation rate of 12 inches per hour, ASTM D3385, or BSI 7044 Test Method 4, meeting a minimum percolation rate of 48 inches per hour and gradation and compaction testing, and testing results. See Materials article above for requirements of sieve and related items.

b. Sieve Analysis: ASTM C136/C136M. Material shall be gathered from the onsite delivered material intended for use on the corresponding field. Provide a laboratory test for every 10,000 square feet of material delivered to the site for both ASTM #57 and ASTM #8 stones. Testing results shall meet the requirements of this article and Materials article above through installation and compaction. Reject any material delivered to the site that does not meet sieve requirements.
c. Deflection: ASTM E2583. Compact the material with the onsite geotechnical engineer present to observe the methods. Test the material with a light weight deflectometer (10 kg weight with 300 mm diameter plate) for a minimum modulus of 40 MPa. Compaction testing shall be performed at a minimum of six (6) test locations, per field, that correspond to the percolation testing locations. If the field exceeds 80,000 square feet or for areas outside the typical limits of the field, provide two (2) additional tests per 20,000 square foot of synthetic turf area.

2. Planarity Check: The contractor shall perform planarity check utilizing a mason's line held taught between two workmen separated by a distance of approximately 40 feet with varication every 5 feet across, shall be placed directly on the finished surface, parallel to the direction of greatest slope. A third workman shall check for separations between the mason's line and the finished surface that are equal to or greater than the specified tolerance. Planarity check shall be conducted in the presence of the Owner, Architect and Synthetic Turf Installer. The surface planarity may not deviate more than 0.02 feet in 10'-0" in any direction when pulling a string line.
   a. The visual string line examination and acceptance of the base will not be a substitute for independent testing and analysis by a qualified engineer or other requirements of the Contract Documents.
   b. The contractor must make any necessary adjustment as required by the testing, reviews and inspections at no cost to the owner regardless of extent of required work including any modifications required to the base material, nailer or other improvements.
   c. The contractor shall perform a final string line check (or additional tests if the tolerances are not met) along the long and short axis of field in the presence of the Owner, Architect and Synthetic Turf Installer using the criteria noted in Preparation article above (conformance survey), after corrective action is taken on initial string line check. Intermediate restringing is required if the conformance is unable to mee the specified tolerance.
3. Provide conformance surveys:
   a. Provide ground survey of both interior and exterior perimeter curbs, bands and paving a minimum of 15' on center. Grades shall be submitted to the Civil engineer of record for review prior to attaching perimeter nailer's. Non-conforming work shall be rectified prior to proceeding.
   b. Provide ground survey of compacted and moisture conditioned subgrade with the onsite geotechnical engineer present. Provide spot grade a minimum of 15' on center. Grades shall be submitted to the Civil engineer of record for review prior to installing the impermeable liner.
   c. Provide ground survey of the compacted and fine graded finished surface of the permeable base system. Provide spot grades a minimum of 15' on center. Grades shall be submitted to the Civil engineer of record for review prior to installing the synthetic turf system.
   d. Provide 10-day written notice to the Architect and Synthetic Turf Installer for observation of the finished Synthetic Turf Permeable Base. Submit as part of permeable base and synthetic turf installation schedule per Part 1 of this Section.

4. Final planarity and acceptance by the Synthetic Turf Installer shall be determined by reviewing the conformance survey and string line testing. The contractor shall make all necessary adjustments to accommodate the requirements of the Synthetic Turf Installer for clean base planarity and compaction. The Contractor shall provide necessary staging area, site access and scheduling of operations for synthetic turf installation to meet the Construction Schedule. Approval by the synthetic turf manufacturer does not relieve the contractor from meeting the specified requirements. Approval is required by the Owner and Architect.
5. Coordinate locations for all utilities including storm drainage system, electrical, low voltage footings or any other improvements.
6. Coordinate work with installation of underground piping and improvements beneath synthetic turf and with installation of field appurtenances such as quick couplers, electrical outlets and lines and other required by the Contract Documents. Any cost associated with the adjustments or replacement of improvements required as a result of a lack of coordination by the contractor or for lack of notification to the Owner and Architect of any potential conflicts, will be borne by the Contractor.

3.07 CLEANING

A. See Section 01 77 00 - Contract Closeout and Final Cleaning, for additional requirements.
B. Remove unused materials, leave area in a clean and neat condition. Grade temporary material storage areas to prevent standing surface water.
C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 18 15
SYNTHETIC TURF SURFACING(NON-ATHLETIC)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Protective surfacing for playground area.

B. Subbase under resilient surfacing.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading.

B. Section 321123 - Aggregate Base Courses: Permeable Aggregate Base.

1.03 REFERENCE STANDARDS

A. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu ft (2,700 kN-m/cu m)); 2012.

B. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment; 2009.

C. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2011.

D. CPSC Pub. No. 325 - Public Playground Safety Handbook; Consumer Products Safety Commission; 2010.

E. ASTM F1951 -Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.04 DEFINITIONS

A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.

C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.

E. Subgrade: The surface of the ground on which the protective surfacing is installed.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.
   1. Include IPEMA certifications where required.
   2. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, specifications; preparation and installation instructions and recommendations; storage, handling requirements and recommendations.
   3. Submit fiber manufacturer's name, type of fiber and composition of fiber.
   4. Submit data in sufficient detail to indicate compliance with the contract documents.
   5. Submit manufacturer's instructions for installation.
   6. Submit manufacturer's instructions for maintenance for the proper care and preventative maintenance of the synthetic turf system, including painting and markings

C. Testing Certification: Submit certified copies of independent (third-party) laboratory reports on ASTM testing:
   1. Pile Height, Face Weight & Total Fabric Weight, ASTM D5848.
   2. Primary & Secondary Backing Weights, ASTM D5848.
   3. Tuft Bind, ASTM D1335.
   4. Grab Tear Strength, ASTM D1682 or D5034.
   5. Water Permeability, ASTM D4491

D. Samples:
   1. Submit samples of synthetic turf, 6 x 6 inches, illustrating details of finished product in amounts as required by General Requirements, or as requested by Architect.

E. Maintenance Data:
   1. For manufactured surfacing products, provide manufacturer's recommended maintenance instructions and list of repair products, with address and phone number of source of supply.

1.06 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than 5 years of documented experience with the same manufacturer, product and company they are proposing on this project.

C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.
   1. The designated Supervisory Personnel on the project shall be certified, in writing by the turf manufacturer, as competent in the installation of specified monofilament material, including gluing seams and proper installation of the infill mixture.
   2. Installer shall be certified by the manufacturer and licensed.
   3. The installer supervisor shall have a minimum of 5 years experience as either a construction manager or a supervisor of synthetic turf installations

1.07 PRE-INSTALLATION MEETING

A. Coordinate with Section 116813 - Playground Equipment.

B. Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
   1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
   2. Include representatives of Contractor.

3. Notify Architect at least 2 weeks prior to meeting.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store protective surfacing to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

C. Protect from damage during delivery, storage, handling and installation. Protect from damage by other trades.

D. Comply with manufacturer’s recommendations.

E. Inspect all delivered materials and products to ensure they are undamaged and in good condition.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. The Contractor shall provide a warranty to the Owner that covers defects in materials and workmanship of the turf for a period of eight (8) years from the date of substantial completion. The turf manufacturer must verify that their representative has inspected the installation and that the work conforms to the manufacturer's requirements. The manufacturer's warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of God beyond the control of the Owner or the manufacturer. The warranty shall be fully third party insured; pre paid for the entire 8 year term and be non-prorated. The Contractor shall provide a warranty to the Owner that covers defects in the installation workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's representative. The insurance policy must be underwritten by an “AM Best” A rated carrier and must reflect the following values:
   1. Pre-Paid 8-year insured warranty.
   2. No maximum per claim coverage amount.
   3. Minimum of thirty-two-million dollar ($32,0000,000) annual aggregate.
   4. Must cover full 100% replacement value of total square footage installed.
   5. Policies that include self insurance or self retention clauses shall not be considered.
   6. Policy cannot include any form of deductible amount.
   7. Sample policy must be provided at time of bid to prove that policy is in force. A letter from an agent or a sample Certificate of Insurance will not be acceptable

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

A. Because the safety of the playground depends on strict conformance to the design criteria, this information is provided for Contractor's information.
   1. The top elevation of the protective surfacing is intended to be flush with adjacent grades.
   2. Use Zone: The protective surfacing has been designed to provide acceptable impact attenuation as defined in ASTM F1292 for Critical Height of 12 feet.

2.02 MATERIALS

A. Artificial grass FieldTurf Commercial system materials shall consist of the following:
   1. Carpet made of “ridged” monofilament polyethylene fibers tufted into a fibrous, non-perforated, porous backing.

2. Infill: Controlled mixture of graded sand and rubber crumb that partially covers the carpet.
3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass monofilament FieldTurf.
4. Acceptable Manufacturer and Distributor
   a. Manufacturer- Forever Lawn
5. The installed artificial grass shall have the following properties:

Standard	Property	Specification
ASTM D1577	Fiber Denier	xxxxx
ASTM D5823	Pile Height	xxxxx
ASTM D5793	Stitch Gauge	xxxx
ASTM D5848	Pile Weight	xx oz. /square yard
ASTM D5848	Primary Backing	xxoz. /square yard
ASTM D4491	Carpet Permeability	xxx inches / hour

6. Carpet shall consist of ridged monofilament fibers tufted into a primary backing with a secondary backing.
7. Backing:
   a. Primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors.
   b. Secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
   c. Perforated (with punched holes), backed turf is unacceptable.
   d. Turf with attached scrim in lieu of porous, heat activated urethane is unacceptable.
8. Fiber shall be xxxx denier, low friction, and UV-resistant fiber measuring not less than xxx inches in high.
9. Infill materials shall be approved by the manufacturer:
   a. Infill shall consist of a resilient layered granular system, comprising selected and graded silica sand.
10. Glue for seaming of turf shall be as recommended by the synthetic turf manufacturer

B. Pad layer(under Artificial turf):
   1. Provide 1 inch min thickness.
   2. Polygreen Foam
      a. Contact Phone Number: 1-877-302-8625

C. Geotextile Fabric: Nonwoven polypropylene sheet.

D. Permeable Aggregate Subbase: As specified in Section 321123.

PART 3 EXECUTION

3.01 PREPARATION

A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in accordance with manufacturer's requirements.

B. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.

C. Remove rocks, debris, and other similar items.

3.02 SUBBASE

A. Install aggregate subbase as indicated on drawings and in Section 321123. Compact aggregate to maximum 90 percent, in accordance with ASTM D1557.

B. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch lower than grades and levels indicated.

C. Install in true, even plane, sloped to provide positive drainage.

D. Flatness Tolerance: 1/4 inch in 10 feet, maximum.

3.03 SYNTHETIC TURF SURFACE LAYER

A. The installation shall be performed in full compliance with approved Shop Drawings.

B. Only trained technicians, skilled in the installation of synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, top dressing or brushing operations.

C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including gluing seams and proper installation of the Infill mixture.

D. Install at location(s) indicated, to comply with final shop drawings, manufacturers'/installer's instructions.

E. The Contractor shall strictly adhere to specified procedures. Any variance from these requirements shall be provided in writing, by the manufacturer's on-site representative, and submitted to the Architect and/or Owner, verifying that the changes do not in any way affect the Warranty. Infill materials shall be approved by the manufacturer and installed in accordance with the manufacturer's standard procedures.

F. Carpet rolls shall be installed directly over the properly prepared aggregate base. Extreme care shall be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity.
   1. Repair and properly compact any disturbed areas of the aggregate base as recommended by manufacturer
   2. Seams shall be flat, tight, and permanent with no separation or fraying.

G. Infill Materials:
   1. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The Infill installation consists of a sand.

H. Upon completion of installation, the finished project shall be inspected by the installation crew and an installation supervisor.

3.04 FIELD QUALITY CONTROL

A. Owner or Owner's representative will inspect playground surfacing after installation to verify that surfacing is of proper type and depth and that playground meets specified design safety and accessibility requirements.

B. Repair or replace rejected work until compliance is achieved.

END OF SECTION

SECTION 32 33 00
SITE FURNISHINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pedestal.
B. Tables.
C. Waste receptacles.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Bollard infill and underground encasement.
B. Section 05 50 00 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.
C. Section 321313-Concrete Paving: Mounting surface for site furnishings

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
E. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984, with Editorial Revision (2019).
F. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
G. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.
H. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
C. Shop Drawings:
    1. Indicate plans for each unit or groups of units, elevations with model number, overall dimensions; construction, and anchorage details.
    2. For bike rack: Indicate size, shape, and dimensions, including clearances from adjacent walls, doors, and obstructions.
D. Samples: Submit two sets of manufacturer's available colors for metal furnishings.
E. Samples: Submit two sets of manufacturer's available colors and finishes for precast furnishings.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer’s warranty against defects in materials or workmanship for ductile iron castings for a period of 10 years from Date of Substantial Completion.

C. Provide manufacturer’s Lifetime Warranty against defects in materials or workmanship for wood benches manufactured from solid teak.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Handle with sufficient care to prevent scratches and other damage to the finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Furnishings:
   1. Substitutions: See Section 01 60 00 - Product Requirements.

B. Precast Furnishings:
   1. Quick Crete Products Corp; Per Plan: www.quickcrete.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PRECAST CONCRETE FURNISHINGS

A. Precast Concrete Furnishings, General:
   1. Precast Concrete Components: Mixture of cement, aggregates, water, and mineral colors; molded to shape, and reinforced with steel bars.
      a. Finish: As indicated on drawings.
      b. Color: As indicated on drawings.
      c. Clear Sealers: Anti-graffiti.
   2. Hardware: Stainless steel.

B. Tables: Precast concrete table and pedestal
   1. Table: Precast concrete frame with precast table top.
   2. Pedestal: Precast concrete block
   3. Mounting: Surface, using concealed anchor rods.
   4. Products:
      a. Quick Crete Products Corp; Per Plan: www.quickcrete.com/#sle.

C. Waste Receptacles: Precast concrete waste receptacle with removable lid.
   1. Lids:
      a. Material: Steel.
      b. Type: Flat.
   2. Mounting: Surface, using concealed anchor rods.
   3. Products:
      a. Quick Crete Products Corp; Per Plan: www.quickcrete.com/#sle.

D. Precast Concrete Pedestal:
   1. Mounting: Surface, using concealed anchor rods.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces, preinstalled anchor bolts, or other mounting devices are properly installed; and ready to receive site furnishing items.

B. Do not begin installation until unacceptable conditions are corrected.

3.02 PREPARATION

A. Ensure surfaces to receive site furnishing are clean, flat, and level.

3.03 INSTALLATION

A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

B. Post-Installed Anchors: Comply with ICC-ES AC308.

END OF SECTION

SECTION 32 33 53
ARCHITECTURAL SITE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Concrete site walls.

B. Concrete retaining walls.(48" or less in height)

C. Other architectural site concrete as indicated.

1.02 RELATED REQUIREMENTS

A. Division 00 Section - 003100 Available Project Information(Geotechnical Report)

B. Division 07 Section - Joint Sealants

C. Division 09 Section - Permanent Non-Sacrificial Anti-Graffiti

D. Division 32 Section - Concrete Paving

E. Division 32 Section - Concrete Paving Joint Sealants

1.03 DEFINITIONS

A. Cast-in-Place Architectural Site Concrete: Non-building formed concrete that is exposed to view in completed exterior work and that requires concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

B. Cementitious Materials: Portland cement alone or in combination with one or more of the following: Fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

C. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of cast-in-place architectural site concrete.

D. Reveal: Projection of coarse aggregate from matrix or mortar after completion of exposure operations.

1.04 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place architectural site concrete to attend, including the following:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. District's Representative(s).
   d. Ready-mix concrete manufacturer.
   e. Architect's Representative(s)
   f. Cast-in-place architectural site concrete subcontractor.
   g. Inspector of Record (IOR).
   h. Subcontractor for any adjacent work

2. Review testing and inspection procedures, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, reinforcement accessory installation, concrete repair procedures, and protection of cast-in-place architectural site concrete.
3. Contractor to provide meeting minutes for pre-installation conference.

1.05 SUBMITTALS

A. Product Data: For each type of product.
   1. Proprietary admixtures, pigments, curing compounds, hardeners, sealers, form-release agents, all accessory material, etc.: Indicate compatibility with other materials used.

B. Samples for Initial Selection: For each type of product, ingredient or admixture requiring color selection.
   1. Submit manufacturer selected range of colors and products for review.
   2. Provide custom colors or samples as required.
   3. Upon selection of color submit 12"X12" sample of material in the specified color/finish for review by the Landscape Architect in addition to the specified mock-ups.

C. LEED Submittals:
   1. Product Data for Credit MR 4.1 [and Credit MR 4.2]: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating cost for each product having recycled content.
   2. Design Mixtures for Credit ID 1.1: For each concrete mixture containing at least 40% fly ash as a replacement for Portland cement or other Portland cement replacements and for equivalent concrete mixtures that do not contain Portland cement replacements.

D. Design Mixtures: Submit proposed mix designs and test data for each class, color, application, and strength of concrete and for each method of placement.
   1. Prepare mix designs on the basis of field experience (preferred) and/or trial mixes, in compliance with California Building Code (CBC), Section 1905A.3.
   2. Mix designs shall be prepared and signed by a structural or civil engineer registered in the State of California.
      a. Mix designs shall be reviewed by the Architect and Structural Engineer of Record (SEOR).
   3. Identify for each mix design submitted the method by which proportions have been selected.
      a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength calculations.
      b. For mix designs based on trial mixtures, include trial mix proportions, test results, graphical analysis and show required average compressive strength face results. Provide gross weight and yield per cubic yard of trial mixes.
      c. Indicate quantity of each ingredient per cubic yard of concrete.
      d. Indicate type and quantity of admixtures proposed or required.
      e. Indicate water to cement ratio by weight.
      f. Measured slump.
      g. Measured air content.
      h. Provide shrinkage test results.
      i. Provide maximum [5%] fly ash; ground granulated blast-furnace slag, and/or silica fume content as Portland cement replacement in all concrete.
      j. No fly ash will be permitted
   4. Submit proposed alternate design mixtures for review by the Architect and SEOR(Strutural Engineer of Record) when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

5. Mix designs for each application must be from a single source for the duration of the project. Multiple venders or courses will not be permitted.
6. All mix designs must be wet stamped by a licensed Engineer.

E. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
1. Coordinate with and identify the details of the Contract Drawings on the shop drawings.
2. Comply with ACI 315, part B and CRSI requirements.

F. Formwork Shop Drawings: Show formwork construction including form-facing joints, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect cast-in-place architectural site concrete.
1. Engineering Responsibility: Formwork shop drawings shall be prepared by or under the supervision of a licensed professional engineer detailing fabrication, assembly, and support of formwork.
2. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
3. Location of form ties and patterns are subject to approval of the Landscape Architect. For walls less than 18” high, ties to be located above and below wall face, whenever possible.
4. Align all form joints with reveal locations indicated on plans. Provide custom size and cut form boards as required.

G. Construction Joint Layout: Indicate proposed construction joints required to construct the structure. Submit dimensioned drawing indicating layout of construction joints, contraction (control) joints, dowelled joints, decorative scoring and placement sequence of concrete.
1. Location of construction joints are subject to approval of the Architect.
2. Construction joints locations should align with reveal locations as located per drawings.
3. Provide custom form boards as required for joint alignment noted per drawings.
4. Align all form joints with reveal locations indicated on plans. Provide custom size and cut form boards as required.

H. Placement Schedule: Submit concrete placement schedule before start of placement operations. Include locations of all joints including construction joints.

I. Samples: For each of the following materials:
1. Form-facing panel.
2. Form ties.
3. Form liners.
4. Coarse- and fine-aggregate gradations.
5. Chamfers and rustications.
6. Reveals
7. One quart sample of sand and fine aggregate
8. On quart sample of coarse aggregate

J. Qualification Data: For manufacturer (batch plant).

K. Welding Certificates: Submit certifications signed by AWS Certified Welding Inspector of prequalified welding procedures, qualifications of welding procedures unless prequalified, qualifications of welding operators and qualifications of welders.

L. Material Certificates: For each of the following:
1. Cementations materials.
2. Aggregates and sand.
3. Admixtures.
4. Form materials and form-release agents.

5. Steel reinforcement and accessories.
   a. Provide mill test certificates for all reinforcing steel, showing physical and chemical analyses. For steel that will be welded, include in the chemical analysis the percentages of carbon, manganese, copper, nickel, chromium, phosphorus and sulfur, and optionally, the percentages of molybdenum and vanadium.
6. Curing compounds.
7. Surface treatments.
8. Bonding agents.
9. Adhesives.
10. Semi rigid joint filler.
11. Joint-filler strips.
12. Repair materials.

M. Material Test Reports: For the following, by a qualified testing agency:
   1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

N. Field Quality-control Reports. Submit reports of all compressive strength, slump, shrinkage and air content tests required by the authorities having jurisdiction and as indicated.
   1. Submit copies of delivery tickets complying with ASTM C 94 for each load of concrete delivered to the site. Tickets shall include all information required by the referenced standard.

O. Minutes of pre-installation conference.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with CBC Chapter 19A.
   1. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.

B. Industry Standards: Comply with the following unless modified by requirements in the Contract Documents.
   1. ACI 301, "Specifications for Structural Concrete".
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
   3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction".
   4. ACI 303.1 "Specifications for Cast-in-Place Architectural Concrete".
   5. ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete".
   6. ACI 305R, "Hot Weather Concreting".
   7. ACI 306.1, "Standard Specification for Cold Weather Concreting".
   8. ACI 318, "Building Code Requirements for Structural Concrete".
   9. ACI 347, "Guide to Formwork for Concrete".
   10. ACI 318, "Building Code Requirements for Structural Concrete."
   11. ACI SP-66, "ACI Detailing Manual".
   12. CRSI, "Manual of Standard Practice".
   13. CRSI, "Placing Reinforcing Bars".

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "NRMCA Quality Control Manual - Section 3, Certification of Ready Mixed Concrete Production Facilities."
   2. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   3. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

4. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations for Cast-in-Place Architectural Site Concrete: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide cast-in-place architectural site concrete of consistent quality in appearance and physical properties for the duration of the project.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specification for Structural Concrete,"[Sections 1 through 5.] [Sections 1 through 5 and Section 6, "Architectural Concrete."]
2. ACI 303.1, "Specification for Cast-in-Place Architectural Concrete."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Source Limitations for Concrete Paving: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties. Secure all material required for the duration of the project as needed to ensure consistent quality in appearance

H. Welding Qualifications: Comply with CBC Chapter 17A.
1. Qualify welding procedures and welding personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel" prior to performing any welding.
2. Qualify welding inspection personnel according to AWS QC1, "Standard for AWS Certification of Welding Inspectors."

I. Mockups: Before casting architectural site concrete, build mockups to verify selections made under Sample submittals and to fully demonstrate typical joints, surface finish, texture, tolerances, reveals edges, bulkhead or cold joints, standard of workmanship and completed product. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Build mockups full-size, matching architectural site concrete components indicated on the Drawings. Mock-ups shall be complete in every detail, including joints, reveals, chamfers, etc. Include complex joinery conditions where necessary to integrate to other Project components as indicated.
3. Maintain accurate records of variables associated with each mockup to facilitate the matching of accepted mockups during actual construction.
4. Demonstrate curing, cleaning, and protecting of cast-in-place architectural site concrete, finishes, and contraction and expansion joints, as applicable.
5. Required Mock-up Types:
   a. Walls: Construct at least 6 linear feet by 4 foot height of finished concrete site walls for each color, finish, and mix design. Thickness of walls as noted on plans.
   b. Benches and Seats: Construct at least 6 linear feet of finished concrete site benches and seats.
   c. Planters: Construct at least 6 linear feet of finished concrete site planters.
   d. Amphitheaters and Steps: Construct at least 6 linear feet of finished concrete steps/amphitheater seating with 3 risers minimum.
   e. As-Cast Retarder Finishes: Mockups shall clearly demonstrate a consistent depth-of-cut for retarder finishes for Architect's review.

f. Repairs: In presence of Architect, damage part of the exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes, honeycombing, spalls, surface blemishes, etc. to match adjacent undamaged surfaces.

6. Mock-up Acceptance: Obtain Architect's approval of mockups before casting architectural site concrete.
   a. The mock-up acceptence shall be judged between a distance of 5 feet to 10 feet, at the Architects discretion.
   b. The Architect may reject mockups that, in the Architect's sole judgment, do not demonstrate an acceptable completed product, including, but not limited to, color, joint work, surface finish, texture, tolerances, and standard of workmanship
   c. The Architect may require modifications to mockups to obtain acceptable results.
   d. The Architect may require modifications to mockup repairs to obtain acceptable results.
   e. The Architect may require removal and reconstruction of mockups to obtain acceptable results. Multiple mock ups may be required.
   f. Contractor shall provide additional mockups as required to obtain results acceptable to the Architect at no additional cost to the Owner.
7. Mockup Disposition: Accepted mockups shall not become part of the completed Project. Maintain mock-up on-site for the duration of construction and until all work has been accepted. Remove and legally dispose mockups after acceptance of final installed work. If sufficient permanent architectural site work has been completed, Contractor may submit a written request to Architect to transfer quality control for architectural site concrete from the accepted mockups to one or more designated portions of the permanent work.

1.07 PROJECT CONDITIONS:

A. Traffic Control: Maintain access for Owner's operations and for vehicular and pedestrian control required for construction activities.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
   1. Label bundles with durable identification tags. Maintain reinforcement identification after bundles are broken.
   2. Store reinforcement to avoid excessive rusting or fouling with grease, oil, dirt or other bond-weakening contaminants.
   3. Avoid damaging applied coatings, if any, on steel reinforcement.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

A. General: Comply with Division 03 Section "Cast-in-Place Concrete" for formwork and other form-facing material requirements.

B. Form-Facing Panels for all exposed As-Cast and Exposed-Aggregate Concrete Finishes: Provide steel, glass-fiber-reinforced plastic, or overlain exterior-grade plywood panels, no absorptive, that will provide continuous, true, and smooth architectural site concrete surfaces, with no wood grain, honeycombing or patch transfer.
   1. Faced plywood panels shall comply with, or be equivalent to, DOC PS 1, Structural I. Provide minimum 7-ply plywood and provide balance sheets for panels coated one-side only. Furnish in largest practicable sizes to minimize number of joints.

a. Smooth As-Cast Finish: High-Density Overlay (HDO). Provide one of the following panels, or comparable substituted product:
   1) Olympic Panel Products, "Multipour Concrete Form." Overlay Color: Buff.
   2) Pacific Laminate Products, "ProFace HDO." Overlay Color: White.
   3) Sylvan Products, LLC, "Armor Ply HDO" Overlay Color: Buff.
b. Retarder As-Cast Finish: Medium-Density Overlay (MDO), with mill-applied release agent and edge sealant. Provide one of the following panels, or comparable substituted product:
   1) Olympic Panel Products, "B-Matte 333 MDO Concrete Form." Overlay Color: Brown.
   2) Pacific Laminate Products, "ProFace MDO." Overlay Color: Black.
   3) Sylvan Products, LLC, "Armor Ply MDO" Overlay Color: Brown.

2. Curved Work: Kerf back of plywood form-facing panels, or use accepted flexible or curved forms for curved work with a radius of 100 feet or less to match finish provided by form material noted in items 1 and 2 above.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will provide surfaces without gradual or abrupt irregularities that exceed specified formwork surface class.
1. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
2. Finished work is to be free of seams or form markings.

D. Form Liners: Units of face design, texture, arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent surface treatments of concrete.

E. Form Joint Sealant: Urethane or silicone elastomeric sealant complying with ASTM C 920, Type M or Type S, Grade NS that adheres to form joint substrates. Form joint sealant shall be compatible with form-facing panels.

F. Form Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood. Form sealer shall be compatible with form-facing panels. All seams and joints are to be sealed.

G. Form-Release Agent: Commercially formulated, colorless form-release agent that will not bond with, stain, or adversely affect architectural site concrete surfaces and will not impair subsequent treatments of those surfaces. Form-release agent shall be compatible with form-facing panels.
1. Obtain written acceptance of form release agent from integral colored concrete pigment manufacturer.
2. Form-release agents shall be non-staining.
3. Formulate form-release agent with rust inhibitor for steel form-facing materials.

H. Surface Retarder (In Form): Chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed concrete surface to depth of reveal specified.
1. Provide Architectural Concrete Chemicals(ACC) "Altus VOC Series" or accepted comparable substitute.

I. Surface Retarder (Top Surface): Chemical liquid set retarder, for application on top surface of formed applications to match finish at formed faces, capable of temporarily delaying final hardening of newly placed concrete surface to depth of reveal specified.
1. Provide W. R. Grace "Top-Cast" or accepted comparable substitute.

J. Form Ties: Factory-fabricated, stainless steel or fiberglass color keyed to wall color snap ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties with tapered plastic tie cone spreaders that, when removed, will leave holes 3/4 inch in diameter on concrete surface.
2. Furnish internally disconnecting ties that will leave no metal closer than 1-1/2 inches (38 mm) after exposing aggregate, from the architectural site concrete surface.
3. Furnish glass-fiber-reinforced plastic ties, not less than 1/2 inch (13 mm) in diameter, of color selected by Architect from manufacturer's full range.
4. Furnish ties with integral water-barrier plates to walls indicated to receive damp proofing or waterproofing.

K. Provide new forms specifically purchased for this project. Reuse of forms from past projects or contractors stock will not be accepted.

L. Provide custom form boards as required to align seams with reveals indicted on plans.

2.02 STEEL REINFORCEMENT AND ACCESSORIES

A. General: Comply with Division 03 Section "Cast-in-Place Concrete" for steel reinforcement and other requirements for reinforcement accessories.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 60 percent.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, unless otherwise indicated.

D. Low-Alloy-Steel Reinforcing Bars (for Welding): ASTM A 706/A 706M, Grade 60, deformed, unless otherwise indicated.

E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place; manufacture according to CRSI's "Manual of Standard Practice."
1. Where legs of wire bar supports contact forms, use CRSI Class 2, stainless-steel bar supports.

F. Tie Wire: Minimum 16 ga. annealed wire, black, galvanized or coated finish to match rebar.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C 150, Type II, or Type IV, gray, unless white cement is required to achieve colors indicated. Supplement with the following:
   a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, complying with building code. Provide aggregates from a single source. All aggregates shall be free of materials with deleterious reactivity to alkali in cement when tested in accordance with ASTM C 289.
1. Comply with CBC section 1903A.3.
2. Maximum Coarse-Aggregate Size: [3/8] inch nominal. Maximum size shall also not be larger than 1/4 of the narrowest dimension between forms, 1/3 the depth of slab nor more than 3/4 of the minimum clear spacing between individual reinforcing bars.
   a. Gradation: Uniformly graded.
   b. Source: Reliance, San Gabriel, or Carrol Canyon

C. Normal-Weight Fine Aggregate: ASTM C 33 or ASTM C 144, manufactured or natural sand, from same source for Project, free of materials with deleterious reactivity to alkali in cement and free of materials which may cause staining and light in color
1. Source: Reliance, Fosters or Corona.
2. Color to be white to light with no dark material.

D. Water: Potable, complying with ASTM C 94/C 94M except free of wash water from mixer washout operations.

2.04 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   3. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Shrinkage-Reducing Admixture: Commercially formulated, shrinkage inhibitor capable of reducing initial shrinkage by 80% and long-term shrinkage by 50%. Provide product suitable for use with either air-entrained or non-air-entrained concrete as appropriate to structural member and project location.
   1. Products: Subject to compliance with requirements, provide one of the following(as required):
      a. Euclid Chemical Company (The), an RPM company; EUCON SRA, SRA+.
      b. Grace Construction Products, W. R. Grace & Co.; Eclipse Floor, Eclipse Plus.
      c. Sika Corporation; Control 40.

2.05 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. /sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Clear, Waterborne (Non-Colored Concrete): Provide products complying with ASTM C 309, Type 1, Class B, 18 to 25 percent solids, certified by curing compound manufacturer to not interfere with bonding of sealers, with no glossy finish and compatible with specified sealer. Provide products with not more than 100g/L volatile organic content.
   1. Products: Subject to compliance with requirements.

D. Clear, Waterborne (Colored Concrete): Provide products that are acceptable to concrete color pigment manufacturer complying with ASTM C 309, Type 1, Class B, 18 to 25 percent solids, certified by curing compound manufacturer to not interfere with bonding of sealers with no glossy finish and compatible with specified sealer. Provide products with not more than 100g/L volatile organic content.
   1. Products: Subject to compliance with requirements.

E. Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
   1. For integrally colored concrete, curing compound shall be approved by color pigment manufacturer.
   2. For concrete indicated to be sealed, curing compound shall be compatible with sealer.

2.06 SEALERS AND WATER REPELLENTS

A. Penetrating Liquid Floor and Horizontal Surface Treatment (Sealer): Clear, chemically reactive, water-based lithium quartz water-based lithium materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces. Materials shall be compatible with concrete admixtures and shall be recommended by manufacturer for intended use. Provide products with 0g/L volatile organic content.
   1. Products: Subject to compliance with requirements, provide one of the following:

a. Sinak Corporation; Concrete Sealer HLQ 125.

B. Penetrating Liquid Wall and Vertical Surface Treatment (Repellent): Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces. Materials shall be compatible with concrete admixtures and shall be recommended by manufacturer for intended use. Provide products with less than 100g/L volatile organic content.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Rainguard International; Microseal(For use with VandlGuardTEN Anti-graffiti coating)

2.07 **ANTI-GRAFFITI COATING**

A. Refer to Section 099620 Permanent Non-Sacrificial Anti-Graffiti Coating for product and specific sealer.
1. Compatible sealer to be applied prior to use of Anti-graffiti coating.

2.08 JOINT DEVICES, FILLER MATERIALS AND OTHER ACCESSORY PRODUCTS

A. Joint Filler at Exterior Sealed Joints: ASTM D 1751
1. Lightweight, nonstaining, polyethylene closed cell expansion joint filler
a. Deck-O-Foam as manufactured by W.R.Meadows, Hampshire, Ill.
2. Exterior Expansion- and Isolation-Joint-Filler Strips: See Division 32 Section "Concrete Paving Joint Sealants" for sealants for exterior joints at concrete pavements.

2.09 REPAIR MATERIALS

A. General: Provide cementitious materials, coarse aggregates, fine aggregates, water, bonding agents and admixtures as required to prepare repair grouts that will match as-cast and site finished architectural site concrete.
1. Maintain accurate records of repair materials and mixtures used on accepted mockups.

B. Bonding Agent: ASTM C 1059, Type II, non-re-emulsifiable. Provide proprietary products composed of latex polymers.
1. Products: Subject to compliance with requirements, provide one of the following:
a. W.R. Meadows, Inc.; Acry-Lok.
b. Grace Construction Products, W. R. Grace & Co.; "Daraweld C".
c. Larsen Products Corp., "Weld-Crete".
2. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.
3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete and for anchoring dowels to hardened concrete.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of cast-in-place architectural site concrete proportioned on basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed design mixtures based on laboratory trial mixtures.
2. Proportioning:
a. The proportioning of ingredients shall be such that the concrete can be readily worked into forms and around reinforcement under the conditions of placement to be used, without segregation or excessive bleeding.
b. When proportioning by weight of loose, dry material, 94 pounds of cement shall be considered 1 cubic foot.

c. Fine aggregate volume shall be at least 35 percent, with a maximum of 50 percent, of the sum of the separate fine and coarse aggregate volumes.
d. Total water content shall not exceed 35 gallons per cubic yard of concrete.
e. Weighing equipment shall be accurate within 1 pound and shall be adjustable for varying aggregate moisture content.
f. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.

3. Prepare compressive strength data for both 7-day and 28-day strengths.
   a. The 7-day compressive strength shall be at least 60 percent of the required 28- day strength.
   b. The 28-day compressive strength shall be as indicated.
4. Provide drying shrinkage test data at 28 days, from not less than 3 test specimens.

B. Proportion concrete mixtures as follows:
1. Minimum Compressive Strength (28 Days): 3000 psi.
   a. Provide the following minimum compressive strength (28 days) where required by high-pressure water or bush hammer finishing techniques: 4500 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.50-0.60.
3. Slump Limit: 4 inches, plus or minus 1 inch, unless indicated otherwise.
4. Slump Limit (High-Range Water-reducing Admixture): 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture, plus or minus 1 inch, unless indicated otherwise.
5. Slump Limit (Plasticizing Admixture): 8 inches for concrete with verified slump of 2 to 4 inches before adding plasticizing admixture, plus or minus 1 inch, if required/unless indicated otherwise.

C. Slump Limit: [4 inches (100 mm)] [8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture], plus or minus 1 inch (25 mm), unless otherwise indicated.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Limit "drying shrinkage" after 28 days of curing hardened concrete to 0.045 percent of the original concrete volume.
2. Admixtures: Admixtures may only be used if they are incorporated into the accepted concrete mix designs. Use admixtures according to manufacturer's written instructions.
   a. Use [water-reducing] [high-range water-reducing] [or] [plasticizing] admixture in concrete, as required, for placement and workability.
   b. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with accepted mockup.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
1. Splices: Do not splice bars, unless indicated on the Drawings.
2. Staggered Splices: Stagger splices such that not more than one-half of the reinforcing bars are spliced at any location.

2.12 CONCRETE MIXING

A. Ready-Mixed Architectural Site Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M [and ASTM C 1116/1116M] and furnish batch ticket information.
1. Clean equipment used to mix and deliver cast-in-place architectural site concrete to prevent contamination from other concrete.

2. When air temperature is between 85 and 90 deg. F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg. F, reduce mixing and delivery time to 60 minutes.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.01 FORMWORK

A. General: Comply with the following, unless otherwise indicated:
   1. Conform to ACI 318, ACI 347 and CBC Section 1906A.

B. Structural Loads: Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

C. Geometry: Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Provide for necessary openings, inserts, anchorages, and other features indicated or required. Properly locate all elements.
   1. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
      a. Class A, 1/16 or 1/8 inch for smooth-formed finished surfaces.

D. Form Joints: Minimize form joints and make forms watertight to prevent leakage of concrete mortar. Locate form joints at exposed concrete symmetrically about center of panel and aligned with reveals, unless otherwise indicated. Align joints symmetrically at exposed conditions.
   1. Seal penetrations at form ties with form joint sealant to prevent cement paste leakage.
   2. Provide custom form boards as required to align with reveals.

E. Removal: Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where dismantling or stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Chamfers: Chamfered edges are not allowed.

3.02 EARTH FORMS

A. General: Unless indicated, placement of concrete directly against soil or earth (casting "neat") shall not be permitted only with the prior approval of the Structural Engineer of Record. Concrete placed directly against earth shall require a minimum increase in concrete thickness of 1" at vertical faces. For example, footings shall be 2" wider than indicated if both vertical faces are cast against earth.

B. Trimming and Cleaning: Hand trim sides and bottoms of soil forms and trenches. Remove loose soil, exposing undisturbed native soil, and prior to placing concrete.

3.03 CONSTRUCTED FORMWORK

A. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

B. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

C. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

D. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

E. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

F. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

G. Provide bracing and shores to ensure stability of formwork and accommodate all loads. Use form ties of sufficient strength and in sufficient quantities to prevent formwork spreading. Maintain principal shores to support concrete until required strength is achieved.

3.04 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install embedded accessories level, true-to-line and plumb in accordance with manufacturer's instructions.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   3. Provide reveals around embedded items such as light fixtures as shown on Drawings.

3.05 OPENINGS, DEPRESSIONS, RECESSES AND CHASES

A. Size and locate formed openings, depressions, recesses and chases to accommodate products to be applied to, built-into and/or pass-through concrete Work. Coordinate size, location and placement of inserts, embedded products, openings and recesses with Work of other sections. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.06 FORM RELEASE AGENTS

A. General: Provide either form materials with factory-applied non-absorptive liner or field-applied form coating. Field-applied coating shall be non-staining.
   1. Non-absorptive Liner: Rust on steel form surfaces is not acceptable.
   2. Field Applied Coating: Comply with manufacturer's written instructions. Obtain written acceptance of form release agent from integral colored concrete pigment manufacturer.
      a. Reapply coating to thoroughly cleaned and reconditioned formwork before each use.
      b. Verify compatibility of release agents with integrally-colored concrete and all subsequently applied curing compounds, coatings, applied finishes, etc. Do not apply release agent if items are non-compatible.

c. Do not apply release agent where decorative wood graining is intended for concrete surface. Leave form face dry.

3.07 CONCRETE SURFACE RETARDERS

A. Coat contact surfaces of forms with surface retarder, according to manufacturer's written instructions, before placing reinforcement.

3.08 FORM LINERS

A. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting. Prevent form liners from sagging and stretching in hot weather. Seal joints of form liners and form liner accessories to prevent mortar leaks. Coat form liner with form-release agent.

3.09 REMOVING AND REUSING FORMS

A. General: Formwork for sides of walls, steps, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg. F for 72 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
   1. Schedule form removal to maintain surface appearance that matches accepted mockups.
   2. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved its 28-day design compressive strength, but not less than 21 days after pour.
   3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
   4. All formwork is to be new specifically purchased for this project.

B. Clean and repair surfaces of forms to be reused in the Work in non-exposed areas. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.10 STEEL REINFORCEMENT

A. General: Place and secure reinforcement as indicated. Comply with CRSI publications "Manual of Standard Practice" and "Placing Reinforcing Bars".
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
   2. Do not bend bars more than once.
   3. Do not bend or straighten reinforcement in a manner injurious to the material, such as heating.
   4. Do not use bars with kinks or bends not indicated.
   5. Do not use bars with reduced cross-section due to corrosion or other cause.
   6. Remove and replace all defective bars.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Space reinforcement as indicated. If not indicated, maintain clear spacing of not less than the bar diameter, 1-inch, or 1-1/3 times the maximum aggregate size, whichever is greater. Where parallel reinforcing is placed in more than one horizontal layer, place as many bars as possible in the outboard layer, maintaining the required lateral clearances and spacing's. Place bars in the inboard layer in direct vertical alignment with the bars of the outboard layer. Maintain not less than 1-inch or the maximum bar diameter in the inboard/outboard layers, whichever is greater, clear space between vertically stacked bars.

D. Accurately position, support, and secure reinforcement against displacement.
   1. Maintain reinforcing steel positions during placement operations. Properly reset any reinforcement that is displaced by runways, workmen and other causes.

E. Locate and support reinforcement with bar supports to maintain minimum concrete cover as indicated or as required by ACI 318.

F. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

G. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

H. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.11 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction or Cold Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Locate horizontal joints in walls and columns as indicated.
   3. Space vertical joints in walls as indicated and as may be directed by the Architect. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   6. Align joints with reveals indicated. Provide custom cut form boards as required.
   7. Do not place expansion material at cold joints.

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, walls and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.12 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, form-release agent, surface retarders, reinforcement, and embedded items is complete and that required inspections have been performed.
   1. Provide protective coatings, coverings and masking's to protect adjacent Work.
   2. Provide temporary runways and other appropriate equipment as necessary to access Work area and to avoid soiling or damage to existing Work.
   3. Prevent run-off of concrete hydration water and water polluted by agents and chemicals from soiling existing surfaces or contaminating landscape areas.

B. Do not add water to concrete during delivery, at Project site, or during placement.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
   2. If indicated in mix design accepted by the Architect, water added to concrete shall be observed by the Project Inspector, and shall be recorded on the delivery ticket.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. Deposit concrete continuously between construction joints. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. No visible cold joints or lift lines are acceptable in the completed work.
   3. Consolidate placed concrete with mechanical vibrating equipment according to ACI 303.1.
   4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. Do not permit vibrators to contact forms. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
   5. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   6. Maintain reinforcement in position on chairs during concrete placement.
   7. Screed slab surfaces with a straightedge and strike off to correct elevations.
   8. Slope surfaces uniformly to drains where required.
   9. Begin initial floating using bull floats or derbies to form a uniform and open-textured surface plane, before excess bleed water appears on the surface.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg. F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents.
   4. Do not use chemical accelerators unless otherwise specified and accepted in design mixtures.

F. Hot-Weather Placement: Comply with ACI 305R and as follows:

1. Maintain concrete temperature below 90 deg. F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.13 FINISHES, GENERAL

A. Architectural Site Concrete Finishes: Match accepted mockups to satisfaction of Architect.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces.
   1. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

C. Maintain uniformity of special finishes over construction joints unless otherwise indicated.

3.14 AS-CAST FORMED FINISHES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Remove fins and other projections exceeding specified limits on formed-surface irregularities. Repair and patch tie holes and defects to match the accepted mockups. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding specified limits on formed-surface irregularities.

3.15 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 305R for hot-weather protection during curing.

B. Begin curing cast-in-place architectural site concrete immediately after removing forms from concrete or after applying as-cast formed finishes to concrete, consistent with mockup preparation. Cure according to ACI 308.1, by one or a combination of the following methods that will not mottle, discolor, or stain concrete:
   1. Moisture Curing: Keep exposed surfaces of cast-in-place architectural site concrete continuously moist for no fewer than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for no fewer than seven days. Immediately repair any holes or tears during curing period; use cover material and waterproof tape.
   3. Curing Compound: Mist concrete surfaces with water. Apply curing compound uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the CBC and ACI 301.
   1. Comply with the requirements of Division 01 Section "Quality Control-DSA".

B. Inspections:
   1. Steel reinforcement placement.
   2. Steel reinforcement welding.
   3. Headed bolts and studs.
   4. Verification of use of required design mixture.
   5. Structural concrete placement, including conveying and depositing.
   6. Curing procedures and maintenance of curing temperature.
   7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
   4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg. F and below and when 90 deg. F and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M.
      a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
      b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
      a. Test one set of two field-cured specimens at 7 days and reserve one set of two specimens for testing at 56 days.
      b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
   7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
   8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.17 DEFECTIVE CONCRETE

A. The following list includes, but is not limited to; concrete that will be deemed to be defective and non-conforming. All such concrete shall be removed and replaced with Work complying with the requirements of the Contract:
   1. Concrete not formed as indicated, not true to alignment indicated, not plumb where intended, not level where intended, not true to level or elevation intended.
   2. Concrete voided or honeycombed, including voids and honeycombs that have been cut, resurfaced or filled without prior approval of the Architect.
   3. Concrete with exposed reinforcement.
   4. Concrete with inadequate cover over reinforcement.
   5. Concrete with embedded foreign objects and debris, including sawdust, wood or metal shavings, nails, cans, trash, etc.
   6. Concrete that does not visually match the accepted mockups [or the designated design reference sample].
   7. Other non-conforming work.

B. All concrete deemed to be defective by the Architect or in non-conformance with the contract documents is to be removed and replaced from expansion joint or cold joint to expansion joint or cold joint at no cost to the owner. Repair defective concrete as directed by the Architect, at no cost to the Owner.

3.18 SEALERS AND REPELLENTS

A. General: Uniformly apply a continuous sealing coat of sealers or repellents to all exposed surfaces of architectural site concrete by power spray or roller according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than 28 days old.

B. Penetrating Liquid Floor and Horizontal Surface Treatment (Sealer): Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

C. Penetrating Liquid Wall and Vertical Surface Treatment (Sealer/Repellent): Prepare, apply, and finish penetrating liquid repellent treatment according to manufacturer's written instructions.

3.19 **ANTI-GRAFFITI COATING**

A. Refer to Section 099620 Permanante Non-Sacrificial Anti-Graffiti Coating.

B. Apply to all exposed architectual site concrete.

C. Apply compatilble sealer to exposed architectural site concrete prior to installation of Anti-Graffiti coating.

3.20 REPAIRS, PROTECTION, AND CLEANING

A. Patching or sacking of damaged or defective concrete as a determined by the Architect is not permitted. Remove and replace all damaged or defective concrete from joint to joint. Remove/Repair and cure damaged or defective finished surfaces of cast-in-place architectural site concrete when accepted by Architect. Match repairs to color, texture, and for any replaced work/uniformity of surrounding surfaces and to repairs on approved mockups.

B. Remove and replace cast-in-place architectural site concrete that does not match mockups accepted by Architect.

C. Protect corners, edges, and surfaces of cast-in-place architectural site concrete from damage; use guards and barricades.

D. Protect cast-in-place architectural site concrete from staining, laitance, and contamination during remainder of construction period.

E. Clean cast-in-place architectural site concrete surfaces after finish treatment to remove stains, markings, dust, and debris.

F. Wash and rinse surfaces according to concrete finish applicator's written instructions. Protect other Work from staining or damage due to cleaning operations.

1. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural site concrete finishes.

END OF SECTION

SECTION 32 84 00
IRRIGATION SYSTEM

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2020.

B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

C. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2020.

D. ASTM D2464 - Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2023.

1.02 SUMMARY

A. The CONTRACTOR shall provide all labor, materials, supplies, tools, and transportation and perform all operations in connection with and reasonably incidental to complete the installation of the automatic sprinkler irrigation systems as shown on the drawings. Items hereinafter are included as an aid to take off, and are not necessarily a complete list of work items.
   1. Keep existing valves operational as required.
      a. Relocate and adjust existing sprinkler heads to achieve and maintain head to head coverage as required.
      b. Trenching, stockpiling, excavation, materials, and refilling trenches.
      c. Furnishing materials and installation for complete system including piping, valves, fittings, sprinkler heads, dripline and fittings, automatic controls, and final adjustment of heads to insure complete coverage.
      d. Line voltage connections to the irrigation controllers and low voltage control wiring from controllers to remote control valves.
      e. Replacement of unsatisfactory materials.
      f. Re-sod or seed all irrigation trenches through existing sod areas.
      g. Clean-up, inspection and approval.
      h. All work of every description mentioned in the specification and/or addenda thereto, all other labor, and materials reasonably incidental to the satisfactory completion of the work, including clean-up of the site, as directed by the Project Representative.
      i. Tests.
      j. As-built record drawings.

B. Work Specified Elsewhere:
   1. Irrigation water stub-out.
   2. 120 volt A.C. electrical stub-out to controller location.
   3. Irrigation piping in structure.
   4. Irrigation sleeves.
   5. Electrical conduit in structure for 24-volt wire.

1.03 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Irrigation System:

1. Measurement: Irrigation system installation is measured on a lump sum basis.
    a. Payment: The contract lump sum price paid for the Irrigation System shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the Irrigation System, complete in place.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer catalog information on all material to be used on the project as specified on the legend, notes, details and plans. Redline or highlight exact items on page to be submitted. Complete material list shall be submitted prior to performing any work.

B. Substitutions: No substitution will be permitted without prior written approval by the Project Representative. If the product is approved and, in the opinion of the Project Representative, the substituted product does not perform as well as the specified product, the Contractor shall replace it with the specified product at no additional cost to the Project Representative.

C. All equipment or materials installed or furnished without prior approval of the Project Representative may be rejected and the Contractor may be required to remove the equipment or material at their own expense.

1.05 CLOSEOUT SUBMITTALS

A. Project As-built Record Documents:
    a. The Contractor shall maintain in good order in the field office, one complete set of black line prints of all sprinkler drawings which form a part of the contract, showing all water lines, electrical, sprinklers, valves, stub-outs. In the event any work is not installed as indicated on the drawings, such work shall be corrected and documented accurately on the working drawings.
    b. Dimension from two permanent points of reference, such as building corners, sidewalks, road intersections or monuments, the following items:
        1) Connection to water source
        2) Backflow preventor
        3) Gate valves
        4) Routing of pressurized mainlines and lateral lines
        5) Remote control valves
        6) Quick coupling valves
        7) Flow sensor, master valve, and irrigation controller
    c. Deliverables shall be one full size colored hard copy of the contract drawings with redlines and dimensions or a full sized colored scanned PDF version.

B. Controller Chart:
    a. Provide one laminated (hermetically sealed between two pieces of 10 mil. plastic) controller chart showing the area covered by controller for each automatic controller supplied at the maximum size controller door will allow. Chart shall be a reduced drawing of the actual "as-built" system. If controller sequence is not legible when the drawing is reduced to door size, the drawing shall be enlarged to a size that is readable and placed folded, in a sealed plastic container, inside the controller door.
    b. Controller chart shall be a blackline print with a different color used to show area of coverage for each station. Charts must be completed and approved by the Project Representative prior to final inspection of the irrigation system.
    c. Locate all dripline flush valves and dripline indicators on colored plans if the locations differ from design plans.

C. Controller Cloud Based Communication and Flow Sensor installation confirmation:

a. Provide written confirmation that the cloud-based communications are set up and operational between controller(s) and cloud-based server.
b. If controller is a two-wire type controller. Provide confirmation that the controller is communicating with each decoder valve on system and there are no error messages logged on the cloud-based communication system. Provide a printout of information to Landscape Architect or Irrigation Consultant.
c. Provide written confirmation from the distributor/manufacturer's representative that the controller is communicating with flow sensors and that the correct "k" and "offsets" are setup and utilized properly. The “k” and “offsets” are pre-set numbers you plug into the controller software based on the flow sensor size and type when calibrating the flow sensor. Confirm that flow values have been "learned" and recorded for each valve on the controller, and the correct gpm per valve is shown and verified on a printout and provided to Landscape Architect or Irrigation Consultant. Flow alarms and automatic shut offs should be set up after plant establishment.

D. Maintenance and Operating Instructions and Manuals:
a. Contractor shall prepare an Operation and Maintenance Manual, organized in a 3-ring binder, containing the following information.
1) Contractor's name, address, and telephone number. Duration of guarantee, periods as specified herein, list of equipment with names and addresses of local manufacturer’s representatives with duration of written warranties. Complete operating and maintenance instructions on all equipment spare parts lists and related manufacturer's information.
b. Submit the Operation and Maintenance Manual to the Project Representative within 10 Calendar Days of completion of work of this Section and as a condition of project acceptance.

E. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis:
a. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who design the landscape or installed landscape.
b. In large projects or projects with multiple landscape installations (i.e. production home developments) an audit rate of 1 to 7 lots or approximately 15% will satisfy this requirement.
c. For new construction and rehabilitated landscape projects installed after December 1,2015, as described in Section 490.1:
1) The project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factor, slop, exposure and any other factors necessary for accurate programming.

1.06 QUALITY ASSURANCE & GENERAL REQUIREMENTS

A. Qualifications: The Contractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible keep the same foreman and workmen on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workmen will be allowed on the job. A minimum of five years’ experience of installing irrigation systems of similar scope, size and complexity as the system being installed under this scope of work is required for all on-site job superintendents.

B. Manufacturer's installation instructions and best practices: Manufacturer's installation instructions shall be followed in all cases when not shown in the Drawings or Specifications.

C. O.S.H.A. Compliance: All articles and services covered by this specification shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act of 1970, together with all amendments in effect as of the date of this specification.

D. All irrigation systems shall be installed to meet or exceed the requirements set forth in the California Department of Water Resources Model Water Efficient Landscape Ordinance.

E. All materials supplied for this Project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to City.

F. Codes and Standards: Comply with all applicable codes and standards.
   a. All work and materials shall be in full accordance with the latest rules and regulations of 2022 CEC, the National Electric Code; published by the Western Plumbing Officials Association; California Code of Regulations, Title 23, Division 2. Department of Water Resources, Chapter 2.7. Model Water Efficient Landscape Ordinance; and other State or local laws regulations. Nothing in these drawings or specifications is to be construed as to permit work not conforming to these codes.
   b. When the specifications call for materials or construction of a better quality or larger size than required by the above mentioned rules and regulations, the provision of the specifications shall take precedence over the requirements of said rules and regulations.
   c. Contractor shall furnish, without extra charge, any additional material and labor when required by the compliance with these rules and regulations, though the work be not mentioned in these particular specifications or shown on the drawings.
   d. The Contractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by O.S.H.A. regulations for the protection of the public or workmen.
   e. Any existing buildings, equipment, piping, pipe covering sewers, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner satisfactory to the Project Representative and at Contractor's own expense, before final payment is made. The Contractor shall be responsible for damage caused by leaks in the piping systems being installed or having been installed under this contract. He/she shall repair, at his/her own expense, all damage so caused, in a manner satisfactory to the Project Representative.
   f. The Contractor shall secure the required licenses and permits including payments of charges and fees, give required notices to public authorities, verify permits secured or arrangements made by others affecting the Work of this section.

1.07 EXISTING CONDITIONS

A. Protection of Existing Structures and Utilities
   a. The Drawings show, if applicable, existing above and below grade structures and utilities that are known to the Project Representative. Locate known existing installations before proceeding with construction operations that may cause damage to such installations. Existing installations shall be kept in service where possible and damage to them shall be repaired with no adjustment of Contract Sum. Verify with Project Representative if As Built drawings are available.
   b. If other structures or utilities are encountered, request Project Representative to provide direction on how to proceed with the Work. If a structure or utility is damaged, take appropriate action to ensure the safety of persons and property.

B. Trench Interference with Existing Tree Root Systems: Prior to trenching, layout main and lateral line locations within drip Line of trees and review locations with Project Representative. Relocate any lines that may interfere with existing root systems to avoid or reduce damage to root systems as accepted by Project Representative.

C. Provide barricades, coverings, warning signs, lights and other protection required by local code or OSHA to prevent damage to existing improvements to remain and to protect the public.

1.08 DELIVERY, STORAGE AND HANDLING:

A. Protection: Use all means necessary to protect irrigation system materials before, during and after installation and the installed work and materials of all other trades.

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Project Representative and at no additional cost to the project.

a. Exercise care in handling, loading, unloading and storing plastic pipe and fittings under cover until ready to install; transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load. Protect pipe from sunlight.

b. Repair all dented and damaged pipe by cutting out the dented or damaged section and rejoining with a coupling.

1.09 LAYOUT OF WORK

A. The Contractor shall stake out the irrigation system as shown on the drawings. These areas shall be checked by the Contractor and Project Representative before construction is started. Any changes, deletions or additions shall be determined at this check.

B. Due to the scale of the Drawings, it is not possible to indicate all piping offsets, fittings, sleeves, etc., which may be required. Carefully investigate the conditions affected all of the work and plan accordingly, and furnish all required fittings. Install system in such a manner to avoid conflicts with planting, utilities and architectural features.

C. Do not install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences or discrepancies in arc dimensions exist that might not have been considered. Bring such obstruction or differences to the attention of the Project Representative. Notify and coordinate irrigation Work with applicable contractors for location and installation of piping and sleeves through or under walls, pavement and structures. In the event this notification is not given, the Contractor shall assume full responsibility for any revision necessary.

1.10 SEQUENCING AND SCHEDULING

A. Acceptance: Do not install main line trenching prior to acceptance by Project Representative of rough grades completed under another Section.

B. Coordination: Coordinate with all other trades: the sleeving, power requirements of the project, prior to the start of construction.

1.11 EXISTING IRRIGATION SYSTEM

A. This Contract requires that the existing irrigation system be kept intact on all areas of the park not yet worked on to permit normal watering during construction. On areas that have been installed according to these plans and specifications, irrigation shall be programmed to operate via the controller. On areas being worked on, the Contractor shall afford the City every opportunity to hand water during the period of shutdown with particular emphasis on the ballfields

B. After the new irrigation system is fully functional, all existing sprinklers, valves, valve boxes, and quick coupling valves in the work areas will be removed by the Contractor. Fill all void with backfill material leaving 6” near the surface for topsoil. Compact by mechanical tamping to a minimum compaction of 85% relative compaction. Add a minimum of 6” of topsoil to compacted backfill. The topsoil shall be placed and blended to the satisfaction of the Project Representative. In turf areas, re-seed the topsoil with an approved seed mix.

1.12 INSTRUCTION

A. After the system has been installed and approved, the Contractor shall instruct the Project Representative and or Maintenance Contractor, in complete operation and maintenance of the irrigation system.

PART 2 MATERIALS

2.01 PIPE AND FITTINGS

A. PVC Pressure Mainline pipe and fittings.
   1. Pressure mainline piping:
      1) 3” AND SMALLER: Shall be PVC 1120-Schedule 40 plastic pipe. Pipe shall be made from NSF approved Type 1, Grade 1 PVC compound conforming to ASTM D1785.
      b. Schedule 40 pipe shall be manufactured in strict compliance to ASTM D1785 and D2665 (where applicable), consistently meeting and/or exceeding the Quality Assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening, and extrusion quality.
   2. All PVC pipe shall bear the following markings:
      a. Manufacturer’s name
         1) Nominal pipe size
         2) Class or Schedule
         3) Pressure rating in PSI
         4) NSF
         5) Date of extrusion
      b. Use solvent weld pipe for mainline pipe with a nominal diameter less than 3-inches or where a pipe connection occurs in a sleeve. Use Schedule 40 Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784 at changes in direction or branch mains. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.
      c. Connections between main lines and RCV’s shall be of Schedule 80 PVC (threaded both ends) nipples and fittings.
      d. All fittings shall bear the manufacturer’s name or trademark, material designation, size, applicable I.P.D. schedule and NSF Seal of approval.
      e. Inside diameter of pipe shall be the same size as iron pipe.
      f. PVC Type I shall not be threaded.
      g. PVC fittings shall be PVC Type II, Schedule 40 NSF approved.
      h. Caution shall be utilized in handling Type I pipe due to the possibility of cracking or splitting.
      i. When connection is plastic to metal, male adapters shall be used unless otherwise noted or detailed. The Male adapter shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base (Teflon paste or equal).
      j. Threaded Nipples – ASTM D2464, Schedule 80 with molded threads.

B. PVC Non-pressure lateral line and fittings

a. Lateral lines (non-pressure): 3/4” and larger shall be Schedule 40 PVC plastic pipe.
b. Manufactured from virgin polyvinyl chloride (PVC) compound in accordance with ASTM D2241 and ASTM D1784; cell classification 12245-B, Type 1, Grade 1.
c. Fittings – All lateral lines shall be connected with Schedule 40, Type I, Grade I, PVC solvent weld fittings.
d. Threads – Injection molded type (where required).
e. Tees and ells – Side gated.
f. Threaded Nipples – ASTM D2464, Schedule 80 with molded threads.
g. Refer to “trenching and backfilling” elsewhere in these specifications for minimum depths.

C. Solvent for all PVC pipe shall be #711 Gray, along with #P-70 primer, NSF approved as manufactured by Industrial Polychemical Service, Gardena, California, or approved equal.

D. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as RectorSeal #5.

E. PVC Flexible Pipe: Extruded from flexible vinyl chloride compound.
1. ½ inch pipe: 0.50 inch inside diameter, 0.090 inch wall thickness
2. Material shall conform to ASTM designation D-2287.

F. Swing joints shall be as shown on construction details.

2.02 SLEEVES

A. Sleeve below all hardscape elements with SCH 40 or Class 200 PVC twice the diameter of the pipe or wire bundle within, or as delineated on the plans.

B. Under Hardscape Crossings: Sleeves shall extend a minimum of 24 inches beyond all sidewalks, or shall be extend 24” beyond the back edge of the curb, where noted on the plans.

2.03 MASTER CONTROL VALVE

A. Master control valve shall be a normally open 24 VAC solenoid actuated globe pattern valve.

B. Valves shall be made of brass with a minimum pressure rating of 150 PSI

C. Valve shall have external and internal bleed for manual operation.

D. Valve model and size shall be as shown on drawings.

2.04 FLOW SENSORS

A. Inline flow sensors shall be installed in accordance with the manufacturer’s installation instructions. Contractor is responsible for the installation, all required materials and connections of the flow sensors for complete operation with the irrigation controller.

B. Flow sensor size and model shall be listed on the drawings.

2.05 FLOW SENSOR CABLE AND CONDUIT

A. Flow sensor wire shall be shielded cable Paige model 7171D or approved equal.

B. Maximum cable distance from controller to flow sensor shall be 2000 feet

C. Install flow sensor cable in a 1” grey SCH 40 PVC conduit with long sweep elbows.

D. Conduit and flow sensor cable shall be routed with mainline wherever possible. Provide a minimum 6” separation between conduit and pressure main line.

E. Provide 10” round gray electrical pull boxes a minimum of every 200, feet at each change in direction and adjacent to each controller. Heat brand lid of pull box “FSB”.

2.06 GATE VALVES

A. Gate valves 3” and smaller shall meet the following requirements:
   a. Valves shall be of stainless steel (304 or higher) or bronze/brass construction with non-rising stem, cross handle and threaded connections.
   b. Valves shall be Leemco Model #LGT-SS, Nibco T-113-K or approved equal. Size as shown on the drawings
   c. Install in 10” diameter plastic valve box as detailed.

2.07 QUICK COUPLING VALVES

A. Quick coupling valves shall be as shown on the drawings.
B. Install in 10” diameter plastic valve box as detailed.

2.08 CONTROLLERS

A. Controller’s size and model shall be as listed on the drawings.
B. Final location(s) of controller shall be approved by the Project Representative.
C. Controller requires 120v power. Maximum power output of controller is 2.5 amps.
D. Install Controller and accessories as detailed and per Manufacturer’s details.

2.09 TWO WIRE CABLE

A. Irrigation control wires: solid copper with U.L. approval for direct burial in ground. Size #14awg wire with a jacketed 2-conductor. Preferred wire make and model is the Paige irrigation wire or approved equal. All splicing shall be made with 3-M DBR/Y-6.
B. Two wire cable shall be installed within 1¼” Schedule 40 grey PVC with Schedule 40 fittings and Schedule 40 electrical long sweeps elbows at all changes in direction. Pull boxes shall be located a maximum of 250 feet on center, adjacent to controller, and at each change of direction.

2.10 CONDUIT PULL BOXES

A. In Landscaped Areas: Conduit pull boxes shall be Carson Model 1419, or approved equal plastic valve box with a lockable plastic lid. Color shall be Gray and lockable. Heat brand box “PB”. Text height of letters to be 2”.
B. In concrete: All irrigation pull boxes placed in concrete surfacing, shall be high density reinforced concrete, with a steel checker plate, bolt-down lid, placed on a concrete footing, and marked “Irrigation”, dependent upon the utility housed within. Acceptable products shall be Christy N-9, Brooks, Quickset, or approved equal. Covers shall have cast brass hold-down lugs.
C. Pull boxes along a long conduit run shall be no more than 250 feet apart.
D. Each pull box shall be set on 6 inches, minimum, of clean drain rock.
E. Pull boxes shall be placed at all angle points in conduit runs.

2.11 ELECTRIC REMOTE CONTROL VALVES

A. Electric remote control valves sizes shall be shown on drawings.
B. Electric remote control valve shall be a normally closed 24 VAC solenoid actuated globe pattern valve.
C. Valves shall be made of durable glass-filled nylon iron with a minimum pressure rating of 150 PSI

D. Valve shall have external and internal bleed for manual operation.

E. Where shown on details, all valves shall have one Schedule 80 PVC FIPT threaded true union ball valve with EPDM O-rings on the upstream side of valve and one Schedule 80 union on the downstream side of valve. Ball valve shall be IPEX VXE series, Asahi Type 21 or equal. Match valve size when sizing ball valve and union.

F. All valves that service dripline or drip systems shall include a plastic wye filter and pressure regulator on the valve or a solid set 40 PSI plastic regulator downstream of the valve. Filters shall be rated to 120 psi, includes a 150 mesh disk or stainless steel screen.

2.12 IDENTIFICATION TAG

A. Identification tags for all electric control valves shall be manufactured by Christy. Tag numbers shall match stationing in controller and as shown on as-built drawings. Provide one yellow station number tag for each electric control valve:
   1. Potable water systems: Christy ID.STD.Y1

2.13 VALVES BOXES

A. ELECTRIC REMOTE CONTROL VALVE BOXES:
   a. All electric remote control valve boxes that service non-drip systems shall be installed within a Carson model 1419 (14”x19”) or 1220 (13” x 20”) plastic valve box with bolt down plastic lid or approved equal. Size of box is dependent on the size of valve. Lid shall be marked: "Irrigation Control Valve."
   b. All electric remote control valve boxes that service dripline or drip systems shall be installed within a Carson model 1220 plastic valve box with bolt down plastic lid or approved equal. Lid shall be marked: "Irrigation Control Valve."
   c. Use black colored boxes in shrub and groundcover areas and green in turf areas.
   d. Heat brand controller letter and numbers into lid. Minimum text height to be 2”.

B. GATE VALVE AND QUICK COUPLING VALVE BOXES:
   a. All gate valve and quick coupling valve shall be installed within a Carson Model 910-18” depth plastic valve box with plastic lid or approved equal. Use 8” or 10” sleeve to encase gate valve.
   b. Use black colored boxes in shrub and groundcover areas and green in turf areas.
   c. Heat brand the letters “GV” into lid. Minimum text height to be 2”.

C. DRIP COMPONENT BOXES:
   a. All drip components shall be installed within a 6” round black plastic valve box with plastic lid. Carson Model 708 plastic valve box with plastic lid or approved

2.14 SPRINKLER HEADS

A. All sprinkler heads shall be as listed on the drawings.

B. Pop-up spray sprinklers shall include a built in check valve in the body to hold up to 14 feet of head.

C. Pop-up spray sprinklers shall include built in pressure regulation in the body.

D. Use 30 psi regulators for all spray nozzles and 45 psi regulators for all rotating nozzles. Use 12” pop-ups in shrub and ground cover areas and 6” pop-ups in turf areas.

E. Riser units and nipples shall be the same size as the inlet to the sprinkler body.

2.15 BUBBLERS

A. Bubblers shall be as listed on the drawings.

B. Bubblers shall be pressure compensating from 20 psi to 60 psi.

C. The bubbler body shall be manufactured with UV Stabilizers and have ½" FIPT threads for connection to ½" MNPT male adaptor or nipple.

D. Flow rate molded onto the bubbler for easy identification

E. Where low head drainage occurs, each bubbler shall have a check valve installed. Hunter HC-50F-50M or approved equal.

2.16 DRIPLINE & DRIPLINE COMPONENTS

A. Dripline shall be as listed on the drawings.

B. Tubing shall be low density, UV resistant, polyethylene tubing with internal pressure-compensating, drip emitters impregnated into the tubing spaced at 12 or 18 inches

C. The built in emitters shall be capable of delivering 0.6 gallons per hour per emitter.

D. All dripline systems shall have a manual flush valve at each isolated zone within the systems. Multiple flush valves may be required per drip zone.

E. All dripline systems shall have air relief valve(s) at the highest elevation point(s) within each isolated zone. Install one air relief valve for every 500 linear feet of dripline.

F. Use purple colored tubing for recycled water systems.

2.17 MISCELLANEOUS INSTALLATION MATERIALS

A. Solvent cement and primer for solvent weld joints shall be of make and type approved by manufacturer(s) of pipe and fittings. Cement shall be maintained at proper consistency throughout use.

B. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as RectorSeal #5.

2.18 MISCELLANEOUS EQUIPMENT

A. Provide all equipment called for by the drawings.

B. Provide to the Project Representative at completion of the maintenance period, three (3) each of all operating and servicing keys and wrenches required for complete maintenance and operation of all heads and valve. Include all wrenches necessary for complete disassembly of all heads and valves.

PART 3 INSTALLATION

3.01 PREPARATION

A. Schedule and coordinate placement of materials and equipment in a manner to effect the earliest completion of work in conformance with construction and progress schedule.

3.02 HANDLING AND STORAGE

A. Protect work and materials from damage during construction and storage as directed by the Project Representative.

B. Handle plastic pipe carefully; especially protect it from prolonged exposure to sunlight. Any section of pipe that has been damaged will be discarded and removed and replaced if installed.

3.03 LAYOUT

A. Lay out work as accurately as possible in accordance with diagrammatic drawings.

B. Where site conditions do not permit location of piping, valves and heads where shown, notify Project Representative immediately and determine relocation in joint conference.

C. Prior to installation, the Contractor shall stake out the routing of all pressurized main lines and sprinkler heads for approval by Project Representative.

D. Run pipelines and automatic control wiring in common trenches wherever practical.

3.04 EXCAVATING AND TRENCHING

A. Work shall be performed when soils are reasonably dry and not saturated.

B. Trenching
   a. Excavations shall be open vertical construction sufficiently wide to provide free working space around the work installed and to provide ample space for backfilling and compacting.
   b. In existing turf areas remove sod with sod cutter. Roll and set aside. Replace immediately after installing conduit (three days maximum), backfilling and compacting.
   c. Depth of trenches shall be pipelines deep enough to provide minimum cover from finish grade as follows.
      1) 24” or 18” minimum cover over main lines to control valves and quick coupling valves. Refer to legend for depth requirements.
      2) 24” or 18” minimum cover over control wires from controller to valves. Refer to legend for depth requirements.
      3) 18” - 12” minimum cover over RCV controlled lateral lines to sprinkler heads. 18” depth will be required at all 12” pop-up sprinklers. Refer to legend for depth requirements.
   d. Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes, or depths of cover indicated on the drawings, and at uniform slopes between indicated elevations.
   e. Whenever cobbles larger than 2 inches in size are present in earthen subgrade, the trench section shall be excavated to the lines required. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated. Trenches shall be excavated with approximately vertical sides between the elevation of the bottom of the pipe and an elevation one foot above the top of the pipe.
   f. When two pipes are to be placed in the same trench, maintain a 4” space between pipes as minimum.
   g. Where other utilities interfere with irrigation trenching and pipe work, adjust the trench depth as instructed by the Project Representative.
   h. Restore surfaces, existing underground installations, etc., damaged or cut as a result of excavations, to original conditions in a manner approved by the Project Representative.

C. Backfilling:
   a. Backfill materials shall be approved native soil in all landscaped areas. Unsuitable material, including clods and rocks over 2inches in size shall be removed from the premises by Contractor and disposed of legally at no cost to the Project Representative.
   b. Backfill only after piping has been tested, inspected and approved.
   c. Place backfill materials in 6” layers and compact by jetting or tamping to a minimum compaction of 90 percent of original soil density.

d. Dress off areas to finish grades and remove excess soil, rocks or debris remaining after backfill is completed.
e. All backfilling shall be properly compacted so as to avoid future settlement.
f. If settlement occurs along trenches, and adjustments in pipes, valves and sprinkler heads, soil, sod or paving are necessary to bring the system, soil, sod or paving to the proper level or the permanent grade, the Contractor, as part of the work under this contract, shall make all adjustments without extra cost to the project.

D. Re-sod Turf Areas
a. The contractor shall sod cut all existing turf areas that require trenching. Keep existing sod cuts moist and relay rolls as quickly as possible to prevent loss and stress.
b. If sod cut turf does not survive, Contractor shall re-sod any turf areas damaged due to trenching, excavation, or equipment damage such as tire tracks, to the satisfaction of the Project Representative. If approved by Project Representative re-seeding of damaged areas may be allowed.
c. Contractor shall furnish topsoil approved by the Project Representative in sufficient quantities needed to perform the work and feather in all edges to eliminate any lips.
d. Sod shall be placed over the top of all excavations through grass areas. Backfill of trenches should be held short of adjacent finished grade by 1/2 inch, minimum, to accommodate sod. Roll sod with a roller to eliminate any lips where existing and new sod transition.
e. If necessary, the edge of new sod and existing turf shall be blended by using a topsoil on the turf surface to eliminate the lip. The topsoil shall be placed and blended until the lip has been blended to the satisfaction of the Project Representative.
f. Roll sod after installation, a minimum of 3 passes, to remove air pockets and promote establishment of sod.

3.05 INSTALLATION OF SLEEVING UNDER ASPHALT OR CONCRETE

A. General: Layout of the piping system shall be per the drawings and to the depth specified above.

B. Under Existing Pavement:
a. Piping under existing pavement may be installed by jacking, boring or hydraulic driving, except that no hydraulic driving will be permitted under asphaltic concrete pavement.
b. Where cutting of existing pavement is necessary, provide alternate routes for vehicular traffic. After placement of pipes, backfill trench and compact to 95%. Replace entire section of base rock and hardscape to match existing conditions.

C. Inspection of Pipe and Fittings: Carefully inspect all pipe fittings before installation, removing all dirt, scale and burrs; ream as required. Install all pipe with all markings up for visual inspection and verification.

D. Installation of Sleeving:
a. Sleeving shall be installed a minimum of 24 inches below grade.
b. Sleeving shall extend 24 inches beyond the edge of finished concrete surface.

c. Trenches containing sleeves shall be backfilled with material that consists of unwashed creek or bank gravel, crushed grave, crushed rock, sand or a mixture of these materials. If must be free from roots, vegetable matter or other deleterious substance and shall be of such nature and so graded that it will bind readily when watered and compacted. Backfill with such material to the bottom of the concrete or hardscape section and compacted to a minimum of 90%. Where the sleeve extends beyond the edge of the hardscape or concrete, the sleeve shall be backfilled with native soil or imported topsoil, which ever is specified. If nothing is specified, use previously excavated native soil.
d. Prior to placement of concrete, the ends of the sleeves shall be marked with a stake that shall be exposed approximately 2”-3” above rough, or finished grade to identify sleeve locations. On all street crossing, the location shall be marked at the edge of concrete or hardscape with a chiseled line or “x”, and the stake removed.

3.06 ASSEMBLING PIPELINES

A. PVC pipe shall be installed in a manner which will provide for expansion and contraction as recommended by the pipe manufacturer. Pipe routing is diagrammatic and shall be installed in such a manner as to conform with the details.

B. In joining, use only the specified solvent and make all joints in strict accordance with the manufacturer's recommended methods. Give solvent welds at least 16 minutes set-up time before moving or handling and 24 hours curing time before filling with water.

C. All pipe shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed.

D. Install 3” wide detectable warning tape above all pressurized main lines as shown in the details. Use Christy model #TA-DT-3-BIRR for potable irrigation systems.

E. Solvent Weld Joint:
   a. Prepare joint by first making sure the pipe end is square. Then, de-burring the pipe end, and clean pipe and fitting of dirt, dust and moisture.
   b. Dry insert pipe into fitting to check for proper sizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.
   c. Coat the inside socket surface of the fitting and the male end of the pipe with P-70 primer (manufactured by Weld-On). Then without delay, apply Weld-On 711 cement liberally to the male end of the pipe and also apply 711 cement lightly to the inside of the socket. At this time, apply a second coat of cement to the pipe end.
   d. Insert pipe immediately into fitting and turn 1/4 turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.
   e. Hold joint still for approximately thirty (30) seconds and then wipe the excess cement from the pipe and fitting.
   f. Cure joint a minimum of thirty (30) minutes before handling, at least six (6) hours before allowing water in the pipe.

F. Threaded Joint:
   a. Field threading of plastic pipe or fittings is not permitted. Only factory formed threads will be permitted.
   b. Factory made nipples shall be used wherever possible. Field cut threads in metallic pipe will be permitted only where absolutely necessary. When field threading, cut threads accurately on axis with sharp dies.
   c. All threaded joints shall be made up with pipe joint compound. Apply compound to male threads only.

d. Where assembling metallic pipe to metallic fitting or valve, not more than three (3) full threads shall show when joint is made up.
e. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.
f. Where assembling plastic pipe, use strap type friction wrench only; do not use metal-jawed wrench.

G. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstructions. Remove caps or plugs only when necessary to continue assembly.

H. Where pipes or control wires pass through sleeves, provide removable non-decaying plug at ends of sleeve to prevent entrance of earth.

I. For plastic-to-steel connections, work the steel connections first; use a non-hardening non-lead base pipe dope on all threaded plastic-to-steel connections and use only light wrench pressure. All plastic-to-steel connections shall be made with SCH 80 PVC nipple or plastic male adapters.

3.07 REMOTE CONTROL VALVES

A. Install where shown on drawings and group together where practical. Limit one remote control valve per box.

B. Locate valve boxes 12” from and perpendicular to walk edges, buildings and walls. Provide 12” between valve boxes where valves are grouped together.

C. Thoroughly flush main line before installing valves.

D. Install in shrub or groundcover areas where possible.

E. Label control line wire at each valve with an I.D. tag, indicating identification number of valve (controller and station number). Attach label to control wire.

F. Flow control stems shall be adjusted or tuned per manufacturer recommendations.

G. Install 18GA ½” x ½” square hot dipped galvanized wire mesh under all valve boxes and wrap up the sides of the valves. Adhere wire mesh to sides of box with stainless-steel screws and washers as required. Refer to details for more information.

3.08 TWO WIRE CABLE

A. Run lines along mains wherever practical.

B. Loop a minimum of two (2) feet of extra wire in each valve box.

C. Connections shall be made by crimping bare wires with brass connectors and sealing with watertight resin sealer packs per manufacturer specifications.

D. Splicing will be permitted only at valve/decoder connections and at main line tee branches. Do not splice in wire pull boxes. Locate all splices within valve boxes or in a two wire splice box.

3.09 TWO WIRE CABLE IN CONDUIT:

A. Install cable in PVC electrical conduit with pull/splice boxes located as shown on plans and as required. This conduit shall be dedicated to irrigation control wires only.

B. For all cable runs, pull/junction boxes will be required every 250 linear feet of conduit run.

C. All electrical equipment and wiring shall comply with local and state codes and be installed by personnel skilled and licensed in the trade.

D. Connecting and splicing of wire at the valves shall be made using approved materials and shall be made by crimping bare wires with brass connectors and sealing with watertight resin sealer packs. 3M DBY-6 or approved equal.

E. All splices shall be placed within a valve box. Leave a 24” long coil, at each pull box, or splice location.

3.10 AUTOMATIC CONTROLLER

A. Provide and install automatic irrigation controller in approximate locations shown on drawings. The exact location will be determined on the site by the Project Representative. Provide conduit and wire and connect to 120 volt switch accessible to controller for ease of maintenance.

3.11 SPRINKLER HEADS AND BUBBLERS

A. All sprinkler heads shall be set perpendicular to finish grade of the area to be irrigated unless otherwise designated on the plans.

B. In lawn areas, all sprinkler heads shall be offset a minimum of 3 inches and a maximum of 6 inches from the edge of adjacent hardscape.

C. Flush and adjust irrigation outlets, bubblers and nozzles for optimum performance and to prevent overspray onto field, walks, roadways, and/or buildings as much as possible. This shall include selecting the best degree of arc and radius to fit the existing site conditions and throttle the flow control at each valve to obtain the optimum operating pressure for each control zone.

D. Install lawn heads 1” above grade in seeded lawn area at time of installation. Lower to finished grade after turf is well established and as directed by Project Representative.

3.12 QUICK COUPLING VALVES

A. Thoroughly flush lines before installing quick coupling valves.

B. Locate quick coupling valves as shown in the drawings and details.

C. Locate valve boxes 12” from and perpendicular to walk edges, buildings and walls. Provide 12” between other valve boxes where valves are grouped together.

3.13 DRIPLINE AND DRIPLINE COMPONENTS

A. Thoroughly flush all driplines.

B. Install dripline a minimum of 12” away from all buildings and 6” off hardscapes for shrubs and groundcover. 2” of paving for all no-mow or sod type grasses.

C. Space driplines equally throughout the planting area as detailed. Refer to legend for emitter and row spacing of dripline. Adjust alternate rows so emitters are spaced in a triangular pattern.

D. All dripline tubing shall be buried 4” below finish grade and stapled down every 4’ and at each change in direction with a 6” tubing stake.

E. For slopes greater than 10:1, modify dripline row spacing on the bottom 1/3 of the slope to be 25% greater at the bottom of the slope.

F. Install flush valves at the low end of each drip zone minimum of 2 valves are required for each valve. Refer to manufacturer details for installation instructions.

G. Install air vacuum relief valve(s) at high point(s) of each planting area. Refer to drawings for approximate locations. Revise locations in field based on actual grades of the site. Locate 1 valve per every 500’ of dripline. Refer to manufacturer details for installation instructions.

H. Thoroughly saturate soil prior to planting. Provide additional surface watering as required to keep plant root systems moist during planting establishment period.

3.14 FIELD QUALITY CONTROL

A. Coverage Tests:

a. Perform coverage tests in the presence of Project Representative, after sprinkler or drip system is completed. Test system to assure that all areas are irrigated completely and uniformly.
b. Do not spray onto pavement or structures. Adjust arc nozzles as needed to provide full coverage without over spray.

B. Adjusting and Cleaning:
1. System adjustment:
a. Valves: Adjust flow for proper operation.
b. Heads: Adjust for alignment and coverage.
c. If it is determined that coverage could be improved by adding additional driplines or a nozzle change, make such changes as required to provide adequate coverage to all plant material.
d. Perform final cleaning of all risers, dripline, heads, and equipment for proper operation. Demonstrate operation and uniform coverage in the presence of the Project Representative prior before final acceptance.

3.15 TESTING

A. General
a. Notify the Project Representative at least three (3) days in advance of testing.
b. Furnish all necessary testing equipment and personnel.
c. Perform testing at his/hers own expense.
d. Correct all leaks and retest until acceptance by the Project Representative.
e. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered

B. Closing uninspected work: Do not allow or cause any of the work of this section to be covered up or enclosed until it has been inspected, tested and approved by the Project Representative and other authorized agencies.

C. Flushing: Before backfilling the main line, and with all control valves in place but before lateral pipes are connected, completely flush and test the main line and repair all leaks. Flush out each section of lateral pipe before sprinkler heads are attached.

D. Perform test as specified below. Remake any faulty joints with all new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

E. Pressure Testing Procedure:
a. Apply the following tests after welded plastic pipe joints have cured at least twenty-four (24) hours.
1) Solvent Weld Mainline: Remove all the air from the piping system then test live (constant pressure) and QCV lines hydrostatically at 125 PSI minimum. Lines will be approved if test pressure is maintained for six (6) hours. The lines shall be restored to the original test pressure. The Contractor shall make tests and repairs as necessary until test conditions are met.
2) Test RCV controlled lateral lines with water at line pressure and visually inspect for leaks. Retest after correcting defects.

F. Final Inspection
a. Thoroughly clean, adjust and balance all systems.
b. Demonstrate the entire system to the Irrigation Consultant and/or, if required, authorized agent and other governing agencies providing that all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, and that the installed system is workable, clean and sufficient.

3.16 GUARANTEE

A. It shall be the responsibility of the Contractor to fill and repair all depressions and replace all necessary lawn and planting due to the settlement of irrigation trenches for one year following completion and acceptance of the job.

B. The Contractor shall also guarantee all materials, equipment and workmanship furnished by him to be free of all defects of workmanship and materials, and shall agree to replace at his expense, at any time within one year after installation is accepted, any and all defective parts that may be found.

3.17 MAINTENANCE

A. Continuously maintain irrigation system in areas indicated in the Contract during the progress of work and for a period of 90 days after substantial completion.

B. It is Contractor's responsibility to turn over the irrigation in a first-class condition at the end of the maintenance period.

C. Maintenance Schedule: Contractor shall submit schedule of maintenance tasks to be performed for Project Representative review and approval. At a minimum, maintenance staff shall be on-site two times per month. It is not the intention of these Specifications to allow a "quick cleanup" at the end of the maintenance period, but rather that the work be continuous and ongoing.

D. Proper irrigation system maintenance includes the overall supervision of the system, controller scheduling, routine adjustments and necessary repairs.

E. Maintain irrigation system for optimum performance, as per manufacturer’s specifications, by inspecting the entire system on an on-going basis. This includes cleaning and adjusting all bubbler heads, dripline and valves for proper coverage.

3.18 CLEAN-UP

A. Preservation and Cleaning: The Contractor shall clean up the work as it progresses. At frequent intervals, and at all times when directed by the Project Representative, the Contractor shall remove and dispose of accumulations of rubbish and debris of all kinds. At the time of completion, the entire site shall be cleared of tools, equipment, rubbish, etc., all of which shall be removed from the site; and the entire project, including surrounding premises, shall be left in proper, clean condition ready for acceptance.

END OF SECTION

SECTION 32 91 19
LANDSCAPE GRADING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Weeding.
B. Finish grading for lawns
C. Finish grading for planting areas.

1.02 RELATED REQUIREMENTS

A. Division 31 Section Site Clearing
B. Division 31 Section Grading
C. Division 32 Section Decomposed Granite Surfacing
D. Division 32 Section: Landscape Work

1.03 DEFINITIONS

A. Finish Grading: finish grading shall consist of adjusting and finishing soil surfaces with site or imported topsoil, raking grades to a smooth, even, uniform plane. Remove and legally dispose of all extraneous matter off site. Facilitate natural run-off water and establish grades and drainage indicated as part of the contract work.
B. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 3/4-inches (19 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
C. Finish Grading: Finish grading shall consist of finishing surfaces by raking smoothly and evenly to facilitate natural run-off water, and by removing and disposing of extraneous matter.
D. Sub-grade: The surfaces upon which additional specified materials are to be placed, prepared, or constructed.
E. Rough Grade: The establishment of grades to required tolerances.
F. Finish Grade: Spot elevations (grades) are indicated based on the best available data. Contract Civil Drawings are referenced to provide additional site grading information. It is intended that constant slopes are maintained between spot elevations.
G. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 EXISTING UTILITIES

A. Stake and mark the location of existing utilities before commencing work.

B. Retain and protect in operating condition all active utilities traversing the site designated to remain.

1.06 QUALITY ASSURANCE

A. Finish grade shall conform to contours, grades, lines, and shapes, as indicated on Contract Drawings, with uniform slopes between finish grades or between finish grades and existing grades.

B. Establish finish landscape grades in a continuous, uniform line, resulting in a uniform surface with no ridges or water pockets.

C. Finish landscape grade tolerance shall be 0.04-feet plus-or-minus from finish elevations indicated on site drawings.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS:

A. Topsoil: A natural, fertile, friable soil, free from stones, roots, clods larger than 1" in diameter, noxious seeds, weeds, subsoil, undesirable insects, plant disease or any other natural objects detrimental to normal plant growth.
   1. Silt plus clay content of the import soil shall not exceed 20% by weight with a minimum 95% passing 2.0-millimeter sieve.
   2. Total pore space content on a volume/volume basis shall be at least 15 percent at field capacity.
   3. Permeability rate shall be not less than one inch per hour or more than 20 inches per hour.
   4. The sodium absorption ratio (SAR) shall not exceed 6 and the electrical conductivity (ECE) shall not exceed 2.0 milliohms per centimeter at 25 degrees centigrade.
   5. Soluble boron shall be no greater than 1.0 part per million (mg/l).
   6. Soil pH range shall be 6.0 - 7.9.
   7. Maximum concentration of soluble chloride shall be 150 parts per million.
   8. Maximum concentration of heavy metals shall not exceed the following when the pH is between 6 and 7:
      a. Arsenic: 1 ppm
      b. Cadmium: 1 ppm
      c. Chromium: 5 ppm
      d. Cobalt: 1 ppm
      e. Lead: 15 ppm
      f. Mercury: 0.5 ppm
      g. Nickel: 2.5 ppm
      h. Selenium: 1.5 ppm
      i. Silver: 0.25 ppm
      j. Vanadium: 1.5 ppm
   9. Petroleum hydrocarbons shall not exceed 100 mg/kg dry soil.
   10. Aromatic volatile organic hydrocarbons shall not exceed 2 mg/kg dry soil.

B. Obtain imported topsoil from approved local sources.

C. All topsoil to be used for planting, regardless of whether import or on-site in origin, shall be tested as described in Part 3 of Section 329300.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verification of conditions: Prior to commencing the finish grading, review the installed work of other trades and verify that their work is complete.
   1. Rough Grading: Grading in planting areas (except raised planter areas) shall be established to within plus or minus 0.10 foot prior to beginning of finish grading.

B. Import topsoil only when necessary to supplement site soil to achieve grades shown on Drawings, or if site soil is unsuitable for planting.

3.02 PREPARATION:

A. Weeding: Before finish grading, weeds and grasses shall be dug out by the root or sprayed with an herbicide and disposed of off-site. This procedure is outlined in Section 329300-Landscape Work.

B. Remove debris, roots, branches, weeds, stones, in excess of 1/2-inch (13 mm) in size and clumps of earth that do not break up. Before and during finish grading, remove weeds and grasses, including roots, and dispose off-site.

C. Remove soil contaminated with petroleum products and legally dispose off-site.

3.03 INSTALLATION:

A. General: When rough grading and weeding have been completed, and the soil has dried sufficiently to be readily worked, lawn and planting areas shall be graded to the elevations indicated on the Drawings.
   1. Grades indicated on Drawing are grades that will result after thorough settlement and compaction of the soil.
   2. Grades not otherwise indicated shall be uniform finish grades and, if required, shall be made at the direction of the Architect.
   3. Finish grades shall be smooth, even, and a uniform plane with no abrupt change of surfaces.
   4. Soil areas adjacent to buildings shall slope away from the building to allow a natural run-off of water, and surface drainage shall be directed as indicated on the drawings by remodeling surfaces to facilitate the runoff water at 2% minimum grade.
   5. Low spots and pockets shall be graded to drain properly.

B. Drainage: Finish grade with proper slope to drains.
   1. Flow lines, designated or not, shall be graded and maintained to allow free flow of surface water.
   2. If any drainage problems arise during construction period due to Contractor's work (such as, but not limited to, low spots, slides, gullies and general erosion), the Contractor shall be responsible for repairing these areas to a condition equal to their original condition, and in so doing shall prevent further drainage problems from occurring.

C. Prior to placing backfill, remove rock, aggregate base, concrete, and deleterious materials to a depth of 18 inches below soil grade in planter areas. Cross-rip subsoil of friable soil to a depth of 12-inches.
   1. Place a minimum of [15-inches] of topsoil backfill in planters.
   2. Refer to Section 329300 “Landscape Work” for soil materials.

D. Toe of slope: To prevent soil creep or erosion across pavement, where pavement (walk, curb, etc.) is at the toe of a slope, finish grade is to level out or swale slightly at least 12-inches before reaching pavement.

E. Moisture Content: The soil shall not be worked when the moisture content is so great that excessive compaction occurs, nor when it is so dry that dust may form in the air or that clods do not break readily. Water may be applied, if necessary, to provide moisture content for tilling and planting operations. It is the Contractor's responsibility to control dust that is spread as a result of grading operations.

F. Grades: The finish grade in areas to be planted with turf shall be 1-inch below grade of adjacent pavement, walks, curbs, or headers. Finish grade in shrub areas shall be 2 1/2-inches below adjacent surfaces. Exceptions may be made when drainage conditions require flush grades, as directed by the Architect.

G. Compaction: Soils in planted areas shall be loose and friable, yet firm enough that no settling occurs from normal foot traffic or irrigation.

3.04 FIELD OBSERVATION:

A. It is the Contractor's responsibility to contact the Architect 48 hours or two working days in advance of each agreed observation or conference.

B. Schedule for On-Site Reviews: at completion of finish grading and prior to any planting operations.
   1. See "Site Observation" in Part 3 of Section 329300-Landscape Work to coordinate inspections and review of work.

END OF SECTION

SECTION 32 93 00
LANDSCAPE WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Soil Prep and Fertilization.
B. Planting Operation.
C. Planting Materials.
D. Topsoil and Planter Mix.
E. Agronomic Testing.
F. Drainage Materials.
G. Jute Mesh and Erosion Control.
H. Mulching.
I. Sod
J. Pruning
K. Tree stabilization.
L. Edgings.
M. Root Barriers.

1.02 RELATED REQUIREMENTS

A. Division 01 Temporary Tree and Plant Protection
B. Division 12 Section Site Furnishings.
C. Division 31 Section Site Clearing
D. Division 32 Section Landscape Grading
E. Division 32 Section Landscape Irrigation
F. Division 32 Section Landscape Maintenance
G. Division 33 Section Storm Drainage Utilities

1.03 REFERENCE STANDARDS

A. American Association of Nurserymen, Inc. (AAN)
    1. American Standard for Nursery Stock, latest edition (ANSI).

1.04 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
B. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum laced as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Exterior plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of exterior plant required.

D. Bare-Root Stock: Exterior plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of exterior plant required.

E. Bio-filtration Planting Soil: Imported specialty Soil manufactured offsite by XXXXX required for storm water infiltration.

F. Root Zone: Imported specialty soil manufactured offsite by XXXXXX to be placed beneath turf fields.

G. Clump: Where three or more young trees were planted in a group and have grown together as a single tree having three or more main stems or trunks.

H. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of exterior plant required.

I. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted exterior plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of exterior plant.

J. Finish Grade: Elevation of finished surface of planting soil.

K. Sub-grade Elevations: Excavation, filling and grading required to establish elevations is shown on drawings. Coordinate all work with grading contractor in order to arrive at rough grades that will allow tolerance for topsoil in planting areas, soil amendments and ornamental mulch as required in other sections of this specification. Contractor to assume tolerance of rough grades established at ± 0.09 feet (less than 1 tenths of a foot)

L. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

M. "Diameter at breast height" (DBH) is measurement for tree trunk caliper.

N. Multi-Stem: Where three or more main stems arise from the ground from a single root crown or at a point right above the root crown.

O. Planting Soil: Native or imported topsoil; mixed with soil amendments.

P. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

Q. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

R. Pruning: As designated on contract drawings. Items not specifically indicated or specified, but normally required to conform with such work, are considered part of the work.

1.05 SUBMITTALS

A. WITHIN 30 DAYS OF START OF THE ROUGH GRADING OPERATIONS:
   1. Submit a certificate indicating all plant material has been secured for the project and is available.
   2. Submit documentation that all plant material has been ordered in accordance with Article 1.06 of this section.

B. CERTIFICATION: Submit the following:

1. Certificates of inspection as required by governmental authorities when transporting materials into the state.
2. Bulk Materials: Submit a certificate of delivery for all material in containers or bulk.

C. TEST REPORTS: Submit the following:
1. Agronomic Soils Laboratory Test Report(s) including required amendments and maintenance recommendations.

D. PRODUCT DATA: Submit the following:
1. In accordance with Division 1 Section "Submittal Procedures", submit complete manufacturer descriptive literature and specifications for proprietary materials and any additional items required by the Architect. Prior to start of construction and submittals; furnish to the Architect the list of items to be submitted and reviewed.
   a. Soil Amendments (as identified in Agronomic Soils Report).
   b. Fertilizer (as identified in Agronomic Soils Report).
   c. Plant Tablets.
   d. Stakes and Guys.
   e. Tree Ties and Vine Ties.
   f. Seed Mixtures.
   g. Mulch.
   h. Edging Material.
   i. Filter Fabric.
   j. Drainage Materials.
   k. Accessory Material.(Root barriers, Tree Grates, Metal edging, Boulders, etc.)
   l. Other soil additives per Agronomic Soils Report.
   m. Rock mulch.
   n. Submit other data substantiating that materials comply with specified requirements. Such certificates may be tags, labels, and/or manufacturers literature. All submittals shall be reviewed and accepted by the Architect before contractor begins work.
   o. Substitution Request
      1) If any plant specified is not obtainable, submit a written substitution request to the Architect during the bidding period.
      2) Substitutions of plant material will not be permitted unless accepted in advance in accordance with the provisions of Division 1 Section "Product Requirements."
      3) The Contractor is responsible for contract growing all required plant material for to project to ensure availability in the size and requirements of the project.
      4) All substitution requests for any material must be made during the bid process. No substitution requests will be permitted after the bid process or during.
   p. With submittal of Bid Documents, submit complete list of plant materials to be provided, including unit prices for plants and for installation. Include:
      1) Quantity.
      2) Size.
      3) Botanical Name.
      4) Plant Unit Price.
      5) Installation Unit Price.
2. PLANTING SCHEDULE: Submit proposed planting schedule at least two months prior to planting any materials, indicating dates for each type of landscape work coinciding with normal seasons for such work. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. If dates need to be revised after acceptance of planting schedule, document reasons for delays and submit for acceptance.

3. Submit two photos of each tree(include DBH, height and spread), shrub(include height and width) and groundcover(include height and width) with a person in the image to be used on the project to the architect for review. Photos are to be of the actual material tagged, or secured and that will used for the project at the sourced nursery. No plants may be delivered or planted prior to approval by Architect.

1.06 QUALITY ASSURANCE

A. QUALIFICATIONS

1. Nursery Qualifications: Regularly engaged, for the preceding ten years, in the production of planting materials equivalent in species and size to those required.
   a. Stocked, and having a demonstrated ability to provide plant materials required within the constraints of the accepted construction schedule.
   b. Landscaper's Qualifications: Regularly engaged and specializing, for the preceding ten years, in the installation and maintenance of planting materials equivalent in species and size to those required.
      1) Capable of furnishing a verifiable list of not less than five projects of equivalent type successfully completed within the preceding two years.
      2) Subcontracts: Landscape work to a single firm specializing in landscape installation.
2. Pre-Installation Conference: Schedule in advance of beginning work of this section. Arrange for attendance by Owner, Architect, and landscaping subcontractor. Review intent of Contract Documents and resolve conflicts. Prepare minutes of conference and distribute to attendees within five (5) days.
3. Source Quality Control
   a. General: Comply with regulations applicable to shipping of landscape materials.
   b. Analysis and Standards: All materials shall be of standard, approved and first-grade quality and shall be in prime condition when installed and accepted. Any commercially processed or packaged material shall be delivered to the site in the original unopened container bearing the manufacture's guaranteed analysis. The Contractor shall supply the Architect with a sample of all materials accompanied by analytical data from an approved laboratory source illustrating compliance of bearing the manufactures guaranteed analysis.
4. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
5. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
   a. Report suitability of topsoil for plant growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
6. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 3/4-inches (19 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
   a. Obtain topsoil only from naturally, well drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes. All topsoil is to be tested and analyzed by an independent laboratory before delivery to site, as indicated in Article 3.03.

7. Contractor shall provide the Architect with location of soil, crops previously planted on such soil within the last two years, and the USGS soil survey classification and name.
8. Trees, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1-1980 "American Standard for Nursery Stock". Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free from disease, insects, insect eggs, larvae and defects such as knots, sun-scald, injuries, abrasions, overlapping surface roots, or disfigurement. Central leaders of all trees shall be intact, undamaged, with evenly spaced lateral branches.
    a. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches (150 mm) above the ground for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above the ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
9. Label all trees and shrubs with securely attached waterproof tag bearing legible designation of botanical and common name. Where formal arrangements and consecutive order of trees is shown, select stock for uniform height/spread, and label with number to assure symmetry in planting.
10. Stock Review: The Architect will review trees and shrubs at site before planting with requirements for genus, species, variety, size and quality. The Architect retains right to further review trees and shrubs for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of the work. Remove rejected vegetation immediately from project site. Contractor shall request review of such stock by the Architect by delivering notice, in writing, 72 hours in advance.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver exterior plants freshly dug.

B. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

C. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.
    1. Protect plants from sun or drying winds. Protect and maintain plants that cannot be planted immediately upon delivery.
    2. Do not drop plant material.
    3. Do not pick up container planter material by stems or trunks.
    4. Protect from wind.
    5. Water as required.
    6. Do not prune trees and shrubs before delivery except as approved by Architect. Do not bend or bind trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery, and provide protection on site from traffic, pedestrians, and deleterious effects of climate while planting operations are in progress. Dropped or damaged stock will not be accepted.
    7. Deliver trees and shrubs after preparations for planting have been completed and plant immediately after approval of plant materials locations. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture. Do not remove container grown stock from containers until planting time.

a. Do not pick up plants by stems or truck. Handle planting stock by root ball.
b. Do not remove container - Grown stock from containers before time of planting.
c. Water root systems of exterior plants stored onsite with a fine-mist spray.
d. Water as often as necessary to maintain root systems in a moist condition.

8. Plant material shall not be stored on the jobsite for more than 48 hours before planting. Contractor shall schedule nursery deliveries in sub-groups as necessary to comply with this requirement.
9. Deliver accessory materials in manufacturer's original, unopened packaging with identifying labels affixed and legible in accordance with state law. Deliver plants with identifying tags affixed. Contractor shall notify Architect 72 hours in advance of plant material delivery for observation. Review plants with Landscape Architect to confirm that they are the plants which had previously been tagged and supplied. The Architect reserves the right to reject the following:
   a. Plant materials not identifiable as previously selected.
   b. Materials not accompanied by required certificates.
   c. Plant materials where damage to rootball, trunks, or desiccation of leaves has been caused by inadequate protection during delivery.
   d. Plant material not matching the form, shape, or growth habit required for the design intent of the Project.
   e. Horticultural or visual defects in material.
   f. Plant material pruned prior to delivery.
   g. Plant material with detrimental pests.

1.08 PROJECT CONDITIONS

A. Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
   1. Planting Restrictions: Coordinate planting periods with maintenance periods to provide required maintenance from date of substantial completion.
      a. Plant or install materials during normal planting seasons for each type of landscape work required.
   2. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed without having detrimental effects on the plant material, or finished product.
   3. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns unless otherwise acceptable to Architect.
      a. When planting trees and shrubs after lawns, protect lawn areas and promptly repair damage caused by planting operations.
   4. Contractor shall verify locations of all existing utilities, whether shown on plans or not. The Contractor shall notify members of Underground Service Alert (DigAlert) two (2) working days in advance of performing any excavation work by calling the toll-free number 1-800-227-2600 or 811.
   5. After determining location of underground utilities, perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
   6. When conditions detrimental to plant growth are encountered, such as rubble fill, hardpan condition, adverse drainage conditions, or obstructions, notify the Architect before planting. Remove all material deemed unsuitable for plant growth as directed by the Architect.
   7. No landscape materials may be planted before an irrigation operation and coverage test is completed by the Architect.
   8. No landscape materials may be planted before finish grade is reviewed by the Architect.
   9. Existing Trees:

a. Prior to the beginning of any clearing, grubbing, trenching, or excavation on site, the general contractor, grading contractor, project arborist, landscape contractor, and the Architect shall meet in a pre-construction conference to discuss grading near existing trees.
b. The contractor shall protect all existing trees and shrubs scheduled to remain against injury or damage, including cutting, breaking or skinning of roots, trunks or branches. No blasting of rock shall occur in any area adjacent to existing trees without prior written consent of the Architect.
c. No trees or shrubs are to be removed, trimmed, or cut without prior approval of the Architect.
d. Prior to the beginning of the clearing and grading phase of the project, a continuous, temporary, six foot (6') high chain link fence shall be erected around the drip line of all trees scheduled to remain, unless otherwise specified by the Architect. The temporary fencing shall be erected prior to commencing any other work on the project. No construction activity shall be allowed within the limits of this fencing unless directed by the Architect. The temporary fencing shall remain in place during the entire construction period and shall not be removed until directed by the Architect.
e. Grading beneath trees to be saved shall be given special attention. Every effort shall be made to avoid creating conditions adverse to the tree's health. The natural ground within the drip lines of trees to be preserved shall remain as undisturbed as possible. Grading within the protected root zone of trees to be preserved will not be permitted unless specifically approved by the Architect prior to beginning of proposed grading.
f. If during construction or grading (grading, excavation, etc.) tree roots of 2" in diameter or greater are encountered, work shall stop immediately and a Certified Arborist, approved in advance by the Architect, shall be contracted for a root inspection. Root cutting of any roots over 2" in diameter must have prior approval from the Architect. All cuts are to be made with appropriate equipment, as to not affect the plant material.
g. Major roots one inch (1") or greater in diameter encountered within the drip line of the tree in the course of excavation or trenching shall not be cut and shall be kept moist and covered with earth as soon as possible. Shredding of roots or damaged caused by trenching or grading equipment is not permitted.
h. Roots one half inch (1/2") to one inch (1") in diameter which are severed shall be trimmed cleanly and covered with earth as soon as possible.
i. All trenching beneath the drip line of trees to remain shall be done with hand tools only. No mechanical trenching or excavation is allowed within the drip line of existing trees at any time, or where roots are encountered outside the dripline of the tree.
j. Branches interfering with construction but not designated for removal may be removed only as directed by the Architect.
k. Any pruning, cutting, or trimming of any trees will be performed by an International Society of Arboriculture Certified Arborist or certified tree worker or in accordance with the National Arborist Association and/or International Society of Arboriculture pruning standards. Cutting of 2" diameter limbs or greater or major dead wooding shall require approval of the Architect.
l. Trees or shrubs scheduled to remain and damaged by construction operations shall be repaired by the contractor in a manner acceptable to the Architect. Damaged trees and shrubs shall be repaired promptly to prevent progressive deterioration. Repair or replacement of trees and shrubs shall be at the contractor's expense as determined by the Architect. Contractor shall be held fully liable for damage caused to trees and shall be assessed fees based on the International Society of Arboriculture "Guide for Plant Appraisal", as determined by the project Arborist; fees will be assessed for: 1) any injury to the trunk, limbs, or root system, and (2) for the value of any tree requiring removal subsequent to injury or treatment that varies from these Specifications.

m. A permit from the City Arborist may be required prior to pruning or removing any trees, as required by applicable codes or ordinances.
n. Parking of vehicles, equipment or storage of materials under the drip line of existing trees shall not occur at any time.
o. Wash all existing and new trees weekly to remove dust and debris during construction.

1.09 SCHEDULING

A. Within 30 days after the commencement of initial grading, furnish documentation to the Architect that all plant material has been secured for the project and is available. Contractor shall be responsible for payments and deposits required by the grower or plant consultant to secure, maintain, and grow plant material indicated on the Contract Drawings.

1.10 WARRANTY

A. Special Warranty: Warrant all plant material in writing where installer agrees to repair or replace plantings and accessories that fail in materials, workmanship or growth within specified warranty period.
1. Failures include, but not limited to, the following:
a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by owner.
b. Structural failures including plantings falling or blowing over including during high wind events.
c. Faulty operation of tree stabilization edgings tree grates.
d. Deterioration of metals, metal finishes and other materials beyond normal weathering.
e. Material not thriving.
f. Warranty periods begin from date of final completion:
1) Trees, vines, shrubs: One year.
2) Ground cover and turf: One year.
2. Warrant plant material, installed, or relocated under the contract, in writing, for a period of one year (after beginning of maintenance period) against defects including death, and unsatisfactory growth, except for defects resulting from neglect, abuse or damage by others.
3. Remove and replace trees, shrubs or other plants found to be dead, yellowing, defoliating, or in unhealthy condition, or other defective materials during warranty period at no additional cost to the Owner. Replace trees and shrubs, which in the opinion of the Architect, are in unhealthy condition at end of warranty period. The Architect shall be the sole judge as to the condition of the material. All replacement materials and installation shall comply with the drawings and specifications. Another inspection may be conducted at end of warranty period to determine acceptance or rejection.
4. Upon receipt of written notice from Owner of the loss of any warranted plant materials during the warranty period, the subject plant materials shall be promptly replaced with the same species originally planted, and of a size closely approximating the size of the plant, if normal growth had occurred since the original planting. Replacements shall be subject to the requirements of this specification.
5. When plants are replaced, advise the Owner, in writing, of the new establishment maintenance period equal to the one year.
6. Plant material must be replaced within ten (10) days of written notification, and shall be installed in accordance with these specifications.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Design is based on the use of products manufactured by the following.

B. California (Northern)
   1. Best Fertilizer Company, Lathrop, CA
   2. BFI Organics, Milpitas, CA 408-262-1401
   3. Deep Root Corporation, Burlington, CA 800-458-7668.
   4. Delta Bluegrass Co. Stockton, CA (209) 469-7979
   5. Horizon, Roseville, CA 916-780-2033.
   6. MacLean Civil Products, Fort Mill, SC 800-925-5360.(check for local distributor)
   7. Landscape Forms, represented by
      a. Rebecca Casey, 800-430-6206 X1313. (San Francisco, East Bay)
      b. Verushka Doshi, 269-276-4424 (San Francisco, Silicon Valley, San Jose, Marin, Peninsula)
      c. Nathan Damratowski, 269-337-1247 (Sacramento, Davis, Roseville, Chico, Redding, Vacaville, Napa, Tahoe, Valley)
      d. Ellie Ickes, 269-337-1239 (Santa Rosa, Stockton, Fresno, Modesto)
   8. LH Voss, Dublin, CA 925-560-9920
   9. Mirafi, Inc. Charlotte, NC. 800-438-1855.
   10. NDS Drainage Products, 800-726-1998.
   11. Pacific Coast Seed. 533 Hawthorne Place, Livermore, CA 94551 (925) 373-4417
   12. Pacific Sod, Patterson, CA, 800-542-7633.
   13. Redi-Grow Corporation, Sacramento, CA, 800-654-4358.
   14. S&S Seeds, Camarillo, CA 805-684-0436.
   15. Silverado Building Material, Sacramento, CA 916-361-7374.
   16. Soil and Plant Laboratory, Inc., Santa Clara, CA 408-727-0330.
   17. Sunland Analytical Labs, Rancho Cordova, CA 916-852-8557.
   18. TMT Enterprises, San Jose, CA 408-432-9040.
   19. Whitecap, Inc. Rancho Cordova, CA 916-636-3215.
   20. Best Fertilizer Co., Lathrop, CA.
   21. Wayside Lumber, Rancho Cordova, CA, 916-635-9090.
   22. Materials shall be the products of one manufacturer and shall be either the ones upon which the design is based, or the products of manufacturer accepted in advance. No substitutions will be permitted.

2.02 SOIL

A. TOPSOIL: Site to be rough graded to elevations shown on Civil Drawings. Topsoil will be required behind curb areas and in planting area. Provide on-site, import, or non-processed topsoil in planting areas as needed to complete rough grading which is fertile, friable, and natural loam in accordance with Article 2.03. Topsoil shall be from agricultural sources, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 3/4-inch in any dimension, and other extraneous or toxic matter harmful to plant growth.

B. All topsoil to be used for planting, regardless of whether import or on-site in origin, shall be tested as described in Part 3 of this Section.

C. Biofiltration Planter Soil
   1. Pre-manufactured soil as purchased by Gail Materials.

a. The soil shall be a blend of 4 parts by volume washed sport sand to 1 part sandy loam topsoil. The gravel content shall not exceed 15% by weight with the largest allowable particle not exceeding 1/4 inch.
b. Chemistry:
    1) The pH shall be in the range of 6-8.0.
    2) Salinity shall not exceed 3.0 dS/m.
    3) Sodium: Sodium absorption ratio (SAR) shall not exceed 5.0
    4) Boron shall not exceed 1 ppm.
c. Amendments:
    1) The top 6 inch layer the following shall be uniformly blended by means of a pub mill or equal.
        (a) Amount/cubic yard
            (1) 10% by volume of Reed Sedge Peat Moss
            (2) 25% 8X20 Lassenite Pozzolan
            (3) 15 lbs. 6-20-20 fertilizer
            (4) 50 lbs. Gypsum
    2) For the depth below 6 inches uniformly blend by means of a pug mill or equal
        (a) Amount/cubic yard
            (1) 10% by volume AXIS medium grade.
d. Location(s)
    1) Use in designated infiltration planter areas and bioswale areas, see planting plans.
    2) Depth shall be per details.
    3) Available through Gail Materials, Corona, CA (951) 667-6106
    4) Contact: Dave Dzwilewski

2.03 SOIL AMENDMENTS

A. The initial application of fertilizers and amendments to be tilled into the soil during soil preparation operations shall be established after soil testing has been conducted by Contractor. An estimated quantity is indicated below for bid purposes only. This estimated quantity does not include mulching, fertilizer tablets, additional topsoil necessary to meet specified grades and fertilizer applications for after planting. After soils analysis recommendations are made to the Architect quantifying the actual amount of amendments required and recommendations have been accepted by the Architect, the Contractor shall, without delay, determine any cost impacts whether credit, no change, or addition, to the Contract Amount. As an integral part of the bid for Landscape Work, provide a Lump Sum bid amount for fertilizers and amendments as described below.

B. Application Rates (FOR BID PURPOSES ONLY):
    1. Sixty (60) lbs. of Tri-C Humate per 1,000 square feet.
    2. Nineteen (19) lbs. of 6-20-20 fertilizer per 1,000 square feet.
    3. Six (6) cubic yards of Aguiñaga GPS2, nitrogen stabilized compost per 1,000 square feet.
    4. 50-lbs Agricultural Gypsum, per 1,000 square feet.

C. Pot or Raised Planter Soil Mix: Prepare and backfill pots with a mix of the following per cubic yard:
    1. Jardinier Capillary Soil
    2. 12-12-12 Commercial Fertilizer
    3. Organic Amendment - 1/3 cubic yard
    4. Fine Sand - 1/3 cubic yard
    5. 12-12-12 Commercial Fertilizer - 1 pound
    6. Iron Sulfate - 2 pounds

D. Actual amendment rates and type shall be per soil test recommendations.

E. Imported Topsoil
   1. Provide natural, fertile, friable soil free from stones, noxious weeds, seeds, roots, subsoil or other material detrimental to normal plant growth. Topsoil acidity range (pH) shall be between 6.5 and 7.5 containing a minimum of 4 percent and a maximum of 25 percent organic matter.
   2. Reuse surface soil stockpiled onsite. Verify suitability of stockpiled surface soil to produce top soil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
      a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain top soil displaced from naturally well drained sites where topsoil occurs at least 4 inches deep; do not obtain from [agricultural land], bogs or marshes. Obtain soil from local sources acceptable to the Architect.
      b. Silt plus clay content of soil shall not exceed 15 percent by weight with a minimum 95 percent passing a 2 millimeter sieve.
   3. Obtain imported topsoil from local sources acceptable to the Architect.
   4. Silt plus clay content of soil shall not exceed 15 percent by weight with a minimum 95 percent passing a 2-millimeter sieve.

F. Organic soil amendment:
   1. "Nitrified Redwood Compost": 0.56 to 0.84% N based on dry weight, treated with relative form of nitrogen (NH3).
      a. Particle Size
      b. 95% - 100% passing 6.35 mm standard sieve.
      c. 80% - 100% passing 2.33mm standard sieve.
      d. Salinity: The saturation extract conductivity shall not exceed 3.5 millimhos/centimeter at 25 degrees (25N) centigrade as determined by saturation extract method.
      e. Iron Content: Minimum 0.08% dilute acid soluble Fe on dry weight basis.
      f. Ash: 0 - 6.0% (dry weight)
      g. Acidity range (ph) shall be between 5.5 and 7.5.
      h. Actual organic content shall be a minimum 280 pounds (lbs.) per cubic yard.
      i. As available from: Redi-Grow Corporation, 909 Elder Creek Road, Sacramento, CA 95828
   2. Organic soil amendment shall be Aguinaga GPS2.
   3. Particle Size:
      a. 90-100 percent passing 6.35 mm standard sieve.
      b. 80-100 percent passing 4.75 mm standard sieve.
   4. Salinity: The saturation extract conductivity shall not exceed 6.5 milliohms/centimeter at 25 degrees Centigrade as determined by saturation extract method.
   5. Iron Content: Minimum 0.08 percent dilute acid soluble iron on dry weight basis.
   6. Actual organic content shall be a minimum of 280 pounds (lbs.) per cubic yard.

G. Fertilizers
   1. Tri-C Humate. Provide per manufacturers specification.
   2. Fertilizer Tablets: Fertilizer Tablets: The following is to be used in the planting of container grown material. Follow manufacturer's application rates.
      a. Best-Paks "20-10-5" fertilizer packets. Packets to be made up of a minimum of 20% Nitrogen, 10% Phosphorus, 5% Potash. Use 1 Pak per 1-gallon container, (G.C.), 3 Paks per 5 G.C., 9 Paks per 15 G.C. and 12 Paks per boxed specimen. Evenly distribute as shown in details.
   3. Commercial Fertilizer: First Quality Commercial Fertilizer, as specified in Agronomic Soils Report.

H. Related Materials:

1. Pre-Planting Herbicide: Phydura, or equal.
2. Pre-Emergent Weed Control: Ronstar-G, Treflan, Eptam, Vegitex, or equal.
3. Peat Moss: Sphagnum peat moss, Canadian or European variety, free from alkali.
4. Soil Sulfur: First quality commercial grade.
5. Ferrous Iron Sulfate: Chelated first quality commercial grade.
6. Agricultural Gypsum: First quality commercial grade.
7. Best "Ammonium Phosphate" 16-20-0 with net less than 16% total nitrogen, 20% available phosphoric acid and 0% soluble potash.
8. Good Humus.
9. Root Hormone: Super Thrive.

2.04 PLANT MATERIALS

A. Quality: Provide trees, shrubs, and other plants of size, form, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".

B. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
   1. Lateral scaffolds shall be radially distributed around the trunk. The lateral branch shall be no more than 2/3 the diameter of the trunk. Trunk to be measured 1" above the branch (lateral scaffold).
   2. The minimum acceptable length of the most recent season's shoot growth for slow growing trees shall be not less than 8"; for fast growing trees not less than 12".
   3. The minimum acceptable height of trees is 6'-0" when planted, or as determined by Architect.

C. Needle Leafed and Broad Leafed Evergreen Trees: Provide evergreens of sizes shown or listed. Where dimensions are shown, they indicate minimum spread for spreading and semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad upright, and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimension shown.
   1. The minimum acceptable height of trees is 6'-0" when planted, or as determined by Architect.

D. Multi-Trunk Trees: Provide sizes shown or listed. Tree is to have a minimum of three (3) dominant trunks with appropriate caliper size and adequate spread.
   1. Shrubs: Provide shrubs of the size shown and with not less than the minimum number of canes required by ANSI Z60.1 for type of shrub required. Provide container grown stock.

E. Ground Cover: Provide plants established and well-rooted in removable containers, in flats, or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the size shown or listed.

F. Vines: Provide vines with good, well-established root systems within the container, and devoid of any abrasions, and or damage to stem.

2.05 SOD

A. Lawn Sod:
   1. Nursery-grown sod shall have the following characteristics:
      a. Sod for planting areas shall be dense, healthy, field-grown on sand fumigated soil with the grass having been mowed at 1-inch height before lifting from field.
      b. Sod for grass pave areas shall be dense and healthy, grown on a sand bed thin cut and washed.

c. Sod shall be dark green in color, relatively free of thatch, free from disease, weeds and harmful insects.
d. Sod shall be reasonably free of objectionable grassy and broadleaf weeds. Sod shall be considered weed free if no more than 2 such weeds are found per 100 square feet of sod.
e. Sod shall be rejected if found to contain the following weeds: common Bermuda grass, quack grass, Johnson grass, nimble weed, thistle, bindweed, bentgrass, perennial sorrel, and bromegrass.
f. Sod variety shall be:
   1) Turf Grass: Tiffway II, Bullseye, Bandera, GN1, Medallion Plus 90% Tall Fescue/10% Bluegrass Blend, as produced by West Coast Turf / Pacific Sod.
   2) Molate Fescue: No Mow Fine Fescue Blend, as produced by Pacific Sod.

2.06 MISCELLANEOUS LANDSCAPE MATERIALS:

A. Tree Stakes: Provide stakes of sound new lodgepole pine 2 inch minimum diameter for 15 gallon to 24 inch box size trees; 3 inch minimum diameter for 36 inch box and larger. Lodge pole minimum height, as indicated on Contract Drawings. Stakes shall have been treated with copper napthanate or ACQ (alkaline) or Ca-B (copper azole) to a minimum wood depth of 1/16". All stakes shall be free of knots larger then 1/2" in diameter, holes and other defects.

B. Tree Straps: Provide VIT black tree straps. Tree straps shall be attached to tree stake as shown in staking detail on the plans, color to be black.
   1. VIT "Cinch-Tie" CT32 for 24-inch box size and smaller tree.
   2. VIT "Twist Brace" TB36 for 36-inch box size and larger tree.

C. Vine Ties: Plastic vine ties, as specified on plans.

D. Headers and Edging
   1. Concrete edger: Dimension as specified on plans, poured in place concrete edger, color per plan.

E. Mulch
   1. Bark Mulch:
      a. Mulch shall be shredded bark mulch, as manufactured by Whittier Fertilizer, Pico Rivera, CA.
         1) Mulch shall consist of shredded bark mulch with a particle range of 2-3/4-inch to 1-inch in size.
      b. Mulch shall be Walk-On Bark
         1) As available from Redi-Grow Corporation, Sacramento, CA.
   2. Weed Control Fabric: Place Mirafi Mirascape landscape fabric below rock mulch or as shown on drawings. Overlap all seams 12" minimum and pin down every 36" typical. Mirascape fabric available from: Towns & Associates, 800-222-6036

F. Root Control Barriers: High-density polyproylene root control planter. Acceptable products include:
   1. Deep Root; Deep Root Corporation.
   2. Size as specified on drawings.

G. Drainage Materials
   1. Gravel in raised planters on structural slab and in pots shall be clean, coarse 3/8-inch to 3/4-inch diameter.
   2. Gravel for tree drainage shall be 3/4" diameter coarse clean gravel.
   3. Synthetic filter membrane cover over drainage course shall be woven synthetic fabrics.
      a. Model 140N, as manufactured by Mirafi.

4. Drain Pipe at trees: 4-inch diameter PVC perforated(within gravel), and non-perforated PVC drain pipe(stand pipe) with PVC adaptor connected to 4-inch ABS female reciever with 4-inch black ABS cleanout plug.

H. Sand: Washed plaster sand.

I. Jute Netting: A uniform open plan weave, single jute yarn not varying in thickness by more than 1/2 of its normal diameter, in rolled strips approximately 50 to 75 yards long and 50 to 60 inches wide. Contractor shall submit sample for approval prior to installation.

J. Staples: 11 gage with 1-inch top and 6-inch legs.

K. Sod Pegs: 1-inch square by 6-inch long pine or 6-inch lengths of lath.

L. Weed Control: Phydura, or equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive exterior plants for compliance with requirements and conditions affecting installation and performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected, and Architect has reviewed and accepted materials as defined within the section.

3.02 SITE OBSERVATION SCHEDULE

A. General: Notify Landscape Architect at least 3 days in advance when requesting on-site reviews.

B. Prior to commencement of site visits, items noted in previous observation reports shall have been either completed or remedied, unless such compliance has been waived. Failure to complete prior tasks or failure to prepare adequately for scheduled observations shall obligate Contractor to reimburse Architect for additional hourly services, plus transportation costs

C. Schedule For On-Site Reviews by the Landscape Architect:
1. Pre-construction conference with general contractor, grading contractor, landscape contractor, project arborist and landscape architect to discuss grading and protective measures to be followed in the vicinity of existing trees, or existing structures.
2. At completion of finish grading, and roto-tilling
3. Review of irrigation coverage prior to installation of any planting material.
4. At completion of fine grading and at delivery of plant materials, together with plant layout; prior to excavating pits.
5. Review of drainage system, standpipes, and plant material locations.
6. After planting pits have been excavated, but prior to backfilling. Provide one sample plant pit mock up for review.
7. After initial planting operations (One tree with each type of specified staking shall be approved prior to planting of trees).
8. Stake all tree locations for review.
9. See "Final Review and Acceptance" at the end of Part 3 in this Section for final site observations and acceptance of work.

3.03 TESTING

A. Planting Soil: Agronomic Soil Testing
1. Test shall be paid for by the Contractor. (NoCal) Testing lab shall be:
a. Sunland Analytical Labs, Rancho Cordova, CA

b. Waypoint Analytical, Santa Clara, CA

2. Agronomic Soils Testing
   a. Take three(3) samples of site soil at a depth of 6 to 12 inches, within proposed planting areas, after completion of final grading and prior to weed control and soil preparation.
   b. Take samples to agronomic soils testing laboratory indicated above for soil evaluation.
   c. Request testing for fertility and suitability analysis with written recommendations for soil amendment, fertilizer and chemical conditioners, application rates for soil preparation, planting backfill mix, pot-soil mix, hydro-spray, and post-maintenance fertilization programs.
   d. Soils report recommendations shall take precedence over the amendment and fertilizer application rates specified in this section.
   e. Submit testing laboratory's interpretation, recommendations, and comments to Architect within 14 days after the completion of rough grading.
   f. Furnish a soils analysis of import soil, and organic soil amendment prior to backfill.
      1) Submit soil testing laboratory's findings to Architect within 5 days prior to backfilling.
   g. Take six additional soil samples after completion of planting in the soil preparation and backfill mix areas, to be determine effectiveness to amendments prior and during planting. Submit to the testing laboratory the original amendment specification with previously issued bulletins for soil amendments and installation procedures. Re-apply necessary amendments based on recommendation of new soils test.

3.04 PREPARATION

A. Final Grades
   1. Finished grading shall insure proper drainage of the site. Conform to Division 31 Section "Earthwork" and Division 32 Section "Landscape Grading."
   2. The following areas shall be graded so that the final grades shall be established below adjacent paved areas, sidewalks, valve boxes, headers, clean outs, drains, manholes, etc. before placement of mulch as follows:
      a. Shrub/Groundcover Areas: 2-1/2 inches.
      b. Turf areas: 1-inch.
      c. Surface drainage shall be away from all building foundations, 2% minimum.
      d. Dispose of excess or unacceptable soil from the site at no expense to the Owner.
      e. Verify that final grades have been established prior to beginning planting operations.
   3. Parking Lot Planters and areas adjacent to hardscape.
      a. All aggregate base rock, lime-treated soil, soil sterilents, and other non-organic materials shall be removed from all parking lot planter areas down to the level of native soil. Scarify native soil to a depth of 12 inches and backfill planters to specified finish grade with native or approved topsoil and amend as specified.
      b. Remove all concrete overpours or any material that may prohibit the placement of plant material, irrigation, grates, root barriers, or any other conflicting material.
   4. Lightweight soil mix shall be sampled after mixing and delivery to the site, but prior to filling planters. Submit the original lightweight soil specification to the testing laboratory with previous bulletins for lightweight soil mix. Provide 1-quart of lightweight soil mix for every 65 cubic yards for organic and fertility analyses. Fertility analysis, recommendations and interpretations shall be furnished by the testing laboratory to ensure all specified amendments have been provided. Lightweight soil is to be used only in locations indicated on the Contract Drawings and as approved by the Architect.
   5. Protect planting areas from compaction by foot, trucks and heavy equipment.

3.05 PLANTING BED ESTABLISHMENT

A. Preparation Of Planting Area
1. Cross-rip on-grade planting areas to a minimum depth of 12 inches minimum 2 perpendicular directions. Remove stones over ½ inch (13mm) in any dimension and sticks, roots, rubbish and other deleterious matter per Division 32 "Landscape Grading".
2. Where additional soil is needed, place the top 15” with topsoil. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil.
3. Leach soil prior to amending.
4. After approximate finished grades have been established and soil has been leached, soil shall be conditioned and fertilized in the following manner: Soil condition shall, at the rate specified in the approved soils test recommendations, be uniformly spread and cultivated thoroughly by means of mechanical tiller into the top (8) eight inches of soil.
5. Broadcast soil amendments uniformly over surface of the area to be treated. Roto-till the top (8) eight inches of planting areas to evenly distribute the amendments and conditioners into the soil.
6. Retest as required to verify leaching was successful. All soil areas shall be compacted and settled by application of irrigation to a minimum depth of six (6) inches prior to any plant materials being installed.
7. At time of planting, the top 12 inches of all areas to be planted shall be free of stones, stumps, or other deleterious matter one 1/2 inch in diameter or larger, and shall be free from all debris, or similar objects that would be a hindrance to planting and maintenance.
8. Weed Eradication:
    a. Manually remove all existing vegetation in planting areas and dispose of it offsite.
    b. Fertilize planting areas with urea 30-0-0 commercial fertilizer at the rate of 0.5 pounds per 1000 square feet.
    c. Water planting areas thoroughly and continuously(by irrigation system, hand/hose, water truck, or other) for a period of 3 consecutive weeks, or until the weed seed have germinated. If accepted in advance by the Landscape Architect, employ a specific watering duration and frequency program designed to germinate residual weed seeds.
    d. Discontinue watering process for 2 days. Then apply a non-selective broad spectrum systemic herbicide for perennial weeds.(2 applications minimum) The type of herbicide to be used shall be determined by a licensed pest control applicator. If annual weeds are present, use straight contact herbicide in accordance with pest control applicator's recommendations.
        1) Do not use a pre-emergent herbicide.
    e. Allow sufficient period of time to ensure that weeds are dead. Follow herbicide manufacturer’s directions.
    f. Water planting areas thoroughly and continuously (by irrigation system, hand/hose, water truck or other)for a period of 3 weeks. A shorter watering period may be permissible at the discretion of the Landscape Architect. Discontinue watering process for 1 day prior to the second application of the herbicide spraying.(2 applications minimum) Re-apply the spraying operation with straight contact weed killer in accordance with pest control adviser's recommendations.
        1) Do not use a pre-emergent herbicide.
        2) Avoid irrigation for a minimum of 4 days for effective final weed kill.
    g. Clear desiccated weeds from the area.
    h. Water Planting areas thoroughly and continuously for 3 consecutive days to saturate upper layers of soil prior to planting operations.

i. Allow planting area soil surface to dry out for I day only prior to the planting application. Exercise care to not allow the soil surface to be either super-saturated with water or bone dry prior to the planting installation. Ensure moderate residual moisture within the top 1/4 inch of the soil surface.
j. The hydraulic equipment used for pesticide applications shall consist of an ISO-gallon minimum capacity fiberglass tank with complete mechanical agitation. The pump capacity shall be 10 gallons per minute while operating at a pressure of 100 pounds. Per square inch.
k. Distribution lines shall be large enough to carry the volume of water necessary for even, chemical distribution. The spray nozzle must cover a IS-foot swath, with a minimum output of 5 gallons per minute at 80 pounds per square inch.

9. Pre-emergent Weed Control: Immediately after planting, apply pre-emergent weed control to planted areas which will not be seeded.
10. Excavation For Trees And Shrubs
    a. Excavate pits, beds, and trenches as shown in details on the drawings.

B. Preparation for Lawn Areas: Limit preparation to areas which will be planted promptly after preparation.
1. Prepare planting area as described in 3.05 A.
2. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Establish smooth uniform surface. Limit fine grading to areas which can be planted immediately after grading.
3. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.
4. Restore lawn areas to specified conditions if eroded or otherwise disturbed after fine grading and prior to planting.

3.06 BIOFILTRATION PLANTER SOIL

A. The Biofiltration planter soil shall be placed on the planter area and firmed to a depth of as shown on the drawings. Mix shall be moist when spread to discourage migration in to the subgrade and to assist forming.

B. Soil mix shall be separated from drainage courses with geotextile fabric equal to Mirafi 140N.

C. See Grading Plans for locations and depths and Planting plans for plant material.

3.07 JUTE MESH

A. Make check slots before the netting is rolled out. Dig a narrow trench across the slope perpendicular to the direction of the flow. Fold jute, the same length as the trench, and press together. Location of check slots shall be a maximum of 50 feet apart.

B. Installation: Roll netting parallel to slope contours. The netting shall completely cover all areas as indicated on Contract Drawings. Overlaps shall be ample and well stapled.
1. Lay netting smoothly, and in continuous contact with the soil surface at all points.
2. Install without stretching. Where one roll of netting ends and a second roll starts, the up slope piece shall be brought over the buried end of the second roll so that there is a 12-inch overlap. Where two or more widths of netting are applied, side by side, the overlap shall be not less than 3 inches.
3. Staple overlapping edges that run parallel to the direction of the flow at 2-inch intervals. Outside edges, centers, and overlaps on banks shall be stapled across the slope at 6-inch intervals.
4. Top dress jute netting area with a thin layer of topsoil. After the top dressing, the yarns shall still be visible.

5. Spread loose topsoils over outside edges of netting to allow for smooth entry of water.
6. Clods that hold the jute off the ground shall be stamped into the soil. Force jute netting down into depressions and hold there with a staple.
7. Install plant material through netting.
8. Maintenance: Maintain jute netting until work on the Project has been completed and accepted and during the 90-day maintenance period. Maintenance shall consist of the repair of eroded areas and the repair or replacement and re-stapling of loose or undermined netting. Replace damaged planting materials as required.
9. Install jute netting in all areas of 30 percent slope or greater.

3.08 SOD

A. Sod shall be laid with closely fitted joints on a smooth, level surface which has been prepared as previously specified. Ends of strips shall be staggered. On irregular areas, sod shall be laid in both directions from the longest straight line that can be drawn through the area.

B. After a light initial watering immediately after installation, the sod shall be rolled to eliminate all irregularities.

C. After compaction, the sodded area shall be wetted to a soil depth of at least 8 inches.

D. Sod shall be as specified on the Contract Drawings

E. Protect sod from pedestrian traffic for 21 days and from sports activity for 6 weeks.

F. Sod is to be rolled minimum two times or as often as required in two directions with a water ballast roller to remove variations in grade. Sand infill all depresses. Sand to comply with turf manufacturer recommendations.

G. Sod is to be machine placed from “Big Rolls”.

3.09 PLANTING

A. General
   1. Actual planting shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally accepted practice, as approved by the Architect.
   2. Only as many plants as can be planted and watered on that same day shall be distributed in a planting area.
   3. Container shall be opened and plants shall be removed in such a manner that the ball of earth surrounding the roots is not broken and they shall be planted and watered as herein specified immediately after removal from the containers. Containers shall not be opened prior to placing the plants in the planting area.

B. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure acceptance by the Architect before start of planting work. Make minor adjustments as may be requested.

C. Excavation for Trees and Shrubs:
   1. Excavate pits, beds and trenches as shown in details on the Drawings.
   2. Roughen and score edges of planting pit to eliminate any glazing of the sides of the pit.
   3. Field Samples: Prior to planting, prepare one plant pit with standpipe, gravel, filter fabric, and root barriers for each tree size to be reviewed by the Architect.
   4. Do not cover standpipes.
   5. Excavation for planting shall include the stripping and stockpiling of all acceptable topsoil encountered within the areas to be excavated for trenches, tree pits, plant pits, and planting beds.

D. Container Removal

1. Cut containers on two sides with an acceptable cutter. Do not cut containers with spade or ax. Do not injure the rootball.
2. Carefully remove plants from containers without injury or damage to rootball.
3. After removing plants, superficially cut edge roots with knife on three sides.
4. For plants with sensitive roots, place container intact in flat pit 1½ times the size of a standard plant pit. Insert blades of sharp, needle-nose shears into a drain hole and cut the container bottom away. Remove bottom from pit. Follow with a cut down one side of the container from top to bottom. Repeat cut on opposite side. Fill plant pit with prepared plant pit mixture. Carefully remove the detached pieces.

E. Box Removal:
1. Remove bottom of planting boxes before planting.
2. Remove sides of box without damage to rootball after positioning plant and partially backfilling.

F. Planting Trees and Shrubs: Set container-grown stock, plumb and in center of pit or trench. Set top of rootball 2-inches above finish grade at trees, 1-inch above finish grade at shrubs, or as indicated on Contract Drawings. Do not use plant, if root system has severely kinked or circling roots, or if rootball is cracked, disturbed or broken. If root system is healthy, loosen spiraling roots and set in plant pit.

G. Planting pit shall be backfilled with the following soil conditioner and organic amendment, per cubic yard:
1. Application Rates, (FOR BID PURPOSES ONLY)as determined by contractor's soils tests:
a. Potassium Sulfate - 0-0-50, ¼-pound
b. Single Superphosphate - 0-20-0, ¼-pound
c. Ammonium Sulfate - 21-0-0, ¼-pound
d. Compost - 15% by volume
e. Agricultural Gypsum - 1.5 pounds
f. Good Humus - 15% by volume
2. Final amendments and rates are to be determined by Agronomic Soils Test.

H. When set, place additional fill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 1/2-full, place appropriate number of fertilizer tablets and complete backfill operations.

I. After backfilling, an earthen basin shall be constructed around each plant. Each basin shall be as indicated on the Contract Drawings. Basin shall be of a size suitable for the individual plant. In no case shall the basin for fifteen (15) gallon plant be less than four (4) feet in diameter; a five (5) gallon plant less than three (3) feet in diameter. The basins shall be constructed of amended backfill materials, and shall not be constructed for trees in turf areas.

J. Repeat watering until no more is absorbed.

K. Apply pre-emergent herbicide as per manufacturer's recommendations to all shrub and ground cover planting areas after planting.

L. Mulch all planted areas that do not receive jute netting, other than lawn areas, at not less than 3" thickness of mulch.
1. Areas with 30% slope and greater shall be protected with jute mesh.

M. Equally space and align trees and shrubs in both directions where designated on Contract Drawings.

N. Pull bark mulch three (3) inches away from the rootballs of all plants to insure proper air circulation.

O. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practices. Prune trees and other plantings only if required. Pruning shall be limited to remove injured wigs and branches, and to compensate for loss of roots during transplanting, but never exceed 1/3 of the branch structure. Never prune without prior review with Architect.

P. Prune shrubs to retain natural character. Unless directed by the Architect, do not prune leaders or apices of any plant material. Do not prune into balled or boxed forms without prior written approval of the Architect.

Q. Remove and replace excessively pruned or malformed stock resulting from improper pruning.

R. Planting Ground Cover
   1. Space plants as shown or scheduled.
   2. Dig holes large enough to allow for spreading of roots and compact area around plant. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover crowns of plants with wet soils.
   3. Mulch areas between ground cover plants with not less than three (3) inch deep mulch.

S. Miscellaneous Landscape Work: Install headers and edgings where shown. See appropriate details.

T. Planting Vines: Plant in accordance with details. Attach vine to vertical elements with vine ties as per manufacturer's recommendations.

U. Tree Staking and Guying: Stake or guy all trees per landscape details, and tie with tree ties as specified. Remove all nursery stakes from trees unless directed otherwise by the Architect. Immediately after planting, stake and guy all trees in accordance with details indicated on Contract Drawings. One tree of each size shall be staked and guyed, and reviewed by Architect prior to continue work.

V. Hardpan Conditions
   1. Where hardpan exists, whether it is in the form of caliche, rock or other impervious matter, and it is within the top 2½ feet of soil, or within the plant pit, use powered equipment to break through completely at each plant location to allow drainage and root growth. Remove hardpan at least 1½ feet greater than the rootball diameter of plant. Backfill with soil mix as specified.
   2. Where hardpan is within the first 12-inches of soil, it shall be completely penetrated for all trees and shrubs.

3.10 CLEANUP AND PROTECTION:

A. During landscape work, keep pavements clean and work area in an orderly condition. Haul away and remove all debris from landscape areas, and do not leave any clippings, and or other material from landscape planting and/or maintenance period.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and/or other trades. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

C. Powerwash all pavement and flatwork as necessary to remove all staining and tire marks and provide a clean surface.

3.11 REVIEW & FINAL ACCEPTANCE

A. General: Notify Landscape Architect at least 5 days in advance when requesting on-site reviews.

B. Site Observation requirements:
   1. Punch list at completion of landscape/irrigation work.
      a. Review of grading, irrigation and planting.
      b. Upon completion of punch list items the Maintenance Period begins.
         1) The maintenance period will not begin until all punchlist items are resolved and acceptance is provided by the Landcape Architect in writing.
   2. Final acceptance of project (at end of Maintenance Period).

a. Review of grading, irrigation and planting.
b. Upon completion of punch list items to the Client and Landscape Architect's satisfaction, the work is deemed completed.

3. The maintenance period will not begin until all punchlist items are resolved and acceptance is provided by the architect in writing.
4. Refer to Division 32 Section "Landscape Maintenance."
5. Where observed work does not comply with the Plans and Specifications, replace rejected work and continue specified maintenance period until reinspected by the Landscape Architect and determined to be acceptable. All replacement materials and installations shall be in accordance with the Plans and Specifications. Remove rejected work and materials immediately from project. Prior to the date of final observation, Contractor shall provide the Landscape Architect with all Record Drawings in accordance with the Plans and Specifications.
6. Replace non-compliant and/or rejected work prior to final observation.
7. Prior to the date of final observation, Conractor sahll provide the Landdscape Architect with all Record Drawings in accordance with the Plans and Specifications.

3.12 REPLACEMENT

A. All plant material and other materials installed under the Contract shall be warranteed against any and all poor, inadequate or inferior materials and/or workmanship or improper maintenance, as determined by the Landscape Architect, and shall be replaced by the Contractor at his expense. Warranty periods are noted in Part of this Specification.
   1. Trees, vines, and shrubs: One Year
   2. Groundcover and Turf: One Year
   3. Replacement: Any materials found to be dead, missing, or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Landscape Architect shall be sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the Contractor within five (5) days of written notification by the Landscape Architect. All replacement materials and installations shall comply with the Plans and Specifications.
      a. As soon as weather condtions permit, replace work that does not comply with the Plans and Specifications, without cost to the Owner. Remove rejected and non-compliant work and mateirals immediately from the project. Continue specified maintenance period until reinspected by the Landscape Architect and dtermeined to be acceptable.
      b. Any plant missing due to suspected theft shall be replaced by the Contractor. If the Contractor suspects that theft may be a problem, the Contractor shall provide written documentation to the Landscape Architect that security on this site needs to be intensified.
   4. Contractor to schedule replacement work with the Owner's representative, and arrange for proper staging and access.
      a. Contractor to include re-inspaection dats as part of replacment work scheduling.
   5. The Contractor may relieve himself of theft responsibility if after the security notice, with no result, a written notice to the Landscape Architect shall be given that plant material will not be replaced for theft or vandalism due to lack of site security being maintained. This procedure may take place only during the Landscape Maintenance Period.

END OF SECTION

SECTION 33 14 16
SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Site water distribution system complete with valves and distribution pipelines from water supply mains to points of connection.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Project Geotechnical Report.

1.03 REFERENCE STANDARDS

A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

B. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2024.

C. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2020.

D. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.

E. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 2019.

F. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2023.

G. AWWA C504 - Rubber-Seated Butterfly Valves; 2023.

H. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 48-In. (50-mm Through 1,200-mm) NPS; 2025.

I. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2023.

J. AWWA C800 - Underground Service Line Valves and Fittings; 2021.

K. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. through 60 In. (100 mm through 1500 mm); 2022.

L. AWWA C651 Disinfecting Water Mains.

M. AWWA C110 Ductile-Iron and Gray-Iron Fittings

N. AWWA C153 Ductile-Iron Compact Fittings

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's catalog cuts for pipe, fittings, joint couplings; Backflow preventers and assemblies, fire hydrants; water meters and accessories; valves; and valve boxes.

1.05 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to the requirements indicated:
   1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Owner's Representative written permission.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with utility company supplying water requirements.

B. All work to be performed and materials to be used shall be in accordance with the Standard Specifications for Public Works Construction, latest edition and supplements.

C. The Contractor shall have a copy of the Standard Specifications at the job site.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

E. NSF Compliance:
   1. Comply with NSF 14 for plastic potable-water-service piping.
   2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Do not store materials directly on the ground. Support the pipe uniformly during shipping and storage. Do not stack higher than 4 feet nor stack with weight on bells. Cover the pipe with plastic to protect it from sunlight. Keep inside of pipe and fittings free of dirt and debris. Avoid scratching the pipe surface.

B. Take special care to avoid damage to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged.

C. Prior to installation, each pipe length shall be carefully inspected for damage.

D. All pipe, fittings, and appurtenances shall be thoroughly cleaned before installation and shall be kept clean until installation and backfilling has completed.

E. Use only nylon ropes, slings, or other lifting devices that will not damage the surface of the pipe.

F. Keep the pipe clean and free of debris, dirt, animals, and trash during and after laying operations.

G. At the close of each operating day, seal the open end of the pipe using a gasketed night cap.

PART 2 PRODUCTS

2.01 WATER PIPE

A. PVC Pipe (NPS 1"-3"): ASTM D1785 Schedule 80.
   1. Fittings: ASTM D2467, PVC.
   2. Joints: ASTM D2855, solvent weld.

B. PVC Pipe (NPS 4"-12"): AWWA C900 Class 235:
   1. Ductile Iron Mechanical Joint Fittings: AWWA C110 Ductile Iron and Gray-Iron Fittings or AWWA C153 Ductile Iron Compact Fittings

2. Gaskets: AWWA C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
3. Joints: ASTM D3139 compression gasket ring.

C. Pipe for potable water use shall be blue, or dark grey in color. Pipe for recycled or reclaimed water use shall be purple in color.

D. Tracer Wire: #8 AWG Type UF (direct burial) stranded single conductor cable with high density polyethylene (HDPE) or high molecular weight polyethylene (HMWPE) insulation. The insulation shall be black in color.

E. Detectable Warning Tape: Per Section 312316.13.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves Up To 3 Inches:
1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, ends, with control rod, and extension box.

C. Gate Valves 3 Inches and Over:
1. AWWA C509, iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, ends, control rod, and extension box.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Project Geotechnical Report, and contract drawings.

B. Cover: As specified in Project Geotechnical Report, and contract drawings.

2.04 ACCESSORIES

A. Concrete for Thrust Restraints: As specified in the water purveyor supplying water standard specifications, or Standard Specifications for Public Works Construction; latest edition.

2.05 CORROSION-PROTECTION ENCASEMENT FOR PIPING

A. Polyethylene Encasement for Underground Ductile-Iron Pipe and Fittings: Polyethylene encasement of eight mils thickness shall conform to AWWA C105. Joint tape shall be self sticking PVC or polythylene, eight mils thick.

B. Fusion-Bonded Epoxy Coatings for Ductile-Iron and Gray-Iron Fittings: Epoxy coating shall conform to AWWA C116.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to beginning work, verify that building service connection and municipal and site water main size, location, and invert are as indicated.

B. Examine trench bottom to ensure that it is accurately graded to provide uniform bearing and to support pipe.

3.02 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

A. See the contract drawings for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide applicable square feet thrust restraint bearing on subsoil per contract drawing details and references.

D. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide thrust restraint bearing on subsoil, size as indicated.

E. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.04 INSTALLATION - PIPE

A. Project site water lines shall terminate approximately five feet from buildings, unless otherwise indicated on contract drawings. Install temporary cap or plug terminals for future connection to building.

B. Bury piping with depth of cover over top at least 36 inches, unless otherwise indicated per the contract drawings.

C. Install underground piping with restrained joints at horizontal and vertical changes in direction, where line size is 4 inches and larger. Use retrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports for all lines NPS 3 or greater.

D. Maintain separation of water main from sewer piping in accordance with applicable codes, jurisdicational requirements and the following:
   1. Lay water mains over sanitary sewer lines to provide vertical separation a miminum of 12 inches.
      a. If 12 inch minimum separation cannot bet met:
         1) Install water line with all joints located at least 10 feet from each side of the sewer pipe.
         2) Encase sewer in 6 inches of concrete around pipe extended to 10 feet of either side of water pipe.

E. Install pipe to indicated elevation to within tolerance of 1/2 inches.

F. All pipe shall be laid true to line and grade as shown on the contract drawings.

G. Install pipe to allow for expansion and contraction without stressing pipe or joints.

H. Install detectable warning tape per design drawing trenching detail. and Section 312316.13.

I. Install tracer wire on top of pipe per design drawing trenching detail. Tape tracer wire to pipe every 10 feet.
   1. Wire shall be continous strand. Crimpable copper butt splice kits are permitted in valve cans only. At valve cans, wire shall be routed up the outside of the valve riser, into the valve can at the top, 12-inch looped, and back down the outside of the valve riser.
   2. Wire shall terminate at surface in an in ground traffic rated access box labeled "Water".

3.05 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with proposed finished grade.

3.06 FIELD QUALITY CONTROL

A. See Section , for additional requirements.

B. Potable Water:
   1. Perform hydrostatic testing on private and public water piping as required by the local water purveyor supplying water.
   2. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

C. Perform Tracer Wire Continuity Tests.

D. Prepare reports of all testing activities.

3.07 CLEANING

A. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

B. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651.

END OF SECTION

SECTION 33 42 11
STORMWATER GRAVITY PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gravity-flow, nonpressure site stormwater drainage piping.

B. Stormwater pipe accessories.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Project Geotechnical Report.

1.03 REFERENCE STANDARDS

A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2025.

C. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2021.

D. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).

E. Standard Specifications for Public Works Construction (Greenbook); current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories, and other drain components as indicated.

C. Field Quality Control Submittals: Document results of field quality control testing.

D. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to the requirements indicated:
   1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Owner's Representative written permission.

PART 2 PRODUCTS

2.01 **STORM DRAINAGE PIPE MATERIALS**

A. Plastic Pipe: ASTM D3034, Type PSM, SDR 35 Poly Vinyl Chloride (PVC) material; inside nominal diameter of 4-10 inches, bell and spigot style gasketed sealed joint ends.

B. Cast in Place Concrete: Greenbook Section 201-1.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Detectable Warning Tape: Per Section 312316.13.

2.03 BEDDING AND COVER MATERIALS

A. Bedding Material: As specified in Project Geotechnical Report, and contract drawings.

B. Cover Material: As specified in Project Geotechnical Report, and contract drawings.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Prior to beginning work, verify that building service connection and municipal and site utility water main size, location, and invert are as indicated.

3.02 TRENCHING

A. See Section 31 23 16 - Excavation and Section 31 23 23 - Fill for additional requirements.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavation for accurate placement of pipe to elevations indicated.

G. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

H. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.

I. Remove excess excavated material and material that is unsuitable for re-use from site.

J. Stockpile excavated material to be re-used in area designated on site.

K. Provide temporary means and methods, as required, to remove all water from trenching. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

L. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.03 INSTALLATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.

E. Install continuous detectable warning tape 12 inches above top of pipe.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 40 00 - Quality Requirements.

B. Do not enclose, cover, or put into service before inspection and approval.

C. Tests: Upon completion of this portion of the work, and prior to acceptance by the owner, perform all required tests and secure approvals from agencies having jurisdiction.
   1. Submit separate reports for each system inspection and test.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5% of internal piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leaking into piping.
      e. Exfiltration: Water leakage from or around piping.
      f. Leaks and loss in test pressure constitute defects that must be repaired.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.
   5. PVC Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
      a. Option: Test according to requirements set forth in ASTM F 1417.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION