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 Terracon.com

March 31, 2023

Lodi Unified School District 880 N. Guild Ave Lodi, California 95240

Attn: Joe Patty P: (209) 712 6363 E: jpatty@lodiusd.net

Re: Geotechnical Engineering Report Addendum 1 New South Central Avenue Campus 19 South Central Avenue Lodi, California Terracon Project No. NA225058

Dear Mr. Patty,

Terracon Consultants prepared a geotechnical engineering report (Project No. NA225058, Dated August 12, 2022) for the New South Central Avenue Campus project located at 19 South Central Avenue in Lodi, California. Terracon's original report was reviewed by the California Geologic Society (CGS) who raised questions concerning the report in their review letter, "Engineering Geology and Seismology Review for Turner Senior Academy – New Campus" dated December 6, 2022. The review letter stated the original report did "not adequately address the seismic and geologic issues of the site." A follow up conference call with CGS was performed to obtain more detail of the exact concern. As a result, Terracon has performed additional testing to address their concerns.

Additionally, the original report provided recommendations for general earthwork based on no substantial below grade structures. We now understand that basements are included as part of two on site buildings to be demolished and backfilled. We understand the basements are 5½ feet below ground surface (bgs) or less. Additional recommendations for backfilling the basements, earthwork observations, and field density testing of the backfill are being provided.

California Geologic Society Review Letter and Response

As previously stated, the CGS review letter stated the original report did "not adequately address the seismic and geologic issues of the site." Specifically, CGS requested that Terracon consider the near surface loose sandy soil may consist of Holocene dune sand that is mapped in discontinuous zones within the Lodi area. CGS requested that additional characterization of the lateral and vertical extent of the near surface loose sandy soils be performed. In a phone conversation with Peter Holland of CGS, Terracon agreed to perform an additional hand auger boring on the site to a planned depth of 15 feet bgs and three geophysical seismic refraction (SR) lines and seismic Multi-channel Analysis of Surface Waves (MASW) arrays in order to further characterize the near surface soils.

The soils encountered in the additional hand auger boring, shown as boring B5 on the exploration plan, consist of similar soils encountered during our initial investigation. Loose silty sand was encountered within the upper 4 to 7 feet below ground surface followed by medium dense silty sand extending to about 11¹/₂ feet bgs. The near surface silty sand was underlain by very stiff to hard sandy silt which extended to the maximum depth explored of 15¹/₂ feet bgs.



Geophysical testing was performed by NORCAL Geophysical Consultants, Inc.: A Terracon Company with a Geophysical Report provided, "Geophysical Investigation: New South Central Avenue Campus" Project number NS235021, dated March 3, 2023. The seismic S-wave velocity values (Vs) across the site ranged from 590 to 1,980 ft/sec. Seismic site class D is classified as "stiff soil" with $600 \le Vs \le 1,200$. The low range result of 590 ft/sec was only encountered in MASW array number 2 from a depth of 4 to 7 feet bgs. Results from all other tests were greater than 600 ft/sec.

Based on the results of the SR and MASW survey, the soil density generally increases with depth as shown on the graphs and tables within the attached Geophysical Report. The SR surveys were able to identify soil profiles extending to depths of between 40 and 50 feet bgs and the MASW surveys were able to identify soundings extending to depths of about 100 feet bgs. The borings performed for this project site and the geophysical survey support our initial findings that characterizes the near surface loose sandy soil extend and are limited to the upper 7 to 10 feet bgs across the project site. Additionally, based on the overall S-wave velocity values of the three profiles, Terracon classifies the seismic site class as class D. Based on the shallow depth of the near surface loose sandy soil and depth of groundwater, it is our opinion that the potential for liquefaction to occur at this site as well as any lateral spreading is low. Based on the results of our initial investigation, our additional investigation and the anticipated structural loading, the recommendations contained within our original report should be followed as reported.

Updated Seismic Parameters

The seismic design parameters provided in our original report were based on the 2019 California Building Code (CBC). We are now providing parameters for the 2022 CBC.

The 2022 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2022 CBC. The 2022 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structure, it is our assumption that the exception in Section 11.4.8 does apply to the proposed structure. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (Fa and Fv) from Tables 1613.2.3(1) and 16132.3(2) presented in Section 16.4.4 of the 2022 CBC.

Description	Value
2022 California Building Code (CBC) Site Classification ¹	D ²
Risk Category	II

Geotechnical Engineering Report Addendum 1

New South Central Avenue Campus
Lodi, CA
March 31, 2023 Terracon Project No. NA225058



Description	Value			
Site Latitude ³	38.1334° N			
Site Longitude ³	121.2656° W			
S _S , Spectral Acceleration for a Short Period ⁴	0.605g			
S ₁ , Spectral Acceleration for a 1-Second Period ⁴	0.254g			
Fa, Site Coefficient	1.316			
Fv, Site Coefficient (1-Second Period)	N/A			
SMs Maximum Considered Spectral Response Acceleration for a Short Period	0.797g			
S _{M1} Maximum Considered Spectral Response Acceleration for a 1- Second Period	N/A			
S _{DS} , Spectral Acceleration for a Short Period	0.531g			
S_{D1} , Spectral Acceleration for a 1-Second Period	N/A			
PGAM Site Modified Peak Ground Acceleration	0.341g			

- Seismic site classification in general accordance with the 2022 California Building Code, which refers to ASCE 7-16. Site Classification is required to determine the Seismic Design Category for a structure.
- 2. The Site Classification is based on the upper 100 feet of the soil profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7-16 and the 2022 CBC. Geophysical shear wave velocity data was obtained at three locations across the project site to determine the appropriate site class.
- 3. Provided coordinates represent a point located in the general vicinity of the project.
- 4. These values were obtained using online seismic design maps and tools provided by the SEAOC and OSHPD (https://seismicmaps.org/).

Typically, a site-specific ground motion study may reduce construction costs. We recommend consulting with a structural engineer to evaluate the need for such a study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Geotechnical Recommendations for Basement Backfill

The walls of the basement should be benched back during Earthwork prior to structural fill placement. The benches should be a minimum 4 feet wide and should be constructed at vertical intervals of 2 feet

Explore with us

Geotechnical Engineering Report Addendum 1 New South Central Avenue Campus Lodi, CA

March 31, 2023
Terracon Project No. NA225058



or less. This will require the existing basement walls and floor slabs to be demolished and removed from the site to accommodate earthwork and construction. To ensure the sidewalk has adequate support, special care should be taken when the wall of the basement is located adjacent to the sidewalk. The demolition should be above an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending downward from the nearest edge of the adjacent sidewalk. Our office shall be afforded the opportunity to observe the subgrade conditions after demolition, and review plans and specifications to verify our recommendations have been properly implemented.

Earthwork

We anticipate fills up to 5½ feet to backfill the basement within the existing building. In general, we anticipate cuts and fills up to 3 feet or less may be require developing final grades in all other areas. If greater cuts and fills are required, Terracon should be contacted to provide supplemental recommendations. Earthwork will include demolition, clearing and grubbing, excavations and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria as necessary to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

Prior to placing fill or benching excavations, the existing basement walls and floor slabs should be demolished and removed. Debris generated from demolition of the building and basements, pavements, old foundations, underground utilities, existing vegetation and root mat, debris, and any unsuitable material should be removed from the site.

Fill Compaction Requirements

Structural fill for the basement below 5 feet from subgrade surface and within the upper 12 inches of subgrade soils beneath pavement should be compacted to 95% of the maximum dry density as determined in the ASTM D1557 test method with moisture contents for compaction above optimum from 0 to +3%. Structural fill within 5 feet from subgrade surface should be compacted to 90% of the maximum dry density as determined in the ASTM D1557 test method with moisture contents for compaction above optimum from 0 to +3%.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer of Record. Monitoring should include documentation of adequate removal of debris generated from demolition of the basements, vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 500 square feet of compacted fill in the basement areas. One density and water content test should be performed for every 12-inch-thick lift for every 50 linear feet of compacted basement backfill. This testing frequency criteria may be adjusted during construction as specified by the Geotechnical Engineer of Record.

This addendum has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical

Geotechnical Engineering Report Addendum 1 New South Central Avenue Campus ■ Lodi, CA



New South Central Avenue Campus
Lodi, CA
March 31, 2023
Terracon Project No. NA225058

engineering practices. No warranties, either express or implied, are intended or made. In the event the nature, design, or locations of the project as outlined in this report are planned, the conclusions and recommendations contained in this addendum shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions in this addendum in writing.

Our original report shall be referenced for all other recommendations and limitations not included in this addendum. We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this letter, or if we may be of further service, please contact us.

Sincerely, Terracon Consultants, Inc.

Christopher B. Congrave, Associate Professional Engineer 92512 Geotechnical Group Manager Garret S.H. Hubbart, Sr. Principal Geotechnical Engineer 2588 Regional Manager

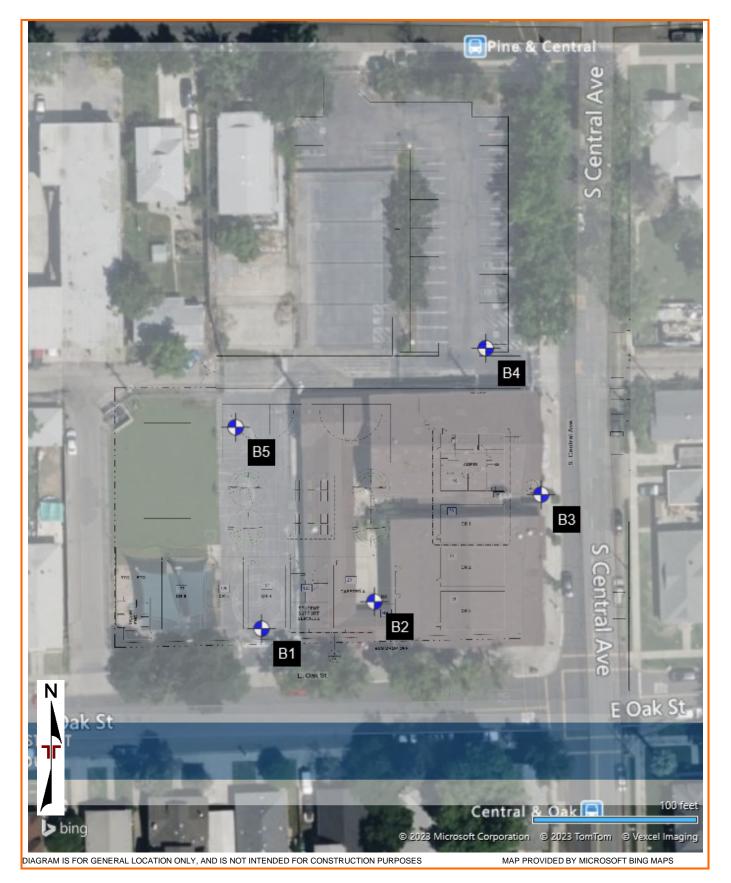
Attachments:

- Exploration Plan
- Boring Log B5
- Geophysical Report
- Original Geotechnical Engineering Report and Geologic Hazards Study

EXPLORATION PLAN

New South Central Avenue Campus
Lodi, California
March 31, 2023
Terracon Project No. NA225058





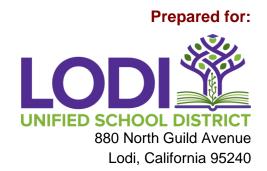
	BORING LOG NO. B5 Page 1 of 1													
PROJECT: New South Central Avenue Campus		CLIE	ENT			d Schoo	l Distr	rict						
S	ITE:	19 South Central Avenue Lodi, CA					Lodi,	CA						
MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 38.1332° Longitude: -121.2662° Approximate Surface E DEPTH E	:lev.: 56 (Ft.) +/- LEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST	RESULTS	DCP (blows/1-3/4 inches)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	Atterberg Limits	PERCENT FINES
		0.5 <u>ASPHALT</u> , 6" 0.6∖ <u>AGGREGATE BASE COURSE</u> , 1" <u>SILTY SAND (SM)</u> , fine to medium grained, brown, loose	55.5+/55.4+//	-	_				3/	- - -	8.4			
1		medium dense		5 -	-	-					9.9			
		11.5	44.5+/-	10-	_	-			16,		4.3	-		
2		SANDY SILT (ML), very stiff to hard		15-	-	-			83		13.8			
		15.5 Boring Terminated at 15.5 Feet	40.5+/-								10.1			
	St	atification lines are approximate. In-situ, the transition may be gra	adual.		_	<u> </u>	<u> </u>	Hamme	er Type: DCP					I
Advancement Method: See Exploration and Testi 4" Hand Auger description of field and lat and additional data (If any Abandonment Method: Boring backfilled with Auger Cuttings			and lab (If any) ormation	oratory p n for exp	oroceo	lures used	Notes: DCP - D	ynamic Cone	Penetrom	neter p	ber ASTM	1 STP 399		
	Gi	WATER LEVEL OBSERVATIONS	ller					Boring Sta	arted: 03-02-2	023	В	oring Cor	mpleted: 03-02-2	023
	0							Drill Rig: H	Hand Auger		D	riller: Ter	racon	
1			904	Lodi,	CA	y		Project No	D.: NA225058					

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NA225058 NEW LUSD CAMPUS.GPJ TERRACON_DATATEMPLATE.GDT 3/29/23

Geophysical Report

Geophysical Investigation: New South Central Avenue Campus 19 South Central Avenue Lodi, California

> March 3, 2023 NORCAL JOB NO. NS235021



Prepared by:



NORCAL Geophysical Consultants, Inc. 321A Blodgett Street Cotati, California 94931 P (707) 796-7170 F (707) 796-7175 norcalgeophysical.com



March 3, 2023

Lodi Unified School District 880 North Guild Avenue Lodi, California 95240

Subject: Geophysical Investigation: New South Central Avenue Campus 19 South Central Avenue Lodi, California NORCAL Project No. NS235021

Attention: Mr. Joe Patty

Dear Mr. Patty,

This report presents the findings of a geophysical investigation performed by NORCAL Geophysical Consultants, Inc., a Terracon company (NORCAL), for the Lodi Unified School District (LUSD) at 19 South Central Avenue in Lodi, California. The investigation consisted of the seismic refraction (SR) & multichannel analysis of surface waves (MASW) geophysical methods.

The work was authorized under a Terracon Inter-Office Service Agreement for Terracon Lodi Project No. NA225058. NORCAL Professional Geophysicist David T. Hagin (CA PGp No. 1033) and Geophysical Field Technician Christopher Kightlinger conducted the survey on February 21, 2023. This geophysical investigation was supplemental to a previous geotechnical investigation performed by the Lodi Terracon office (August 2022).

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, express or implied, is made by NORCAL.

NORCAL Geophysical Consultants, Inc. 321A Blodgett Street Cotati, California 94931 P (707) 796-7170 F (707) 796-7175 norcalgeophysical.com



We appreciate having the opportunity to provide our services for this project. If you have any questions or require additional geophysical services, please do not hesitate to call on us.

Sincerely, NORCAL Geophysical Consultants, Inc.

anie agn

David T. Hagin California Professional Geophysicist PGp 1033



Donald J. Kuku Donald J. Kirker, Reviewer

Donald J. Kirker, Reviewer California Professional Geophysicist PGp No. 997





1.0 INTRODUCTION

The New South Central Avenue Campus will be located at 19 South Central Avenue in Lodi, California. Subsurface exploration and geotechnical engineering services were previously performed by the Lodi Terracon office (August 2022) and logs for borings B1 through B4 have been provided by Terracon. This geophysical investigation was completed to supplement the geotechnical report. The geophysical investigation comprised seismic refraction (SR) and multichannel analysis of surface waves (MASW) surveys.

The SR method provides P-wave velocity values that may aid in determining the consolidation of the underlying lithologic materials. The MASW method defines S-wave velocity values that can provide information regarding the relative strength of the underlying geology, and can be used to determine seismic site class (Vs30).

2.0 SITE CONDITIONS

The following description of site conditions is derived from our observations during the survey and a review of publicly available aerial photographs, geologic and topographic maps.

Item	Description		
Site Information	The campus is currently not in use, and consists of vacant buildings, yard and parking lot areas. The approximate geographic coordinates of the center of the site are: (38°07'59.8"N 121°15'57.1"W).		
Current Ground Cover	Open areas of the site consist of asphalt-, artificial turf- and bark-covered exercise areas as well as an asphalt parking lot and soil-covered planter areas.		
Existing Topography	Based on our Trimble Geo7X GPS, Google Earth and site observations, the survey areas are flat, with surface elevations of about 57- to 58-ft (NAVD88).		
Site Geology	Available geologic maps (CGS 2002, 2003) indicate that the site geology consists of Quaternary age alluvial deposits. Borings B1 through B4 (Terracon 2022) indicate mostly silty sands and sandy silts with some clayey sands and lean clays.		

3.0 SCOPE OF WORK

Our scope of work included acquiring SR data along three traverses, denoted as Lines SR-1 through SR-3. Three MASW soundings were acquired with the same geophone arrays, designated MASW-1 through MASW-3, respectively.



Aerial photographic images showing the site vicinity and the locations of the SR lines in red and the MASW soundings (and associated geophone arrays) in blue are provided on Plate 1 – Site Location Map.

To provide documentation of our investigation, this geophysical report includes the site location map, details of our data acquisition and processing, as well as the resulting SR profiles and MASW shear-wave models, presented in both tabular and graphic form.

4.0 SEISMIC REFRACTION SURVEY

4.1 SR SURVEY METHOD

The SR method is designed to measure subsurface variations in the compressional (P-) wave velocities, which will be denoted herein as "Vp." Variations in Vp can be indicative of variations in the density and elastic properties of subsurface materials. The Vp values can typically be interpreted to differentiate between bedrock and overburden, as well as to assess the character of the bedrock surface. The SR method provides both vertical and lateral variations in the Vp of subsurface materials. These measurements can then be used to produce a two-dimensional (2D) cross-section (profile) illustrating variations in Vp versus depth and distance beneath the seismic line.

Vp is dependent on physical properties such as density, hardness, compaction and induration. However, other factors such as bedding, fracturing and saturation also affect Vp. In general, the Vp of weathered rock and consolidated or cemented sedimentary deposits are higher than those of unconsolidated sediments or fill material. Within rock, higher Vp values typically correspond with harder, less weathered and/or fractured rock. Therefore, the configuration of Vp values may aid in determining the thickness of sedimentary and soil layers (overburden), and the character of the underlying bedrock.

Detailed descriptions of the SR methodology, the instrumentation we used, our data acquisition, analysis and interpretation procedures as well as the general limitations of the method are provided in Appendix A – Seismic Refraction Survey.

4.2 SR PROFILES

The results of the SR survey are illustrated by the color contoured seismic velocity cross-sections (profiles) shown on **Plates 2 through 4 – Seismic Refraction Profiles**. On each plate, the vertical axis represents elevation (NAVD88), and the horizontal axis represents the survey stationing established for each SR line with the zero-value at the southernmost end of each line. The unit of measure for all axes is the US Survey Foot. The solid black line along the top of the contoured portion of the profiles represents the ground surface. The maximum depth of



investigation is determined by the greatest shot-to-receiver distance and is estimated to be 50-ft for Line SR-1 and 40-ft for Lines SR-2 and SR-3.

4.3 SEISMIC P-WAVE VELOCITY VALUES

Seismic P-wave velocity (Vp) is represented by the labeled contours and the color shading between contours and is presented in feet per second (ft/sec). The relationship between color and Vp is specified by the color scale shown below each profile. The color scales are identical for ease of comparison. Typically, we differentiate the Vp range into three sub-ranges: low, moderate and high. However, the measured P-wave velocity values are relatively low and fall within our typical low range.

4.4 SR RESULTS

The Vp measured by the seismic refraction survey range from less than 1,000 ft/sec near the surface to about 4,600 ft/sec at depth. The lines all show that Vp increases gradually with depth, likely reflecting uniformly increasing compaction of soils and/or sedimentary deposits with depth. These conditions are also reflected in the boring log descriptions of "loose to medium dense" soils and/or sediments for borings B1 through B4.

5.0 MASW SURVEY

5.1 MASW SURVEY METHOD

The Seismic Multichannel Analysis of Surface Waves (MASW) sounding survey measures the shear-wave velocities of the subsurface as a function of depth. The method used for this survey is referred to as a sounding, producing one-dimensional (1D) data that are presented in both tabular and graphic form as a layered shear wave model. The location of each sounding is considered to be the center of the geophone array. Descriptions of the MASW methodology, our data acquisition and analysis procedures, and the instrumentation we employed are provided in **Appendix B – MASW Sounding Survey**.

The standard method of reporting MASW data is to consider the location of the 1D velocity vs. depth model as the center point of the MASW array. However, this does not mean that the measured velocity values represent materials solely beneath that location. In fact, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values.



5.2 MASW TABLES AND STEP-CHART GRAPHS

The results of the MASW survey are listed in the tables presented in Section 5.3. The left columns of each table contain the depth ranges for each layer (feet below ground surface) and the right columns comprise the associated shear wave (S-wave) values in feet per second (ft/sec).

The results are also presented graphically in ft/sec by the step charts shown on Plates 5 through 7 - MASW Soundings. The maximum depth of investigation is determined by the longest wavelength measured by the survey, which is a function of the site geology and the array length. The maximum depth of exploration for each sounding is approximated as 100-ft below ground surface.

5.3 **MASW RESULTS**

Seismic S-wave velocity values (Vs) measured for the MASW survey range from 590 to 1,980 ft/sec. These values are relatively low and correspond well with the results of the SR survey and the boring logs. The MASW results tables are presented below:

MASW-1: Seismic S-Wave Velocity vs Depth			
DEPTH RANGE (FT)	S-WAVE VELOCITY (FT/SEC)		
0 - 2	810		
2 - 5	750		
5 - 9	640		
9 - 14	960		
14 - 20	1,590		
20 - 27	1,400		
27 - 36	1,000		
36 - 47	1,350		
47 - 61	1,820		
61 - 100	1,090		

MASW-1: Soismic S-Waye Velocity vs Depth



DEPTH RANGE (FT)	S-WAVE VELOCITY (FT/SEC)
0 - 2	860
2 - 4	630
4 - 7	590
7 - 10	1,050
10 - 15	1,220
15 - 20	990
20 - 27	1,410
27 - 36	1,980
36 - 46	980
46 - 100	1,220

MASW-2 : Seismic S-Wave Velocity vs Depth

MASW-3 : Seismic S-Wave Velocity vs Depth

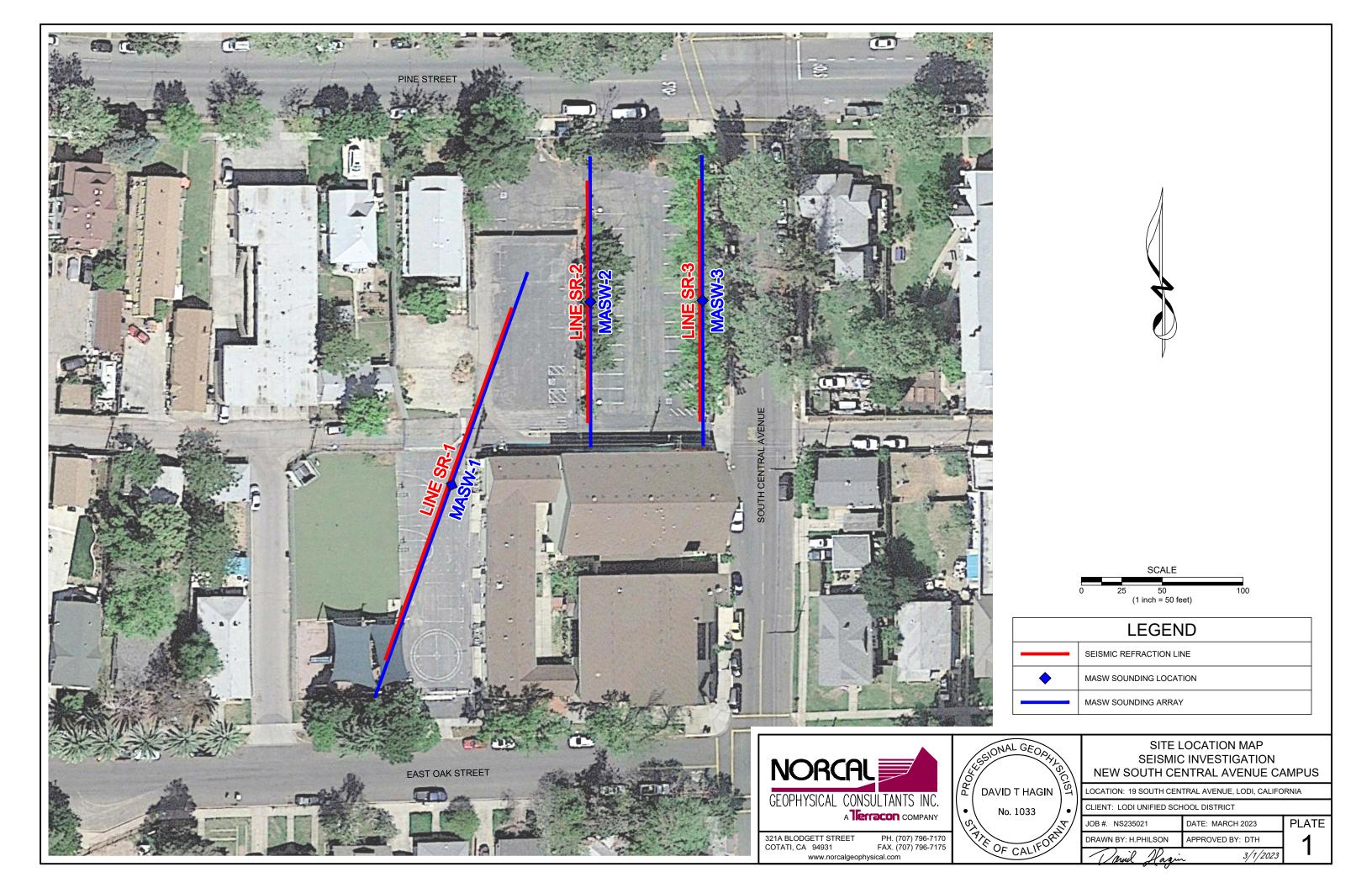
DEPTH RANGE (FT)	S-WAVE VELOCITY (FT/SEC)
0 -3	1,090
3 - 6	1,010
6 - 10	690
10 - 15	1,030
15 - 21	1,630
21 - 29	1,590
29 - 39	1,260
39 - 51	1,050
51 - 66	1,550
66 - 100	1,720

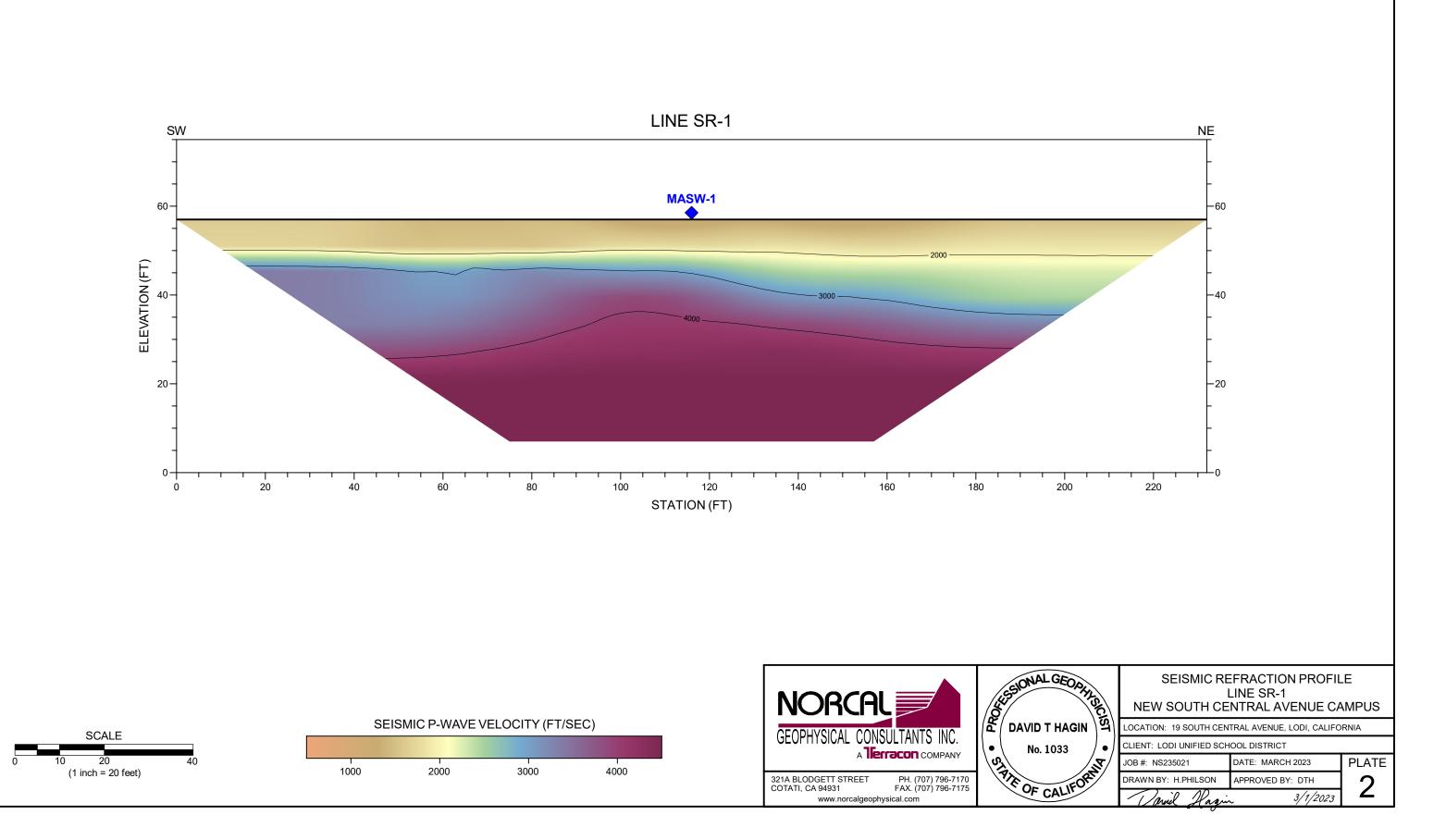
The values generally increase with increasing depth; however, velocity inversions (decreasing Vs with depth) are apparent on all three soundings. The data for MASW-1 and MASW-2 are very similar, with the Vs values for MASW-3 being somewhat higher.

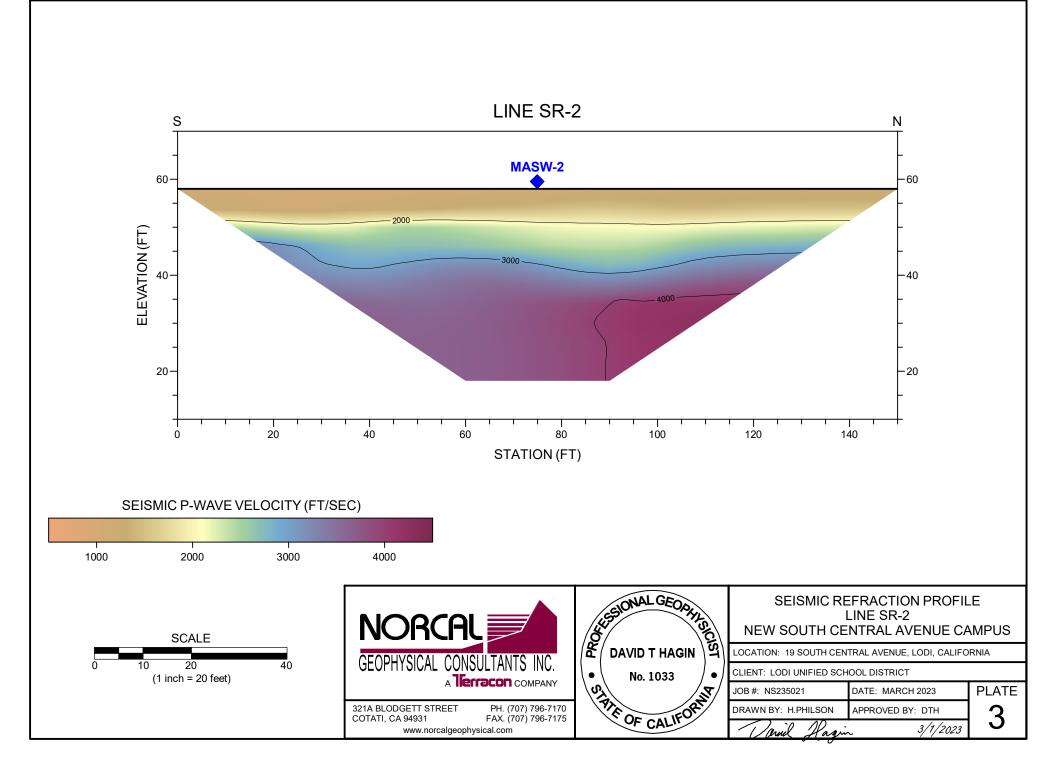


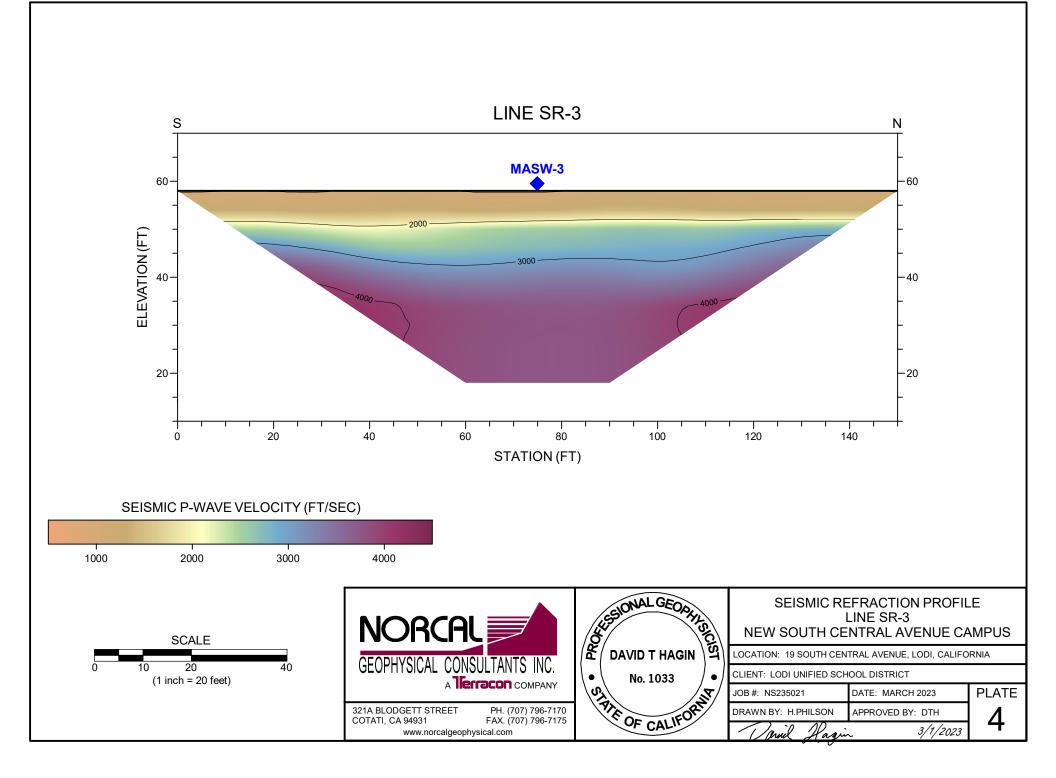
6.0 **DISCUSSION**

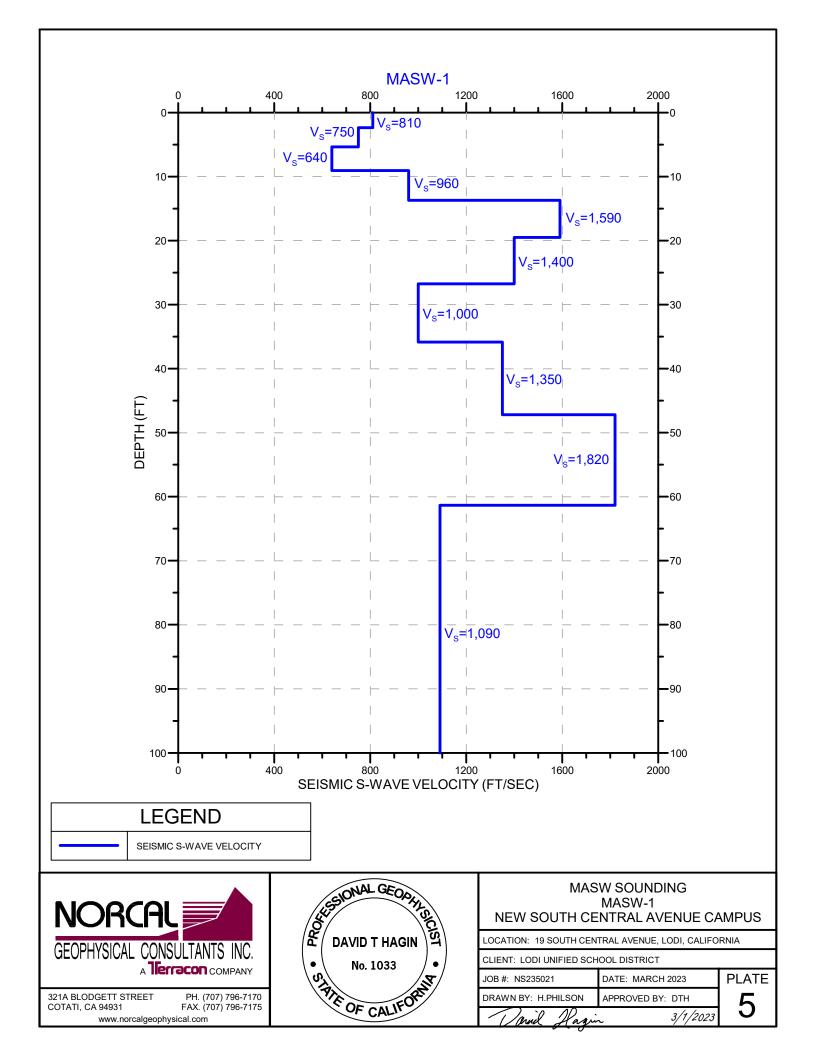
Generally, the seismic velocity values measured by the SR and MASW surveys are low, indicating a relatively low degree of consolidation and moisture content of the shallow soils and/or sedimentary deposits within the depth ranges of the two surveys. The models resulting from the two data sets correlate well with each other, and with the boring logs for Borings B1 through B4.

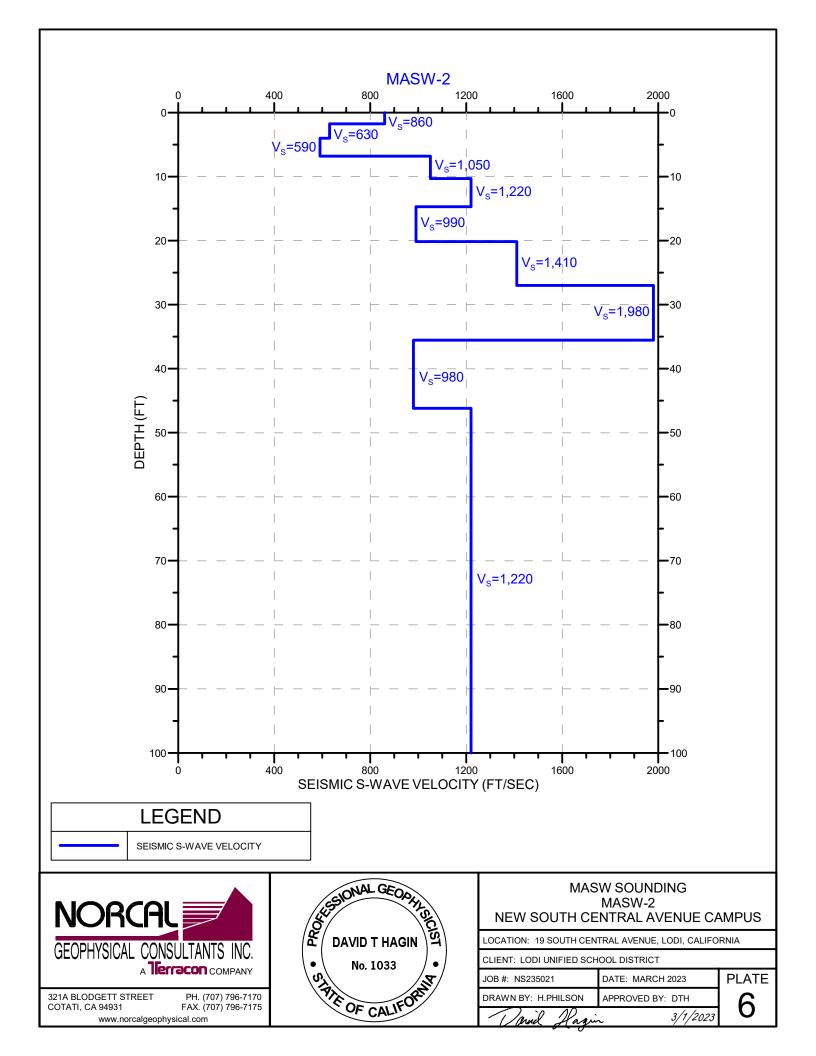


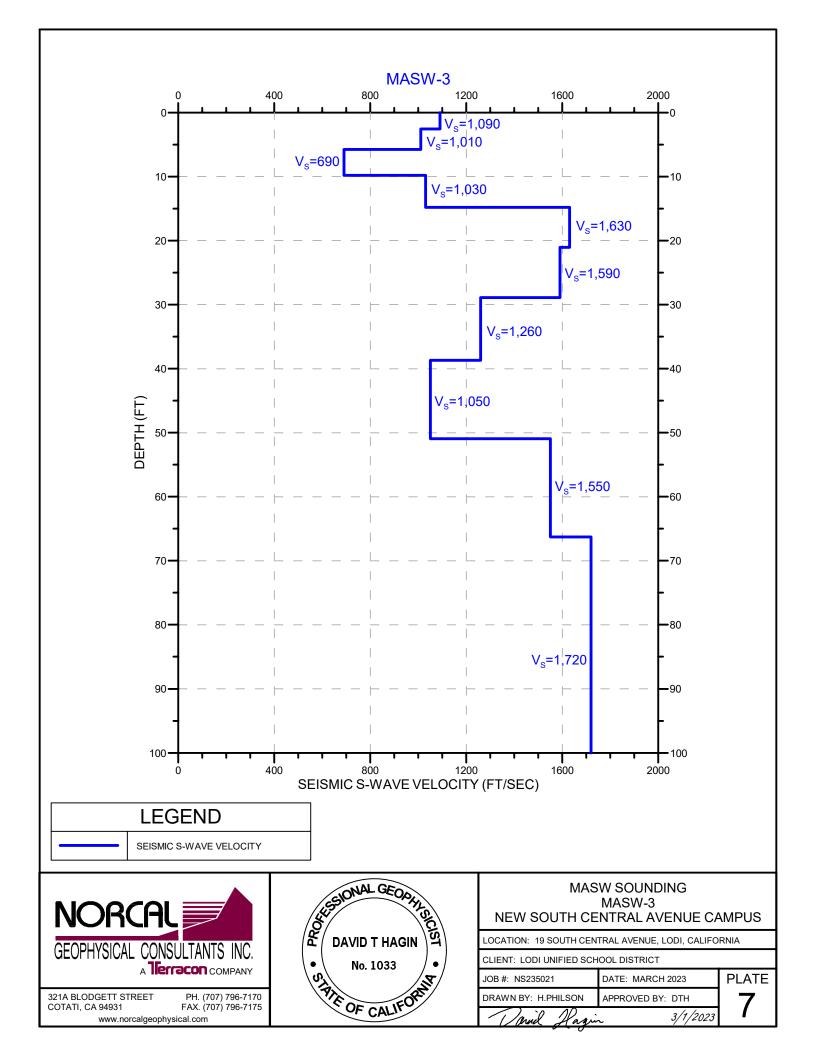












APPENDIX A:

Seismic Refraction Survey



APPENDIX A: Seismic Refraction Survey

1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional P-wave seismic energy at the surface. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is typically refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances and elevation data to determine the depth, thickness, and velocity of subsurface seismic layers.

2.0 INSTRUMENTATION

The seismic waveforms produced at each shot point were recorded using a Geometrics **Geode** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and **RT Clark** geophones with a natural frequency of 4.5 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a 16-pound sledgehammer against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on the computer's LCD screen in the form of seismograms, analyzed for quality assurance and archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array (spread).





Figure 1: Geometrics Geode 24-channel engineering distributed array seismograph.

3.0 DATA ACQUISITION

We collected SR data along three lines designated as Lines SR-1 through SR-3, as shown by the red lines on Plate 1. Terracon personnel determined the locations and orientations of the SR lines. Data were acquired using arrays of 24 geophones with 6- and 8-ft spacing and 5 and 7 shotpoints, respectively. The shot-points were placed off each end of the geophone arrays as well as distributed equally within each array. Each seismic line comprised a single spread, yielding 150- and 232-ft lengths, respectively. The maximum depth of investigation is determined by the greatest shot-to-receiver distance and is estimated to be 50-ft for Line SR-1 and 40-ft for Lines SR-2 and SR-3.

4.0 DATA ANALYSIS

The seismic refraction data were processed using the software package **SeisImager**, written by Oyo Corporation (Japan) and distributed by Geometrics Inc. This package consists of two programs titled **Pickwin**, Version 5.1.1.2 (2013) and **Plotrefa**, Version 3.0.0.6 (2014). For each seismic line we used **Pickwin** to view the seismic records and identify first arriving P-wave energy at each geophone and to determine the shot point to geophone travel time associated with each arrival. We then used **Plotrefa** to assign elevations to each geophone and to plot the shot point to geophone travel times versus their distance (Station) along the line. A sample Time versus Depth (T-D) graph is shown in Figure 2.



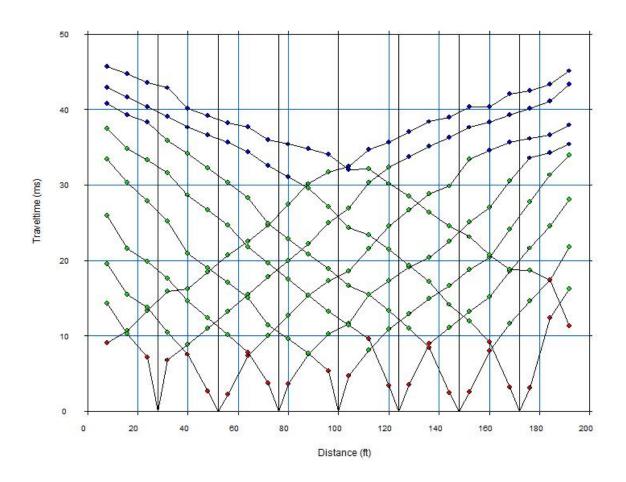


Figure 2: Sample SR Time-Distance Graph. Red circles represent layer 1 (V1), green circles represent V2 and blue circles represent V3.



After examining the T-D graph we assigned velocity layers (1-3) to each travel time and then computed a 2D model using *Plotrefa's* time-term routine. This resulted in a 2D layered cross-section (profile) illustrating seismic velocity versus depth. A sample 2D time-term model is shown in Figure 3.

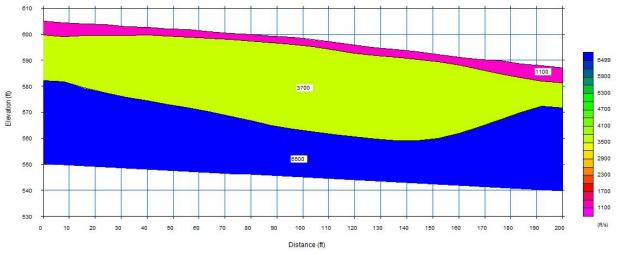


Figure 3: Sample Time-Term Seismic Velocity Model. Velocities are labeled and indicated by the color bar on the right.

Finally, we used the time term model as input to *Plotrefa's* tomographic routine. This routine divided the input model into cells according to the geophone spacing and depth range and assigned a velocity to each cell. It then used a ray-tracing routine to compute synthetic travel times through the model from each shot point to every geophone. The synthetic travel times were compared with the observed travel times to determine the goodness of fit. If the fit was not within certain assigned parameters, the program then adjusted the velocity in each cell and reran the ray tracing. This procedure was repeated through as many as 20 iterations in order to achieve the optimum fit between observed and synthetic travel times. A sample tomographic model is shown in Figure 4.



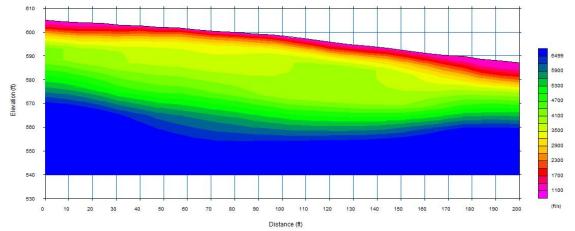


Figure 4: Sample tomographic Inverted Seismic Velocity Model. Velocities indicated by color bar on right.

Once the tomographic processing was complete, we used the computer program *Surfer 21.2* by Golden Software to construct a color contoured 2D cross-section (profile) illustrating the results for each seismic line.

5.0 INTERPRETATION

The SR profiles described above are models of the subsurface based on P-wave velocities. How these velocities and their subsurface distribution relate to geology is a matter of interpretation. This interpretation can be based on experience and a general knowledge of the local geology. However, the best results are achieved when the models can be correlated with subsurface information provided by other means such as onsite observations, borehole geological and/or geophysical logs, trench logs or projections based on mapped surface geology. This type of information is referred to as "ground truth."

In any case, the resulting seismic velocity profile represents a model of the subsurface that must be interpreted by the best means available. Thus, the interpreted profile is conceptual in nature, and is not expected to represent an exact depiction of the subsurface.

6.0 LIMITATIONS

Based on the physical properties of refraction (Snell's Law), in order for a seismic wave to be refracted back toward the surface, the seismic velocity of the upper layer must be less than the velocity of the lower layer. When higher velocities overlie lower velocities, often referred to as a velocity inversion, the seismic energy will be refracted downward and the lower layer will not be detected at the surface. As a result, the calculated depths of any deeper higher velocity layers



may be over-estimated. Furthermore, some layers may be truncated or too thin to detect. These are referred to as "hidden layers".

If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the first arriving P-waves at each geophone may not be visible on the seismic records. Additionally, extraneous seismic energy sources such as wind, traffic or nearby machinery may create "noise" on the recorded waveforms that may mask the first arrivals.

Another common external noise source is overhead power lines. If the cable is laid out parallel to the lines electrical noise may be induced in the cable. Possible internal noise sources may be faulty geophone connections due to dirt or moisture or use of an unsuppressed power supply.

In noisy conditions many "stacks" (multiple shots) may be necessary to achieve an acceptable signal-to-noise ratio. Stacking consists of superposition of waveforms such that the stacked shot energy builds with successive shots, whereas the noise tends to cancel itself out due to its random nature. In extremely noisy conditions it may not be possible to achieve an acceptable signal-to-noise ratio for the greatest shot-to-receiver distance, possibly reducing the maximum depth of investigation.

Finally, seismic refraction processing algorithms are based on the assumption that the seismic velocity layers are isotropic. That is, that the velocity is uniform within the length and breadth of each layer. Another assumption is that the velocity distribution does not change in a direction transverse to the seismic line. In other words, that there is true 2D symmetry. If these conditions are not met, the actual subsurface conditions will vary from those represented by the seismic model.

APPENDIX B:

MASW Sounding Survey



APPENDIX B: MASW Sounding Survey

1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, both body and surface waves are produced. Body waves expand omni-directionally throughout the subsurface. They consist of both compressional (P) and shear (S) waves. Surface waves (e.g., Rayleigh, Love, etc.) radiate along the ground surface at velocities that are proportional to shear wave velocity (Vs). Rayleigh waves are characterized by retrograde elliptical particle motion, and travel at approximately 0.9 times the velocity of S-waves.

If a vertical impact source is used, approximately two-thirds of the seismic energy that is produced is in the form of ground roll. As a result, surface waves are typically the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. By analyzing the dispersion of surface waves, it is possible to obtain an S-wave versus depth velocity profile. Since s-wave velocity is directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Surface waves can be recorded and analyzed using a method referred to as Multichannel Analysis of Surface Waves (MASW). This method is used to collect surface wave data using a fixed array of geophones and shot points. This is referred to as a sounding, and results in a onedimensional (1D) model depicting variation in S-wave velocity versus depth beneath the center of the array. However, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values. The method requires an energy source that is capable of producing ground roll and geophones that are capable of detecting low frequencies (<10 Hz) signals.

2.0 INSTRUMENTATION

The seismic waveforms produced at each shot point were recorded using a Geometrics **Geode** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and **RT Clark** geophones with a natural frequency of 4.5 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a 16-pound sledgehammer against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on



the computer's LCD screen in the form of seismograms, analyzed for quality assurance and archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array (spread).



Figure 1: Geometrics Geode 24-channel engineering distributed array seismograph.

3.0 DATA ACQUISITION

We acquired three MASW soundings, designated MASW-1 through MASW-3, as determined by Terracon personnel. The positions of the MASW arrays are shown on Plate 1 by the blue lines. The center points of the arrays, which are considered the sounding locations, are represented by the blue diamonds. For each sounding, the seismic equipment was set out in the identical set-up as the respective seismic refraction line, as specified in Appendix A, section 3.0. The depth of the MASW survey is determined by the frequency content of the seismic waveforms and, in this case, is approximated at 100-ft for each sounding.

4.0 DATA ANALYSIS

The seismic wave-traces (shot gathers) recorded at each shot point were analyzed using the computer program *SURFSEIS* developed by the Kansas Geological Survey (Version 5.0, 2016). This interactive program converts the data acquired from all four shot points in a given sounding into a dispersion curve representing phase velocity versus frequency. This curve is then inverted to produce a 1D model indicating S-wave velocity versus depth. The steps involved in this procedure are as follows:

- 1) The shot gathers are converted to KGS format.
- 2) Stations are assigned to the geophone and shot point locations.
- The resulting records are viewed to determine their overall quality. If necessary, portions
 of the records are muted to remove interference from refractions, reflections and higher
 mode events.



- 4) For each formatted (and/or muted) record, the program produces what is referred to as an "overtone plot". This is a colored cross-section indicating phase velocity versus frequency and amplitude. The vertical axis represents phase velocity (increasing upward); the horizontal axis represents frequency (increasing to the right); and signal amplitude is indicated by various colors, with the hottest colors (orange to red to dark brown) representing the greatest signal to noise ratio. Typically, the strongest signals align in a curved pattern with a symmetry with the shape of a "hockey stick" where the blade is pointing upward at the lower end of the frequency spectrum (higher velocity at greater depth) and the handle projects to the right in the direction of increasing frequencies indicating lower velocities.
- 5) The overtone plots compiled from the four shot points are reviewed to determine their overall quality and the best among them (possibly all) are merged to form a single overtone. This enhances the overall signal to noise ratio of the survey and incorporates data from both ends of the spread (if feasible).
- 6) The resulting overtone plot is used as a guide in deriving a dispersion curve representing phase velocity versus frequency. This is done by fitting the curve along the center of the hockey stick where the signal to noise ratio is highest.
- 7) The resulting dispersion curve is inverted through an iterative process to compute a 1D model representing S-wave velocity versus depth.

The shear-wave velocities for the soundings are presented by the tables in Section 5.3, in the main body of the report. The results are also presented graphically by the step-chart graphs on Plates 5 through 7.

5.0 LIMITATIONS

Extraneous seismic energy sources such as wind, traffic or nearby machinery may create "noise" on the recorded waveforms. Also, live electric lines may induce unwanted electrical current into the seismic cable, also creating noise. If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the wave forms created by the surface waves may be overly contaminated by noise and reduce the signal-to-noise ratio and thus the data quality.

In noisy conditions many "stacks" may be necessary to achieve an acceptable signal-to-noise ratio. Stacking consists of superposition of waveforms such that the stacked shot energy builds with successive shots whereas the noise tends to cancel itself out due to its random nature. In some cases, however, noise is not sufficiently random to be reduced to acceptable levels.



Geotechnical Engineering Report and Geological Hazards Study

New South Central Avenue Campus

Lodi, California August 12, 2022 Terracon Project No. NA225058

Prepared for:

Lodi Unified School District Lodi, California

Prepared by:

Terracon Consultants, Inc. Lodi, California

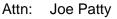
Facilities

Geote Geote



August 12, 2022

Lodi Unified School District 880 N. Guild Ave Lodi, California 95240



- P: (209) 712 6363
- E: jpatty@lodiusd.net
- Re: Geotechnical Engineering Report and Geological Hazards Study New South Central Avenue Campus **19 South Central Avenue** Lodi. California Terracon Project No. NA225058

Dear Mr. Patty:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Supplement to Agreement for Services, Change to Scope of Services, Reference Number R1217761, dated June 15, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely, **Terracon Consultants, Inc.**

Yuchen Huang Professional Engineer 93244 Staff Engineer





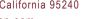
Christopher B. Cong Professional Engineer 92512 Geotechnical Group Manager

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Environmental Facilities Geotechnical Materials

REPORT TOPICS

INTRODUCTION	1
SITE CONDITIONS	
PROJECT DESCRIPTION	2
GEOTECHNICAL CHARACTERIZATION	3
GEOTECHNICAL OVERVIEW	4
EARTHWORK	4
SHALLOW FOUNDATIONS	9
FLOOR SLABS	11
SEISMIC CONSIDERATIONS	
LIQUEFACTION	
PAVEMENTS	
CORROSIVITY	
GENERAL COMMENTS	

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the *GeoReport* logo will bring you back to this page. For more interactive features, please view your project online at <u>client.terracon.com</u>.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES SITE LOCATION AND EXPLORATION PLANS EXPLORATION RESULTS SUPPORTING INFORMATION

Note: Refer to each individual Attachment for a listing of contents.



REPORT SUMMARY

Topic ¹	Overview Statement ²	
Project Description	The project includes construction/installation of nine (9) portable classroom/admin/cafeteria/student support services buildings to be located on a site with an existing building which is scheduled to be demolished. Eight of the portable buildings will have a footprint of approximately 1,000 square feet each and one portable building will have a footprint of about 1,500 square feet.	
Geotechnical Characterization	The soils encountered generally consisted of loose to dense sand with various amounts of silt and clay, very stiff to hard silt with various amounts of sand, and hard lean clay with various amounts of sand. Groundwater was not encountered during our field exploration.	
Earthwork	Over-excavate and recompact to provided a minimum of 24 inches of engineered fill below slabs and foundations.	
Shallow Foundations	Support the slabs and foundations on a minimum of 24 inches of compacted native soil or imported engineered fill material. Allowable bearing pressure = 2,500 psf. Expected settlements: less than 1-inch total, less than ½-inch differential.	
Pavements	See the Pavements section for descriptions of pavement thicknesses.	
General Comments	This section contains important information about the limitations of this geotechnical engineering report.	
 If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself. This summary is for convenience only. It should be used in conjunction with the entire report for design 		

2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

New South Central Avenue Campus 19 South Central Avenue Lodi, California Terracon Project No. NA225058 August 12, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed New South Central Avenue Campus to be located at 19 South Central Avenue in Lodi, California. A Geologic Hazards Study was also performed for the new campus and is attached to this report. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations

- Foundation design and construction
- Pavement design and construction
- Seismic design parameters per the 2019 California Building Code (CBC)

The geotechnical engineering Scope of Services for this project included the advancement of four (4) test borings to depths ranging from approximately 10 to 16½ feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

ltem	Description
Parcel Information	The project is located at 19 South Central Avenue in Lodi, California.
	APN: 04312118. The site encompasses 1.96 acres.
	The approximate coordinates of the site are 38.1334°N and 121.2656°W
	See Site Location
Existing Improvements	The project locates on a site with an existing building, playground, pavements, and landscaping.



Item	Description	
Current Ground Cover	The current ground cover consists of concrete pavements within the courtyard of the existing building, woodchips in the playground, asphaltic concrete pavements in the parking and activity areas, and landscaping.	
Existing Topography	The site is relatively flat.	
Geology	Geology at the site consist of Pleistocene age alluvial soils consisting of silts, sands and clay from the Modesto Formation (Qm) ¹ . The soils encountered in our borings are consistent with the anticipated geology. The site is not located within an Alquist Priolo Fault zone nor is it mapped in a liquefaction hazard zone identified by the California Geological Survey.	

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our supplement to agreement for services and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description	
Information Provided	A site plan was provided by the client.	
Project Description	The project includes construction/installation of nine (9) portable classroom/admin/cafeteria/student support services buildings to be located on a site with an existing building which is scheduled to be demolished. Eight of the portable buildings will have a footprint of approximately 1,000 square feet each and one portable building will have a footprint of about 1,500 square feet.	
Proposed Structures	We anticipate the buildings will be modular buildings supported on steel support piers with ground anchors or shallow spread foundations with slab on grade floor.	
Finished Floor Elevation	Unknown, but anticipated to be within 2 feet of existing grade.	
Maximum Loads (assumed)	Columns: 12 to 15 kipsWalls: 1 to 2 kips per linear foot (klf)	
Grading	Up to 3 feet of cut and 3 feet of fill may be required to develop final grade.	
Below-Grade Structures	None anticipated.	
Free-Standing Retaining Walls	None anticipated.	
Below-Grade Areas	None anticipated.	

¹ Wagner, D.L., Jennings, C.W., Bedrossian, T.L., and Bortugno, E.J., 1981, Geologic map of the Sacramento quadrangle, California, 1:250,000: California Division of Mines and Geology, Regional Geologic Map 1A, scale 1:250,000

New South Central Avenue Campus
Lodi, California
August 12, 2022
Terracon Project No. NA225058



Item	Description
Pavements	 Paved driveways and parking will be constructed as part of this project. We assume flexible (asphalt) and rigid (concrete) pavement section may be considered. Anticipated traffic is as follows: Automobile parking area: Traffic Index of 4.0 Main entrance and drive lanes: Traffic Index of 5.0 to 8.0
Estimated Start of Construction	Unknown

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Silty Sand	fine to medium grained, loose to very dense silty sand
2	Sandy Silt	fine to medium grained, very stiff to hard sandy silt
3	Clayey Sand	fine grained, dense clayey sand
4	Lean Clay with Sand	fine to medium grained, hard lean clay with sand

Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not encountered in any of the borings at the time of this investigation.

Groundwater data obtained from the State of California Department of Water Resources Sustainable Groundwater Management Act Portal² website indicates recent depth to groundwater is approximately 60 to 70 feet bgs at the project site. However, historical high groundwater was

²https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#currentconditions



recorded to be approximately 21½ feet below ground surface as recorded in monitoring well number 381376N1212740W001 in December of 1942.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were drilled. Therefore, groundwater levels during construction or at other times in the life of the project may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The near surface loose to medium dense silty sands could become unstable and pump with typical earthwork and construction traffic, especially after precipitation events. Effective site drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. If grading is performed during winter months, an increased risk for possible required undercutting and replacement of unstable subgrade will persist. Additional site preparation recommendations, including subgrade improvements and fill placements, are provided in the Earthwork section.

The **Shallow Foundation** section addresses support of the building bearing on a minimum of 24 inches of compacted native soil or imported non-expansive engineered fill. The **Floor Slabs** section addresses support of the slab-on-grade floor supported on 24 inches of compacted native soils or imported non-expansive engineered fill.

Either a flexible (asphalt concrete) and/or a rigid (Portland cement concrete) pavement system may be considered for this project. The **Pavements** section addresses the design and construction of pavement.

The General Comments section provides an understanding of the report limitations.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and pavements.



Site Preparation

Prior to placing fill, the existing building pavements should be removed. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas.

Underground facilities or debris from demolition may be encountered during construction. If underground facilities are encountered, such materials and features should be completely removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Once cuts have been made and prior to placing any engineered fill, the subgrade should be proofrolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck or water truck. The proofrolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed, or moisture conditioned and recompacted. Such areas may also be modified by stabilizing with lime/cement or aggregate base with geogrids.

Subgrade Preparation

Due to the relatively loose near surface soils, foundations should bear on compacted native soil or engineered fill. The compacted native soil or engineered fill should extend to a minimum depth of 2 foot below the bottom of foundations, or 3 feet below existing grades, whichever is greater. Grading for the proposed buildings should incorporate the limits of the structures plus a lateral distance of 5 feet beyond the outside edge of perimeter footings.

The exposed subgrade soil at the bottom of the over-excavation should be scarified, moisture conditioned, and compacted. The depth of scarification of subgrade soils and moisture conditioning of the subgrade shall be a minimum of 12 inches.

Following scarification and compaction of the subgrade, any required fill may be placed and compacted in accordance with the *Fill Material Types* and *Compaction Requirements* sections of this report.

The moisture content and compaction of subgrade soils should be maintained until foundation construction. Care should be taken to prevent wetting or drying of the bearing materials during construction.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

The on-site near surface granular soils likely can be used as non-expansive engineered fill. This should be confirmed by our representative at the time of construction. Imported earth materials for use as non-expansive engineered fill should be pre-approved by our representative <u>prior</u> to construction. On-site or imported non-expansive soils may be used as fill material for the following:

- general site grading
- foundation areas
- slab-on-grade floor
- pavement subgrade
- foundation backfill
- trench backfill
- exterior slabs-on-grade

Soils for use on the site as compacted engineered fill material should conform to non-expansive materials as indicated in the following recommendations:

Gradation	Percent Finer (by weight)*
3":	100
No. 4 Sieve:	50 - 100
No. 200 Sieve:	15 - 50
<u>Property</u>	<u>Limit</u>
Liquid Limit:	30 (max)
Plasticity Index:	10 (max)
Maximum Expansive Index:**	20 (max)
* ASTM D 4829	
** ASTM C 136	

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches in loose thickness.

The contractor should notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor should also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is only "mildly corrosive" to ferrous metal and copper. The reports should be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.





Fill Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

	Per the Modified Proctor Test (ASTM D 1557)		
Material Type and Location	Minimum Compaction	Range of Moisture Contents for Compaction Above Optimum	
	Requirement (%)	Minimum	Maximum
On-site sandy soils and/or Low volume change (non-expansive) engineered imported fill:			
Beneath foundations:	90	0%	+3%
Beneath slabs	90	0%	+3%
Miscellaneous backfill:	90	0%	+3%
Beneath pavement and fills greater than 5 feet deep *:	95	0%	+3%
Utility Trenches*:	90	0%	+4%
Bottom of native soil excavation receiving fill:	90	+2%	+4%

*The upper 12 inches of subgrade soils beneath pavement should be compacted to 95% of the maximum dry density as determined in the ASTM D1557 test method.

We recommend that compacted native soil or any engineered fill be tested for moisture content and relative compaction during placement. Should the results of the in-place density tests indicate the specified moisture content or compaction requirements have not been met, the area represented by the test should be reworked and retested as required until the specified moisture content and relative compaction requirements are achieved.

Utility Trench Backfill

It is anticipated that the on-site soils and fill materials will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 should be used for bedding and shading of utilities, unless allowed or specified otherwise by the utility manufacturer.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.



Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto pavements or are tied to tight lines that discharge into the on-site storm drain system.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.



Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 800 square feet of compacted fill in the building areas and 1,500 square feet in pavement areas. One density and water content test should be performed for every 12-inch thick lift for every 50 to 100 linear feet of compacted utility trench backfill. This testing frequency criteria may be adjusted during construction as specified by the geotechnical engineer of record.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations. In order to provide uniform support for the foundations, we recommend the bottom of all foundation excavations be compacted with jumping jack or similar hand-operated equipment.

Design Parameters – Compressive Loads

ltem	Description	
Maximum Net Allowable Bearing pressure ^{1, 2}	2,500 pounds per square foot	
Required Bearing Stratum ³	24 inches of compacted native soil or engineered fill	
Minimum Foundation Dimensiona	Columns: 24 inches	
Minimum Foundation Dimensions	Continuous: 12 inches	
Maximum Foundation Dimensions	Columns: 60 inches	
Maximum Foundation Dimensions	Continuous: 36 inches	

Geotechnical Engineering Report and Geological Hazards Study

New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project No. NA225058



Item	Description
Ultimate Passive Resistance ⁴ (equivalent fluid pressures)	330 pcf
Ultimate Coefficient of Sliding Friction ⁵	0.40
Minimum Embedment below Finished Grade ⁶	12 inches
Estimated Total Settlement from Structural Loads ²	Less than about 1 inch
Estimated Differential Settlement ^{2, 7}	About ½ of total settlement

- 1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. These bearing pressures can be increased by 1/3 for transient loads unless those loads have been factored to account for transient conditions. Values assume that exterior grades are relatively flat around the structure.
- 2. Values provided are for maximum loads noted in **Project Description**.
- 3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the Earthwork.
- 4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. If passive resistance is used to resist lateral loads, the base friction should be reduced by 25 percent.
- 5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions.
- 6. Embedment necessary to minimize the effects of seasonal water content variations. Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (exterior) footings.
- 7. Differential settlements are as measured over a span of 40 feet.

Foundation Construction Considerations

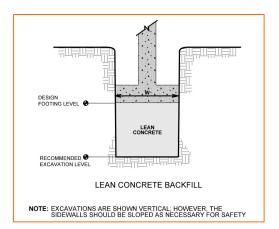
As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.

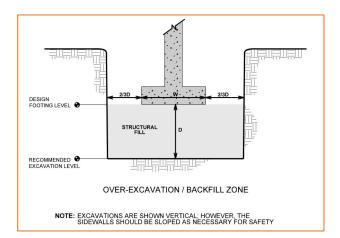
Geotechnical Engineering Report and Geological Hazards Study

New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project No. NA225058





Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with engineered fill placed, as recommended in the **Earthwork** section.



To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of the adjacent trench.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.



Floor Slab Design Parameters

ltem	Description
Floor Slab Support	 Minimum 4 inches of free-draining ³/₄ inch crushed aggregate¹ At least 24 inches of non-expansive soils
Estimated Modulus of Subgrade Reaction ² 150 pounds per square inch per inch (psi/in) for point loads	
 Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Oth design considerations such as cold temperatures and condensation development could warrant mo extensive design provisions. 	
	rade reaction is an estimated value based upon our experience with the subgrade uirements noted in Earthwork , and the floor slab support as noted in this table. It is

provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder. The vapor retarder should meet Class A ASTM E1745 standard. Care should be taken to ensure a curing compound is utilized at concrete slab on grade floors to limit the potential of slab curing. Providing a vapor retarder directly under the slab can increase the potential for slab curing, hence application of a well applied curing compound is critical.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and structural fill should be added to replace the

Geotechnical Engineering Report and Geological Hazards Study New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project No. NA225058



resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

SEISMIC CONSIDERATIONS

The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 does apply to the proposed structures. However, the structural engineer should verify the applicability of this exception.

Description	Value
2019 California Building Code Site Classification (CBC)	D ²
Site Latitude	38.1334°N
Site Longitude	121.2656° W
S_s Spectral Acceleration for a Short Period	0.605g
S ₁ Spectral Acceleration for a 1-Second Period	0.254g
F _a Site Coefficient for a Short Period	1.316
F _v Site Coefficient for a 1-Second Period	N/A
S_{Ms} Maximum Considered Spectral Response Acceleration for a Short Period	0.797g
S _{M1} Maximum Considered Spectral Response Acceleration for a 1-Second Period	N/A
S _{DS} Design Spectral Acceleration for a Short Period ³	0.531g
S _{D1} Spectral Acceleration for a 1-Second Period ³	N/A
PGA _M Site Modified Peak Ground Acceleration	0.341g



Description	Value
1. Seismic site classification in general accordance with the 2019 California Building	Code, which refers to
ASCE 7-16.	

- The 2019 California Building Code (CBC) uses a site profile extending to a depth of 100 feet for seismic site classification. Borings at this site were extended to a maximum depth of 16½ feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth. However, we do not believe these are necessary.
- 3. These values were obtained using online seismic design maps and tools provided by the USGS and OSHPD (https://seismicmaps.org/).

LIQUEFACTION

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils or non-plastic fine-grained soils exist below groundwater. The California Geologic Survey (CGS) has designated certain areas within California as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. The project site is not located within a liquefaction hazard zone mapped by the CGS.

Based on our experience in the area and a recent study for LUSD, we performed a peer review (Project Number NA195095, dated August 17, 2018) of a recent Geohazards/Geotechnical Report for the New Classrooms at Lodi High School prepared by MPE, dated August 17, 2018. Lodi High School is approximately 1¼ miles west of the project site. As part of our peer review, we reviewed their liquefaction assessment which included a CPT sounding and analysis which indicates the potential for seismically induced liquefaction settlement to be low and less than 1/2 The liquefiable layer was identified to be between at approximately 43 to 45 feet bgs. inch. Furthermore, we understand CGS has already reviewed this report and has deemed it to be acceptable. Additionally, the soils encountered at the project site consist of mainly loose to medium dense silty sand in the upper approximately 5 feet, and dense to very dense silty sand below depths ranging from approximately 5 to 13½ feet, locally underlain by very stiff to hard sandy silt below the approximate 41/2-foot depth and locally dense clayey sand below the approximate 13½-foot depth to the maximum explored depth of approximately 16½ feet. Based upon review of the analysis performed at Lodi High School as well as of the depth of the liquefaction susceptibility, Pleistocene-age of the alluvium deposits, and recent estimated depth to groundwater (deeper than 50 feet at the project site), despite the historic high ground water depth of approximately 21½ feet, it is also our opinion that the potential for liquefaction to occur at this site as well as any lateral spreading is low and agree with the findings presented in the Geohazards report referenced above.



PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Design of Asphaltic Concrete (AC) pavements are based on the procedures in the Caltrans Highway Design Manual, 2018 edition. Design of Portland Cement Concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-01; Guide for Design and Construction of Concrete Parking Lots.

A design R-value of 30 was used for the AC and PCC pavement designs. We have provided pavement sections for traffic indices (TI) of 4.0 through 8.0. The project civil engineer should determine the appropriate TI for the development. If additional pavement sections are required, we should be contacted to provide the additional recommendations.

Pavement Section Thicknesses

Asphaltic Concrete Design					
Thickness (inches)					
Layer	TI=4.0	TI= 5.0	TI= 6.0	TI=7.0	TI= 8.0
AC ¹	3.0	3.5	4.0	4.5	5.0
Aggregate Base	4.0	5.0	7.0	9.0	11.0

The following table provides options for AC and PCC Sections:

1. All materials should meet the current Caltrans Standard Specifications, latest edition

Portland Cement Concrete Design					
. Thickness (inches)					
Layer	TI=4.0	TI=5.0	TI=6.0	TI=7.0	TI=8.0
PC C ¹	5.5	5.5	6.0	6.5	6.5
Aggregate Base	4.0	4.0	4.0	4.0	4.0

1. All materials should meet the current Caltrans Standard Specifications, latest edition.



The estimated pavement sections provided in this report are minimums for the assumed design criteria, and as such, periodic maintenance should be expected. Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles. A maintenance program including surface sealing, joint cleaning and sealing, and timely repair of cracks and deteriorated areas will increase the pavement's service life. As an option, thicker sections could be constructed to decrease future maintenance.

Concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi, a modulus of rupture of 500 psi, and be placed with a maximum slump of 4 inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its "green" state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Pavement design methods are intended to provide structural sections with adequate thickness over a subgrade such that wheel loads are reduced to a level the subgrade can support.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. This is especially applicable for islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils. The civil design for the pavements with these conditions should include features to restrict or to collect and discharge excess water from the islands. Examples of features are edge drains connected to the storm water collection system, longitudinal subdrains, or other suitable outlet and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Dishing in parking lots surfaced with AC is usually observed in frequently-used parking stalls (such as near the front of buildings) and occurs under the wheel footprint in these stalls. The use of higher-grade asphaltic cement, or surfacing these areas with PCC, should be considered. The dishing is exacerbated by factors such as irrigated islands or planter areas, sheet surface drainage to the front of structures, and placing the ACC directly on a compacted clay subgrade.

Rigid PCC pavements will perform better than AC in areas where short-radii turning and braking are expected (i.e. entrance/exit aprons) due to better resistance to rutting and shoving. In addition, PCC pavement will perform better in areas subject to large or sustained loads. An adequate

Geotechnical Engineering Report and Geological Hazards Study New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project No. NA225058



number of longitudinal and transverse control joints should be placed in the rigid pavement in accordance with ACI and/or AASHTO requirements. Expansion (isolation) joints must be full depth and should only be used to isolate fixed objects abutting or within the paved area.

PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with American Concrete Institute (ACI 330R-01 and ACI 325R.9-91). PCC pavements should be provided with mechanically reinforced joints (doweled or keyed) in accordance with ACI 330R-01.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

The pavement surfacing and adjacent sidewalks should be sloped to provide rapid drainage of surface water. Water should not be allowed to pond on or adjacent to slabs, since it could saturate the subgrade and contribute to premature pavement or slab deterioration.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- 1. Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- 2. Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- 3. Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- 4. Install joint sealant and seal cracks immediately.



- 5. Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- 6. Place compacted, low permeability backfill against the exterior side of curb and gutter.
- 7. Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

CORROSIVITY

The table below lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics of the onsite soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary						
Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (%)	Soluble Chloride (%)	Electrical Resistivity (Ω-cm)	рН
B1	2½ - 4	Silty Sand	0.11	0.01	1,746	7.54

These test results are provided to assist in determining the type and degree of corrosion protection that may be required for the project. We recommend that a certified corrosion engineer determine the need for corrosion protection and design appropriate protective measures.

Resistivity

The resistivity values indicate the sample tested exhibits a high corrosive potential to buried metal pipes at boring B1. Evaluation of the test results is based upon the guidelines of J.F. Palmer, "Soil Resistivity Measurements and Analysis", Materials Performance, Volume 13, January 1974. The following table outlines the guidelines for soil resistivity for corrosion potential.

Corrosion Potential of Soil on Steel		
Soil Resistivity (ohm-cm)	Corrosion Potential	
0 to 1,000	Very High	
1,000 to 2,000	High	
2,000 to 5,000	Moderate	
> 5,000	Mild	



Sulfates

The sulfate test results indicate that the soil from boring B1 at depths of 2½ to 4 feet bgs classifies as Class S1 according to Table 19.3.1.1 of ACI 318-14. This indicates that the sulfate severity is moderate when considering corrosion to concrete. Based on the sulfate content test results, ACI 318-14, Section 19.3, Table 19.3.2.1 specifies a required a maximum water-cement ratio of 0.5 w/cm and minimum concrete compressive strength of 4000 psi for sulfate Class S1. For further information, see ACI 318-14, Section 19.3.

Laboratory pH

Data suggests the soil pH should not be the dominant soil variable affecting soil corrosion if the soil has a pH in the 5 to 8 range. The pH of the sample tested was within the recommended range.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there



may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

Responsive Resourceful Reliable



EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)	Planned Location
3	10 – 16½	Proposed Building Area
1	16½	Proposed Pavement Area

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ± 10 feet) and approximate elevations were obtained utilizing Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using continuous solid stem auger and hollow stem flight augers for two borings and a hand auger for the other two borings. We generally obtained samples at depths of 1 foot, 2½ feet, and 5 feet and at intervals of 5 feet thereafter, for more detailed sample depths, refer to individual boring logs. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 2.5-inch O.D. split-barrel Modified California sampling spoon with 2.0-inch I.D. tube lined sampler was used for sampling. Tube-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are not equivalent to the SPT blow counts. Dynamic cone penetrometer (DCP) was used by dropping a 15-lb steel mass falling 20-in to strike an anvil to penetrate a 1.5-in diameter 45-degree cone that has been seated in the bottom of a hand augered hole. The number of blows required to advance the cone 1³/₄ inches was recorded. Correlations between DCP blow counts and N-values can be found in ASTM STP 399. The values provided on our boring logs are uncorrected. We observed and recorded groundwater levels during drilling and sampling. For safety purposes and as required by the county, two borings were backfilled with auger cuttings and the other two borings were backfilled with neat cement after their completion. Pavements were patched with cold-mix asphalt.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the



Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D7263 Standard Test Methods for Laboratory Determination of Density and Unit Weight of Soil Specimens
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D1140 Standard Test Method for Determining the Amount of Material Finer than No. 200 Sieve by Soil Washing
- Corrosivity Suite (ASTM-G51-18, ASTM C 1580, ASTM-D4658-15, ASTM D512, ASTM D-1498, ASTM D1125-14, ASTM G187)

The laboratory testing program included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan Exploration Plan Subsurface Profile A-A' Subsurface Profile B-B'

Note: All attachments are one page unless noted above.

SITE LOCATION

New South Central Avenue Campus
Lodi, California August 12, 2022
Terracon Project No. NA225058



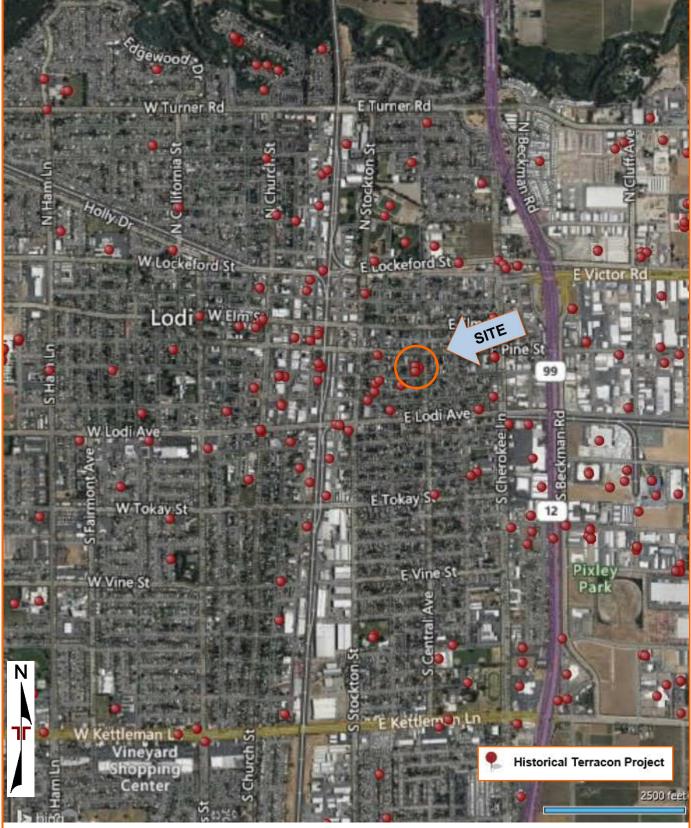


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

New South Central Avenue Campus
Lodi, California
August 12, 2022
Terracon Project No. NA225058



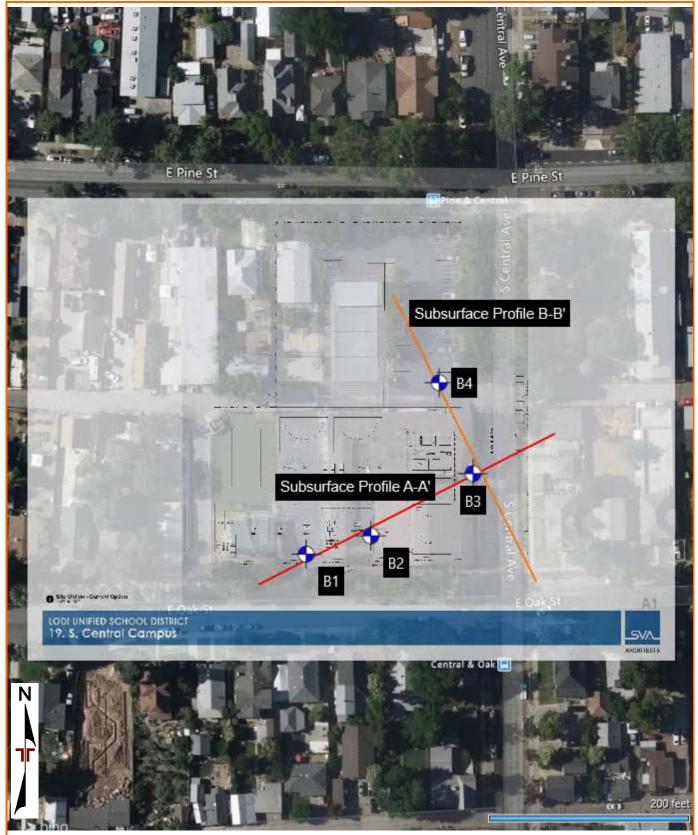
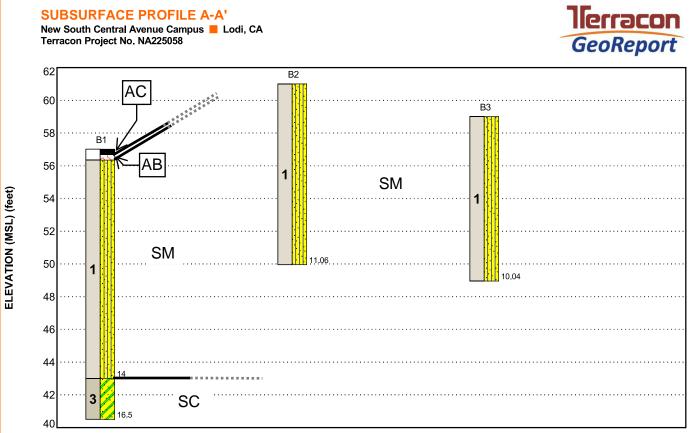


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

SUBSURFACE PROFILE A-A'

New South Central Avenue Campus 📕 Lodi, CA Terracon Project No. NA225058



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Silty Sand	fine to medium grained, loose to very dense silty sand
2	Sandy Silt	fine to medium grained, very stiff to hard sandy silt
3	Clayey Sand	fine, dense clayey sand
4	Lean Clay with Sand	fine to medium grained, hard lean clay with sand

LEGEND

Asphalt

Clayey Sand

Aggregate Base Course

Silty Sand

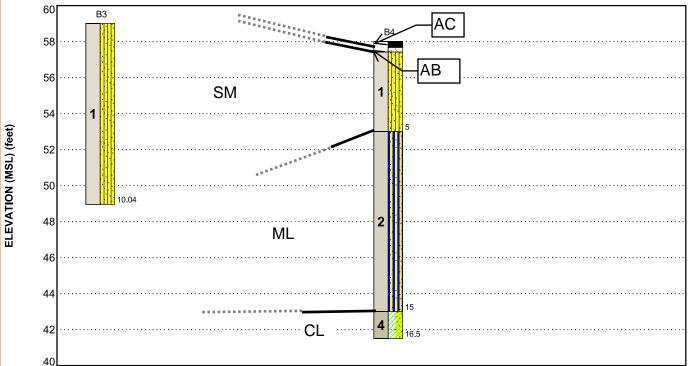
NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

SUBSURFACE PROFILE B-B'

New South Central Avenue Campus 📕 Lodi, CA Terracon Project No. NA225058





This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Silty Sand	fine to medium grained, loose to very dense silty sand
2	Sandy Silt	fine to medium grained, very stiff to hard sandy silt
3	Clayey Sand	fine, dense clayey sand
4	Lean Clay with Sand	fine to medium grained, hard lean clay with sand

LEGEND

Silty Sand

Sandy Silt

Asphalt

Lean Clay with Sand

Aggregate Base Course

NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

EXPLORATION RESULTS

Contents:

Boring Logs (B1 through B4) Atterberg Limits Corrosivity

Note: All attachments are one page unless noted above.

BORING LOG NO. B1

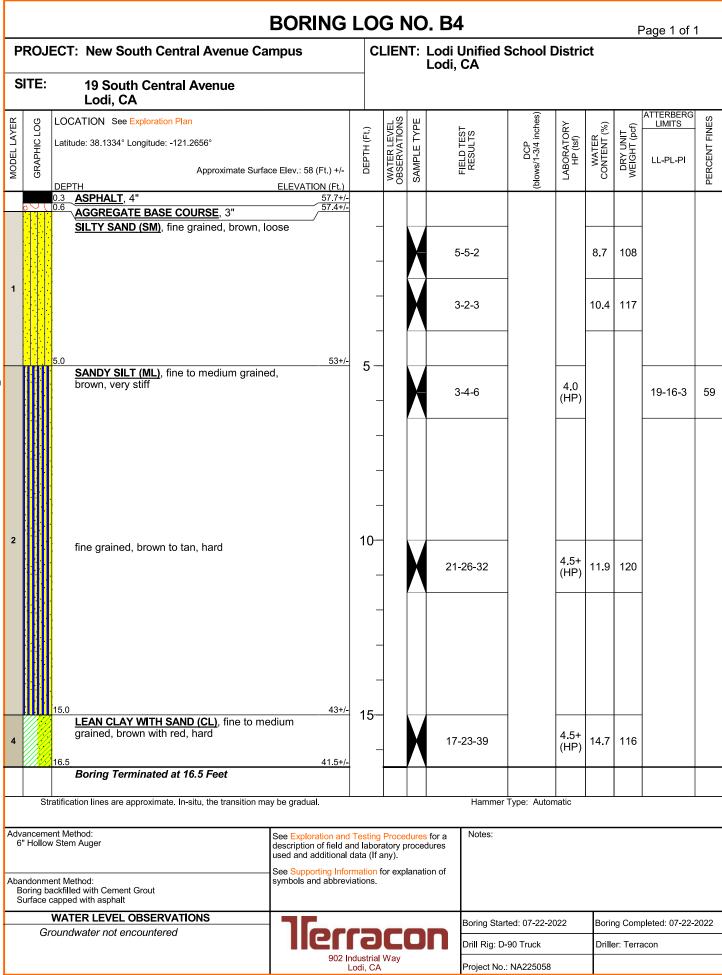
Page 1 of 1 **PROJECT: New South Central Avenue Campus CLIENT: Lodi Unified School District** Lodi, CA SITE: **19 South Central Avenue** Lodi, CA ATTERBERG LIMITS DCP (blows/1-3/4 inches) LOCATION See Exploration Plan PERCENT FINES WATER LEVEL OBSERVATIONS SAMPLE TYPE MODEL LAYER **GRAPHIC LOG** LABORATORY HP (tsf) WATER CONTENT (%) DRY UNIT WEIGHT (pcf) FIELD TEST RESULTS DEPTH (Ft.) Latitude: 38.1329° Longitude: -121.2661° LL-PL-PI Approximate Surface Elev : 57 (Ft.) +/-DEPTH ELEVATION (Ft.) ASPHALT, 4" 0.3 56.7+/-0.7 56.3+/-AGGREGATE BASE COURSE, 4" SILTY SAND (SM), fine to medium grained, light brown. loose 2-2-1 31 loose 2-1-4 5 medium dense 4-5-5 9.6 115 10trace clay, light brown with rust mottling, medium dense 11-10-12 11.0 115 14.0 43+/-CLAYEY SAND (SC), fine grained, light brown with red, dense 15-15-21-30 12.8 108 40.5+/-Boring Terminated at 16.5 Feet Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic Advancement Method: Notes: See Exploration and Testing Procedures for a 4" Solid Stem Auger description of field and laboratory procedures used and additional data (If any) Supporting Information for explanation of See Abandonment Method: symbols and abbreviations. Boring backfilled with Cement Grout Surface capped with asphalt WATER LEVEL OBSERVATIONS Boring Started: 07-22-2022 Boring Completed: 07-22-2022 Groundwater not encountered Drill Rig: D-90 Truck Driller: Terracon 902 Industrial Way Project No : NA225058 Lodi, CA

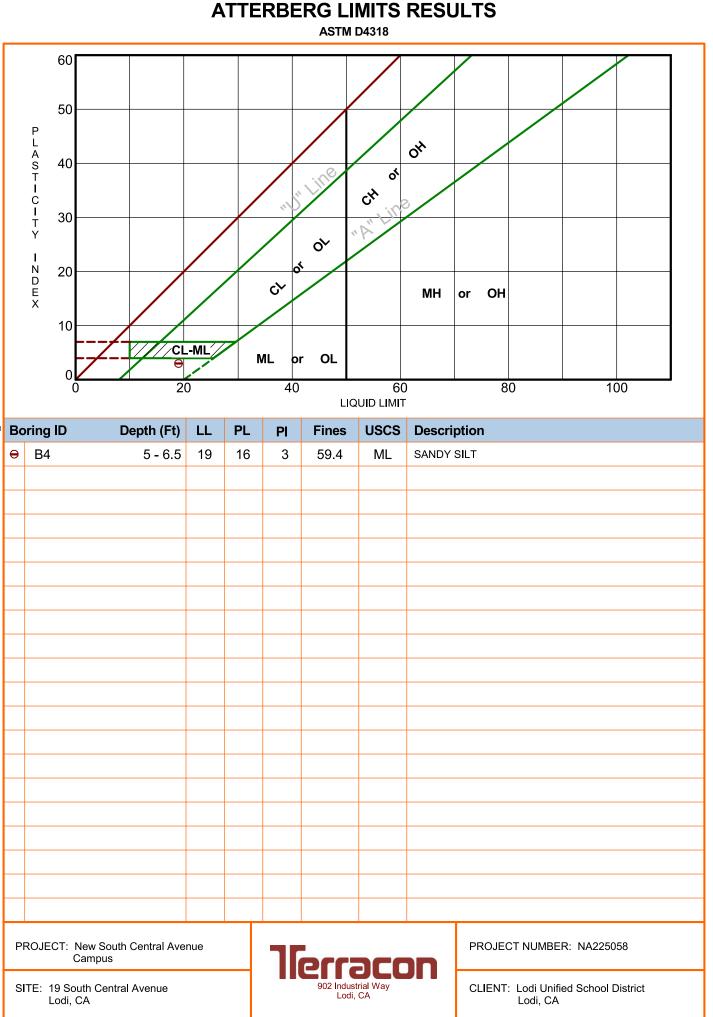
BORING LOG NO. B2

Page 1 of 1 **PROJECT: New South Central Avenue Campus CLIENT: Lodi Unified School District** Lodi, CA SITE: **19 South Central Avenue** Lodi, CA ATTERBERG LIMITS DCP (blows/1-3/4 inches) LOCATION See Exploration Plan PERCENT FINES WATER LEVEL OBSERVATIONS SAMPLE TYPE MODEL LAYER **GRAPHIC LOG** LABORATORY HP (tsf) WATER CONTENT (%) DRY UNIT WEIGHT (pcf) FIELD TEST RESULTS DEPTH (Ft.) Latitude: 38.1329° Longitude: -121.2659° LL-PL-PI Approximate Surface Elev : 61 (Ft.) +/-DEPTH ELEVATION (Ft.) SILTY SAND (SM), fine to medium grained, brown, loose 10 3.5 11 36 loose to medium dense 5 16 5.0 medium dense medium dense 36 34 16 29 medium dense 10-49.9+/-11.1 37 100 for very dense 3/4 of Auger Refusal at 11.06 Feet an inch Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: DCP Advancement Method: Notes: See Exploration and Testing Procedures for a 4" Hand Auger description of field and laboratory procedures DCP - Dynamic Cone Penetrometer per ASTM STP 399 Used DCP due to Inadequate Access with Drill Rig. used and additional data (If any). Supporting Information for explanation of See Abandonment Method: Boring backfilled with Auger Cuttings symbols and abbreviations. WATER LEVEL OBSERVATIONS Boring Started: 07-22-2022 Boring Completed: 07-22-2022 Groundwater not encountered Drill Rig: Hand Auger Driller: Terracon 902 Industrial Way Project No.: NA225058 Lodi, CA

BORING LOG NO. B3

Page 1 of 1 **PROJECT: New South Central Avenue Campus CLIENT: Lodi Unified School District** Lodi, CA SITE: **19 South Central Avenue** Lodi, CA ATTERBERG LIMITS DCP (blows/1-3/4 inches) LOCATION See Exploration Plan PERCENT FINES WATER LEVEL OBSERVATIONS MODEL LAYER SAMPLE TYPE **GRAPHIC LOG** LABORATORY HP (tsf) WATER CONTENT (%) DRY UNIT WEIGHT (pcf) FIELD TEST RESULTS DEPTH (Ft.) Latitude: 38.1331° Longitude: -121.2655° LL-PL-PI Approximate Surface Elev : 59 (Ft.) +/-ELEVATION (Ft.) DEPTH SILTY SAND (SM), fine to medium grained, brown, medium dense 20 4.7 5 6.9 loose 5 7 47 loose 8 11.4 loose 17 15.2 trace gravel, medium dense 10.0 49+/-10-100 for 12.2 very dense 1/2 of Auger Refusal at 10.04 Feet an inch Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: DCP Advancement Method: Notes: See Exploration and Testing Procedures for a 4" Hand Auger description of field and laboratory procedures DCP - Dynamic Cone Penetrometer per ASTM STP 399 Used DCP due to Inadequate Access with Drill Rig. used and additional data (If any) Supporting Information for explanation of See Abandonment Method: Boring backfilled with Auger Cuttings symbols and abbreviations. WATER LEVEL OBSERVATIONS Boring Started: 07-22-2022 Boring Completed: 07-22-2022 Groundwater not encountered Drill Rig: Hand Auger Driller: Terracon 902 Industrial Way Project No.: NA225058 Lodi, CA





LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS NA225058 NEW LUSD CAMPUS.GPJ TERRACON_DATATEMPLATE.GDT 8/9/22

750 Pilot Road, Suite F Las Vegas, Nevada 89119 (702) 597-9393

Client

Lodi Unified School District

llerracon GeoReport

Project

New LUSD Campus

Sample Submitted By: Terracon (NA)

Date Received: 7/27/2022

Lab No.: 22-0525

Results	s of Corros
Sample Number	2
Sample Location	B1
Sample Depth (ft.)	2.5-4.0
pH Analysis, ASTM G 51	7.54
Water Soluble Sulfate (SO4), AWWA 4500 E (percent %)	0.11
Sulfides, AWWA 4500-S D, (mg/kg)	Nil
Chlorides, ASTM D 512, (percent %)	0.01
Red-Ox, AWWA 2580, (mV)	+721
Total Salts, AWWA 2540, (mg/kg)	2514
Resistivity, ASTM G 57, (ohm-cm)	1746

M. Carp

Analyzed By:

Nathan Campo **Engineering Technician II**

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

SUPPORTING INFORMATION

Contents:

General Notes Unified Soil Classification System Geologic Hazards Study Report (43 pages)

Note: All attachments are one page unless noted above.

GENERAL NOTES DESCRIPTION OF SYMBOLS AND ABBREVIATIONS New South Central Avenue Campus Lodi, CA Terracon Project No. NA225058



SAMPLING	WATER LEVEL	FIELD TESTS	
M	_─_ Water Initially Encountered	N	Standard Penetration Test Resistance (Blows/Ft.)
Modified California Ring Penetrometer	Water Level After a Specified Period of Time	(HP)	Hand Penetrometer
Sampler Sampler	────────────────────────────────────	(T)	Torvane
	Cave In Encountered	(DCP)	Dynamic Cone Penetrometer
	Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur		Unconfined Compressive Strength
	over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level		Photo-Ionization Detector
	observations	(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS							
RELATIVE DENS	SITY OF COARSE-GRAI	NED SOILS		CONSISTENCY OF F	INE-GRAINED SOILS		
(More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			(50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manu procedures or standard penetration resistance			ual-manual	
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency) Unconfined Compressive Strength Qu, (tsf) Standard Penetration or N-Value Ring Sar Blows/ Blows/				
Very Loose	0 - 3	0 - 5	Very Soft	less than 0.25	0 - 1	< 3	
Loose	4 - 9	6 - 14	Soft	0.25 to 0.50	2 - 4	3 - 5	
Medium Dense	10 - 29	15 - 46	Medium Stiff	0.50 to 1.00	4 - 8	6 - 10	
Dense	30 - 50	47 - 79	Stiff	1.00 to 2.00	8 - 15	11 - 18	
Very Dense	> 50	<u>></u> 80	Very Stiff	2.00 to 4.00	15 - 30	19 - 36	
			Hard	> 4.00	> 30	> 36	

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

			Soil Classification			
					Group Symbol	Group Name ^B
		Clean Gravels:	$Cu \geq 4$ and $1 \leq Cc \leq 3$ $^{\text{E}}$		GW	Well-graded gravel F
	Gravels: More than 50% of	Less than 5% fines ^C	Cu < 4 and/or [Cc<1 or C	Cu < 4 and/or [Cc<1 or Cc>3.0] E		Poorly graded gravel ^F
	coarse fraction retained on No. 4 sieve	Gravels with Fines:	Fines classify as ML or N	/H	GM	Silty gravel ^{F, G, H}
Coarse-Grained Soils:		More than 12% fines ^C	Fines classify as CL or C	Ή	GC	Clayey gravel ^{F, G, H}
More than 50% retained on No. 200 sieve		Clean Sands:	$Cu \geq 6$ and $1 \leq Cc \leq 3^{\mbox{ E}}$		SW	Well-graded sand
S an 50%	Sands: 50% or more of coarse fraction passes No. 4 sieve	Less than 5% fines D	Cu < 6 and/or [Cc<1 or Cc>3.0] $^{\hbox{\scriptsize E}}$		SP	Poorly graded sand ^I
		Sands with Fines:	Fines classify as ML or MH		SM	Silty sand ^{G, H, I}
		More than 12% fines ^D	Fines classify as CL or CH		SC	Clayey sand ^{G, H, I}
		Inergenie	PI > 7 and plots on or above "A"		CL	Lean clay ^{K, L, M}
	Silts and Clays:	Inorganic: PI < 4 or plots below "A" line J		line ^J	ML	Silt ^K , L, M
	Liquid limit less than 50	Organic:	Liquid limit - oven dried	< 0.7E	< 0.75 OL	Organic clay ^{K, L, M, N}
Fine-Grained Soils: 50% or more passes the		Organic.	Liquid limit - not dried	< 0.75		Organic silt ^{K, L, M, O}
No. 200 sieve		Inorganic:	PI plots on or above "A" line		СН	Fat clay ^K , ^L , ^M
	Silts and Clays:	niorganic.	PI plots below "A" line		MH	Elastic Silt ^{K, L, M}
	Liquid limit 50 or more	Organic:	Liquid limit - oven dried	× 0.75	ОН	Organic clay ^K , L, M, P
		Organic:	Liquid limit - not dried	< 0.75		Organic silt K, L, M, Q
Highly organic soils:	Primarily	organic matter, dark in co	olor, and organic odor		PT	Peat

A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

- ^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
- ^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

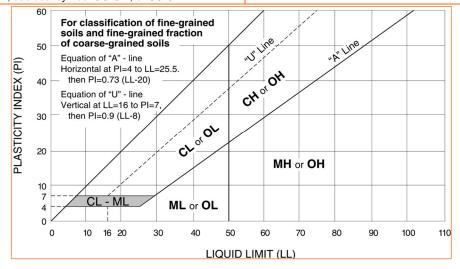
$$D_{60}/D_{10}$$
 $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

E Cu =

F If soil contains \geq 15% sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

- ^H If fines are organic, add "with organic fines" to group name.
- $^{|}$ If soil contains \geq 15% gravel, add "with gravel" to group name.
- ^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
- ^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
- L If soil contains \geq 30% plus No. 200 predominantly sand, add "sandy" to group name.
- ^MIf soil contains \geq 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
- ^N PI \geq 4 and plots on or above "A" line.
- ^OPI < 4 or plots below "A" line.
- P PI plots on or above "A" line.
- ^QPI plots below "A" line.



Terracon

August 12, 2022

Lodi Unified School District 1305 E Vine Street Lodi, California 95240

- Attn: Mrs. Vickie Brum P: (209) 331-7223 E: vbrum@lodiusd.com
- Subject: Geologic Hazards Study Report New South Central Avenue Campus 19 South Central Avenue Lodi, California 95240 Terracon Project No. NA225058

Dear Vickie:

In accordance with your request, we have performed a geologic hazards study for the proposed new South Central Avenue campus at 19 South Central Avenue, Lodi, California. The results of the study indicate that the site is underlain by undivided alluvial deposits of the Pleistocene age Modesto Formation (upper member). The subject site is considered susceptible to potential dam failure inundation from the Camanche, Camanche South and North Dikes, and Pardee Dams. The site is mapped within an area of 0.2% annual chance flood, but not within a FEMA 100-year floodplain. The site is not in an earthquake fault zone. The nearest active fault is located about 37 kilometers (23 miles) from the site.

The opportunity to provide consulting services to you on this project is appreciated. If you have any questions regarding the report, please contact the undersigned at your convenience.

Respectfully submitted,

Stephen E. Joeop

Stephen E. Jacobs Certified Engineering Geologist 1307



Terracon 902 Industrial Way Lodi, CA 95240 Main (209) 367-3701 Fax (209) 333-8303 Dispatch (209) 263-0593 terracon.com



GEOLOGIC HAZARDS STUDY New South Central Avenue Campus 19 South Central Avenue Lodi, California August 12, 2022

INTRODUCTION

This report presents the results of a geologic hazards study for the proposed new South Central Avenue campus in the City of Lodi, County of San Joaquin, California (Figure No. 1). The primary purpose of this study was to evaluate the potential geologic hazards affecting the site.

This report has been prepared for the exclusive use of the Lodi Unified School District, their representatives and direct clients, and because conditions may change over time due to earthquakes, rainstorms, construction, and other causes, this report may require an updated investigation. This report is not to be provided to any other third party without Terracon authorization. Should this report be provided to another third party without Terracon authorization, then Terracon will assume no liability whatsoever.

SITE AND PROPOSED PROJECT DESCRIPTION

The proposed new South Central Avenue campus is located at 19 South Avenue in the City of Lodi, California. The South Central campus site is bound on the east by South Central Avenue, on the south by East Oak Street, on the west by residential lots and South Washington Street, and on the north by an unnamed street, residential lots and Pine Street. The topography of the site is nearly level and situated at an elevation of approximately 56 feet above mean sea level (MSL), according to the topographic map (Figure No. 1), Google Earth imagery and site survey.

REVIEW OF GEOLOGIC LITERATURE

We reviewed available published geologic literature, including publications by Miller (1989), Jennings and Bryant (2010, Figure No. 4), and Dawson (2009, Figure No. 3) that cover the area in the vicinity of the subject site. A list of references is presented in Appendix A. Text figures are presented in Appendix B. Locations of gas fields and gas wells are shown on Figure No. 2. A regional fault activity map is shown on Figure No. 4, and a flood hazard zones map is shown on Figure No. 5.



GEOLOGY AND GEOLOGIC HAZARDS

Local Geology

<u>General</u>

The subject site is located in the central portion of the northern region of the Great Valley geomorphic province.

The Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern part is the Sacramento Valley, drained by the Sacramento River, and its southern part is the San Joaquin Valley, drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). Great oil fields have been found in southernmost San Joaquin Valley and along anticlinal uplifts on its southwestern margin (California Geological Survey, 2002).

The site is located in the southern portion of Sacramento Valley. About 21 miles to the east are the foothills of the Sierra Nevada province, and about 33 miles to the west is the Coast Ranges province. Tectonic processes involved with the western Coast Ranges are a significant source of seismicity, faulting, and folding.

Oil and Gas Exploration

Oil and gas well location maps were reviewed to locate any wells or test holes on the subject property or nearby. Well information can be used to evaluate the subsurface geology and estimate potential hazards associated with well operations, subsidence, or related environmental issues.

According to well field map 611 (DOGGR, 2007, Figure No. 2), published by the California Division of Oil, Gas and Geothermal Resources, the subject property is not located within any gas or oil production area. The nearest gas fields, the Lodi Airport Gas, the Southeast Lodi Gas, and the Lodi Gas fields, are located about 5 miles southwest, 3 miles east-southeast and 4 miles northeast, respectively, from the subject site. The DOGGR online mapping system depicts three (3) abandoned or plugged gas wells and one (1) active gas well located within about 4 miles of the site. The nearest abandoned or plugged gas well is located about 2½ miles southwest of the site. No known active gas wells are within 2 miles of the site (DOGGR, 2007; Figure No. 2).



Stratigraphy

We reviewed the Preliminary Geologic Map of the Lodi 30' x 60' Quadrangle by Dawson (2009, Figure No. 3). The subject property is located within the undivided alluvial deposits of the Pleistocene age Modesto Formation, upper member (map unit Qm2 of Dawson, 2009). Dawson (2009, p. 5) described the undivided alluvial deposits of the Modesto Formation as "Arkosic alluvium, sand with minor gravel and silt, forming low terraces, high floodplains, and alluvial fans along the Consumnes and Mokelumne Rivers."

We also reviewed our four (4) soil test boring logs, borings drilled on July 22, 2022, for the proposed new South Central Avenue campus site. Beneath the site and underlying locally about 1 foot of asphalt and aggregate base course, the undivided alluvial deposits of the upper member of the Modesto Formation consist of loose to medium dense, light brown, silty sand extending downward to dense to very dense silty sand at depths ranging from approximately 4½ to 13½ feet. This material is locally underlain by very stiff to hard, brown, sandy silt from the approximate 4½-foot depth to the maximum explored depth of approximately 16½ feet, as encountered in Boring No. B4. Also, locally in Boring No. B1, the silty sand is underlain by dense, light brown with red, clayey sand extending from the approximate 13½-foot depth to the maximum explored depth of approximately 16½ feet.

Faulting and Seismicity

We reviewed the Guidelines for Evaluating and Mitigating Seismic Hazards in California (CGS, 2008a). The site does not lie within an Alquist-Priolo special studies (currently called earthquake fault) zone as established by the State of California (CGS, 2018). Twenty-four (24) significant faults capable of generating earthquake-induced ground motion at the site are located within 130 kilometers (81 miles) of the subject site (see Figure No. 4). The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. Table 1 below indicates the approximate distance of the fault zones and the associated maximum credible earthquake that can be produced by nearby seismic events, as calculated using the USGS Unified Hazard Tool (unless otherwise noted; see attached analysis results). These and other faults located throughout California are studied as part of an ongoing effort to create a probabilistic model to estimate earthquake-induced ground motion for the State of California (CDMG, 1996 and 2002; Cao and others, 2003).

The nearest mapped fault to the site is the Stockton fault which passes within about 17 kilometers (11 miles) southeast of the site within Sacramento Valley; this fault has been classified as a pre-Quaternary age fault. The Great Valley 6 (Midland alt 1) fault zone, the nearest Quaternary age (potentially active) fault, is located approximately 34 kilometers (21 miles) west of the site.



Table 1

Significant Faults Located within 130 kilometers (unless otherwise noted) of the New South Central Avenue Campus, Lodi, California (0

CDMG, 1996	, updated 2002	; USGS Unified	Hazard Tool, 2022c)
------------	----------------	----------------	---------------------

(021110) 1000) apaatoa 200			. ,	
Significant Earthquake Fault	Geometry	Slip Rate (mm/yr)	Mmax (MCE)	Dist (km) ¹
GREAT VALLEY 6 (Midland alt 1)	r	1.5	6.98 ²	34.14 ²
GREAT VALLEY 6 (Midland alt 2)	r	1.5	7.14 ²	36.47 ²
FOOTHILLS FAULT SYSTEM	n-rl-o	0.05	6.5	37
GREAT VALLEY 6	r	1.5	6.7	48
MOUNT DIABLO THRUST SOUTH	r		7.11 ²	52.54 ²
GREAT VALLEY 5 (Pittsburg Kirby Hills)	r	1.5	6.7	53
MOUNT DIABLO THRUST NORTH CFM	r		7.31 ²	56.02 ²
GREAT VALLEY 7	r	1.5	6.7	55
GREENVILLE (No)	rl-ss	2.0	7.19 ²	57.71 ²
GREAT VALLEY 4b (Gordon Valley)	r	1.5	6.9	63
CONCORD – GREEN VALLEY	rl-ss	5.0	6.2	69
CALAVERAS (No. of Calaveras Res.)	rl-ss	6.0	7.3	75
GREAT VALLEY 4a	r	1.5	6.6	66
GREAT VALLEY 8	r	1.5	6.6	80
HAYWARD (SE Extension)	rl-ss	9.0	7.4	86
HAYWARD (Total Length)	rl-ss	9.0	7.1	86
WEST NAPA	rl-ss	1.0	6.5	86
RODGERS CREEK	rl-ss	9.0	7.0	88
HUNTING CREEK – BERRYESSA	rl-ss	6.0	7.1	89
GREAT VALLEY 3	r	1.5	6.9	91
ORTIGALITA	rl-ss	1.0	7.1	98
SAN ANDREAS (Peninsula)	rl-ss	17.0	8.17 ²	117.75 ²
SAN ANDREAS (1906)	rl-ss	24.0	8.17 ²	117.75 ²
MAACAMA	rl-ss	9.0	7.5	128

¹ Fault distance estimated, unless otherwise noted, from Jennings, C.W., and Bryant, W.A., 2010, Fault Activity Map of California: California Geological Survey, Geologic Data Map No. 6, scale 1:750,000.

² Maximum Credible Earthquake and fault distance are calculated using the Unified Hazard Tool (USGS, 2022c)



Significant Earthquake Fault	Geometry	Slip Rate (mm/yr)	Mmax (MCE)	Dist (km) ¹
eometry- (ss) strike slip, (r) reverse, (n) i ist (Mi) is epicentral distance.	normal, (rl) rig	ht lateral, (II),	left lateral, (o)) oblique.

Historic Earthquakes

Historically, the San Andreas Fault Zone Complex has rendered many earthquakes of the magnitude range of 5.0Mw or greater ('Mw' is the Moment Magnitude as defined by the USGS) that may have affected the project site. These major quakes have been estimated to be in the range of 5.0Mw to 6.6Mw. Each of these major quakes has rendered light to moderate damage to buildings and roads. For reference purposes, a summary of the significant (≥5.0Mw) earthquakes (other than those listed in Table 3 below) that affected the site (within 100 km) is provided in Table 2 using the NCEC (2022) and USGS (2022a) earthquake catalogue websites.

of t	of the New South Central Avenue Campus, Lodi, California						
Date	Latitude (Degrees N)	Longitude (-Degrees W)	Moment Magnitude (Mw)	Depth (km)			
5/19/1902	38.300	121.900	5.4	-			
6/11/1903	37.400	121.900	5.8	-			
1/24/1980	37.811	121.775	5.1	6.5			
1/24/1980	37.852	121.815	5.8	11.0			
1/27/1980	37.749	121.706	5.4	14.2			
4/24/1984	37.310	121.679	6.2	8.2			
3/31/1986	37.479	121.687	5.7	8.5			
6/13/1988	37.393	121.742	5.3	9.1			
10/31/2007	37.434	121.774	5.5	9.7			
8/24/2014	38.215	122.312	6.0	11.1			

Table 2

San Francisco Bay Area Faults

The San Andreas Fault Zone is located approximately 118 kilometers (74 miles) to the southwest of the site. Two (2) of the biggest earthquakes in California occurred along the San Andreas Fault, the 1857 Fort Tejon earthquake of magnitude (Mw) 7.92 and the 1906 San Francisco earthquake of Mw 7.68.

Geologic Hazards Study New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project # NA225058



The San Andreas Fault Zone is considered the active boundary between the North American tectonic plate to the east, the Pacific plate to the west, and the Juan de Fuca plate to the north. The San Andreas Fault is also regarded as the primary expression of movement along this boundary. Other parallel and related faults in the California Coast Ranges are considered lesser expressions of tectonic stresses that occur along the plate boundary. These faults make up the majority of the active faults in the Central California area.

The closest active fault with a maximum moment magnitude of 6.5 and a slip rate of 0.05 millimeters per year is the Foothills fault system, located at a distance of about 37 kilometers (23 miles) northeast from the site. A significantly more active fault with a maximum moment magnitude of 7.1 and a slip rate of 9 millimeters per year is the Hayward Fault located at a distance of about 86 kilometers (54 miles) southwest from the site.

CRCV Boundary

The Coast Range-Central Valley (CRCV) geomorphic boundary (margin) is located about 33 miles west of the site. The CRCV boundary is underlain by a 310-mile (500 km) long seismically active fold and thrust belt (Wakabayashi and Smith, 1994). Wakabayashi and Smith (1994) point out that, for communities located along the western margin of the Central Valley, the CRCV, because of its proximity to the site and the comparatively long distance to major strike-slip faults, may represent the most significant seismic hazard for the area.

In addition to the historic earthquakes (generated on other faults) listed above in Table 2, numerous earthquakes have occurred along the CRCV fold and thrust zone including the 1866 Patterson earthquake of Mw 5.9. The most recent large earthquake occurring along the CRCV fold and thrust zone was the 1983 Coalinga earthquake, Mw 6.5, which caused considerable damage in the Coalinga area. A summary of large damaging earthquakes thought to be associated with the CRCV fold and thrust zone is presented in Table 3.

Table 3
Historic Large Earthquakes Associated with the CRCV Boundary
(Wakabayashi and Smith, 1994)

Year	Location and Comments	Mw (Moment Magnitude)
1892	Vacaville-Winters mainshock	6.8
1892	Vacaville-Winters aftershock	6.4
1892	Vacaville-Winters aftershock	5.8
1889	Antioch	6.3
1866	Near Patterson	5.9
1881	Near San Luis Reservoir	6.4



Year	Location and Comments	Mw (Moment Magnitude)
1905	Near Firebaugh	6.1
1885	Near Mendota	6.5
1983	Coalinga mainshock	6.5
1983	Coalinga aftershock	6.0
1985	Kettleman Hills (north dome)	6.1

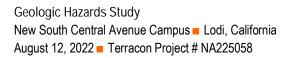
The subject site will have a potential for ground shaking because of its proximity to the CRCV seismically active fold and thrust belt and the nearby San Francisco Bay area faults. Wakabayashi and Smith (1994) point out that although eleven (11) earthquakes with magnitudes greater than or equal to 5.8 have taken place on the CRCV boundary (Great Valley Fault), approximately 65% of the fault system has not yielded earthquakes of this size in historic time. Since Wakabayashi and Smith (1994) described the CRCV fold and thrust belt, it has since been sectioned into distinct fault segments (see Figure No. 4) by the California Geological Survey (CGS) and the United States Geological Survey (USGS). The general name of the fault is Great Valley (GV) followed by the segment number (CDMG, 1996; Cao and others, 2003). The maximum moment magnitude of earthquakes occurring on the closest segment (GV-6, Midland alt 1) to the site is 6.98. However, the next closest segment (GV-6, Midland alt 2) to the site has a slightly higher maximum moment magnitude of 7.14.

Foothills Fault System

The edge of the Foothills Fault System, which roughly defines the Central Valley and the Sierra Nevada margin, lies about 37 kilometers (23 miles) northeast of the subject site. The Foothills Fault System is regarded as an aerial earthquake source that is based on poorly constrained Quaternary slip rates across the Bear Mountain and Melones Fault Zones (CDMG, 1996; Woodward-Clyde Consultants, 1978). Wakabayashi and Smith (1994) describe the Foothills Fault Zone as lacking evidence of active crustal shortening and note that deformation along the east side of the Central Valley is extensional or transtensional. This fault system has much less activity relative to the Central Coast area strike-slip faults and the CRCV boundary located along the west side of the Sacramento and San Joaquin Valleys.

Estimated Ground Motion, Seismic Site Class and Parameters of the Site

Peak ground acceleration at the site for a 2% probability of being exceeded in 50 years is on the order of 0.334g for a predominant Site Class D as estimated from the California Geological Survey website (CGS, 2022b). This estimate is for evaluation purposes only and is not a substitute for the seismic deaggregation analysis, the results of which are presented below for determining seismic design parameters on the site. It should be noted that the subsurface soils encountered in the soil test borings are considered to be predominantly within the Class D site classification. However,





soils considered to be in Class E were interpreted locally to be within the upper approximately 4½ to 5 feet as encountered in Boring Nos. B1, B3, and B4. Subsurface soils interpreted to be within Class C were encountered in the borings below depths ranging from approximately 10 to 13½ feet. Therefore, Tables 4A through 4C present the seismic design values for three site classes (Site Class D in Tables 4A, Site Class C in Table 4B, and Site Class E in Table 4C) as calculated according to guidelines presented at the USGS U.S. Seismic Design Maps website utilizing ASCE 7-16 (ASCE, 2022). We have provided values for site classes C, D and E for the ASCE 7-16 standard, because the subsurface soils range from loose to very dense for non-cohesive soils and very stiff to hard for cohesive soils. The seismic design analysis reports are provided as separate attachments to this geologic hazards study report.

DESCRIPTION	VALUE
2019 California Building Code Site Classification (CBC) ¹	D
Risk Category	I-IV
Site Latitude	38.1334°N
Site Longitude	-121.2656°W
S _s Spectral Acceleration for a Short Period	0.605g
S1 Spectral Acceleration for a 1-Second Period	0.254g
Fa Site Coefficient for a Short Period	1.316
F _v Site Coefficient for a 1-Second Period	N/A
$S_{\mbox{\scriptsize Ms}}$ Maximum Considered Spectral Response Acceleration for a Short Period	0.797g
S_{M1} Maximum Considered Spectral Response Acceleration for a 1-Second Period	N/A
S _{Ds} Design Spectral Response Acceleration for a Short Period	0.531g
S_{D1} Design Spectral Response Acceleration for a 1-Second Period	N/A
PGA _M Mean Peak Ground Acceleration	0.341g

Table 4A Seismic Design Parameters (ASCE 7-16 Standard)

¹ Note: The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings extended to a maximum depth of 16½ feet, and this seismic site class definition considers that similar soils continue below the maximum depth of the subsurface exploration. Additional exploration to greater depths could be considered to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration by us could be utilized in order to attempt to confirm the seismic site class.



Table 4B Seismic Design Parameters (ASCE 7-16 Standard)

DESCRIPTION	VALUE
2019 California Building Code Site Classification (CBC) ¹	С
Risk Category	I-IV
Site Latitude	38.1334°N
Site Longitude	-121.2656°W
S _s Spectral Acceleration for a Short Period	0.605g
S ₁ Spectral Acceleration for a 1-Second Period	0.254g
Fa Site Coefficient for a Short Period	1.258
F _v Site Coefficient for a 1-Second Period	1.500
S _{Ms} Maximum Considered Spectral Response Acceleration for a Short Period	0.762g
S_{M1} Maximum Considered Spectral Response Acceleration for a 1-Second Period	0.382g
S _{Ds} Design Spectral Response Acceleration for a Short Period	0.508g
S _{D1} Design Spectral Response Acceleration for a 1-Second Period	0.254g
PGA _M Mean Peak Ground Acceleration	0.304g

¹ Note: The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings extended to a maximum depth of 16½ feet, and this seismic site class definition considers that similar soils continue below the maximum depth of the subsurface exploration. Additional exploration to greater depths could be considered to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration by us could be utilized in order to attempt to confirm the seismic site class.

Table 4C Seismic Design Parameters

(ASCE 7-16 Standard)

DESCRIPTION	VALUE
2019 California Building Code Site Classification (CBC) ¹	E
Risk Category	I-IV
Site Latitude	38.1334°N
Site Longitude	-121.2656°W
S _s Spectral Acceleration for a Short Period	0.605g
S ₁ Spectral Acceleration for a 1-Second Period	0.254g



DESCRIPTION	VALUE
Fa Site Coefficient for a Short Period	1.531
F _v Site Coefficient for a 1-Second Period	N/A
$S_{\mbox{\scriptsize Ms}}$ Maximum Considered Spectral Response Acceleration for a Short Period	0.927g
S_{M1} Maximum Considered Spectral Response Acceleration for a 1-Second Period	N/A
S _{Ds} Design Spectral Response Acceleration for a Short Period	0.618g
S _{D1} Design Spectral Response Acceleration for a 1-Second Period	N/A
PGA _M Mean Peak Ground Acceleration	0.441g

¹ Note: The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings extended to a maximum depth of 16½ feet, and this seismic site class definition considers that similar soils continue below the maximum depth of the subsurface exploration. Additional exploration to greater depths could be considered to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration by us could be utilized in order to attempt to confirm the seismic site class.

Geologic Hazards

Liquefaction Potential

Liquefaction of saturated cohesionless soils can be caused by strong ground motion resulting from earthquakes. Soil liquefaction is a phenomenon in which saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure during cyclic loading such as that induced by earthquakes. The primary factors affecting the liquefaction potential of a deposit are: 1) intensity and duration of earthquake shaking, 2) soil type and relative density, 3) overburden pressures, and 4) depth to groundwater. Soils most susceptible to liquefaction are clean, loose, uniformly graded, fine-grained sands, and non-plastic silts that are saturated. Silty sands, under certain site conditions, may also be susceptible to liquefaction.

The undivided alluvial deposits of the Pleistocene Modesto Formation, upper member (map unit Qm2, Figure No. 3), despite having a reported historic high groundwater depth of approximately 21½ feet (CDWR, 2022) within about 1 mile of the site, are considered generally not susceptible to liquefaction due to their mostly relatively high density (below approximately the 5-foot depth as encountered in the borings) to the maximum explored depth of 16½ feet.

At anticipated foundation depths, the undivided alluvial deposits of the Pleistocene Modesto Formation, upper member, will underlie the proposed new South Central Avenue Campus on the subject property. These materials reportedly consist of mainly loose to medium dense silty sand in the upper approximately 5 feet, and dense to very dense silty sand below depths ranging from approximately 5 to 13½ feet, locally underlain by very stiff to hard sandy silt below the approximate

Geologic Hazards Study New South Central Avenue Campus Lodi, California August 12, 2022 Terracon Project # NA225058



4½-foot depth and locally dense clayey sand below the approximate 13½-foot depth to the maximum explored depth of approximately 16½ feet. Despite the historic high ground water depth of approximately 21½ feet, the upper approximately 5 feet of mostly loose sediment and the medium dense to very dense or very stiff to hard materials below this depth are considered to have a low susceptibility to seismically induced liquefaction or settlement. This assessment is for evaluation purposes only and is not a substitute for a detailed liquefaction analysis on the site.

Fault Rupture Hazard

The site does not lie within an Alquist-Priolo special studies (currently earthquake fault) zone as determined by the State of California (CGS, 2018), and there are no known mapped surface faults on or adjacent to the site. The nearest potentially active (Quaternary age) fault, capable of surface rupture, is the Great Valley 6 (Midland alt 1) fault, located approximately 34 kilometers (21 miles) west of the subject site within the Sacramento Valley. The active Foothills Fault system lies about 37 kilometers (23 miles) northeast of the site.

Blind thrust faults of the Great Valley system lie approximately 34 kilometers (21 miles, to the nearest segment) southwest of the site, and strike-slip faults of the Bay Area Fault system lie about 86 kilometers (54 miles) southwest of the site (Fault Activity Map, Figure No. 4). The Great Valley faults are buried relatively deeply at a low angle, approximately one-half mile deep. Historically, blind thrust faults do not cause surface rupture due to their low angle geometry. Due to the large distance from any of the active faults within the greater area, surface rupture faulting is not expected at the site.

Earthquake-Induced Landsliding

The site is not considered susceptible to landsliding because of its low topographic relief and lack of hills/mountains in the vicinity of the site.

Volcanic Hazards

Six active volcanic hazard zones have been identified in California. The Clear Lake Volcanic area is the closest of the six active zones to the subject property. The Clear Lake Volcanic area is located about 95 miles northwest of the site in the City of Lodi. The Mount Lassen Volcanic Area (MVLA) is located about 185 miles to the north of the site.

The procedures and methods used to evaluate potential volcanic hazards for the site are largely adopted from the work of Miller (1989). Hazards associated with volcanic events are first categorized and characterized into two groups, "Flowage Hazards" and "Tephra Hazards." Flowage hazards include pyroclastic flows, debris flows, directed blasts, and lava flows. Tephra hazards are primarily considered to be ash falls. Historic and geologic information on each of these



types of events has been accumulated for volcanic centers around the world. Hazards associated with volcanic events can then be further categorized based on magnitude of an event and whether it is precedented or unprecedented for a particular volcanic area. Precedented events are associated with previous eruptions at the specific volcanic hazard zone. Unprecedented events refer to large cataclysmic events, which are very infrequent geologically.

Risk associated with potential volcanic hazards can then be evaluated as a function of distance from the volcanic center based on historic and geologic information defined in terms of four categories: (1) precedented combined flowage hazards, (2) unprecedented combined flowage hazards, (3) precedented tephra hazards, and (4) unprecedented tephra hazards.

Due to the considerable distance from the Clear Lake Volcanic area, and the type of eruptions (less mafic and more silicic, i.e. more viscous) likely produced, it is unlikely that any of the above mentioned hazards would affect the site. A more likely source of hazard would come from the Lassen Volcanic Area.

For precedented events associated with the MLVA, combined flowage hazards could be anticipated to extend 15 km (9+ miles) from the volcanic center (Miller, 1989). For unprecedented events, flowage hazards are documented to reach distances of 25 to 31 miles from the center of the volcanic zone (Miller, 1989). For comparative purposes, the pyroclastic flow associated with the 1980 Mt. Saint Helens eruption reached as far as 17 miles from the volcanic center. The 1980 Mt. Saint Helens eruption is a medium size eruption involving only 3 km³ of material. Based on the fact that MLVA is located about 185 miles from the subject property, the subject property is too far from the nearest active volcanic center to be impacted by either precedented or unprecedented volcanic flowage hazards.

At about 185 miles from MLVA, the subject site is close enough to be affected by either a precedented or unprecedented tephra (ash fall) event. For a precedented event, less than 2 inches (5 centimeters or less) are predicted at 185 miles from MLVA (Miller, 1989). For an unprecedented event, anywhere between 4 and 31 inches (10 cm to 80 cm) of ash could potentially accumulate depending on the size of the event. However, the likelihood of tephra impact is a function of prevailing wind direction and strength, and the wind blows toward the southwest (from MLVA toward Lodi) only 2% of the time (Miller, 1989). Consequently, only 2% of the precedented or unprecedented events would be expected to deposit ash at the subject property. There is a low risk of volcanic hazards affecting the property because the frequency of eruptions is rare.

Inundation by Tsunamis and Seiches

Tsunamis, often incorrectly called tidal waves, are long period waves of water usually caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. There is no



potential for tsunamis at the site due to the large distance from the Pacific Ocean and the San Francisco Bay shore line. Therefore, tsunamis are not a potential hazard at the site.

A seiche is an oscillation of a body of water in an enclosed or semi-enclosed basin that varies in period. Seiches are often caused by tidal currents, landslides, earthquakes, and wind. There are no water bodies adjacent to the site. Therefore, the potential for seiches influencing the site is nil.

Flooding

Flood hazards generally consist of shallow sheet flooding caused by surface water runoff during large rain storms. Flooding at the site underlain by alluvial fan deposits could be caused by nearby rivers, the nearest of which is the Mokelumne River to the north (City of Lodi, 2010). The site is not located within a Special Flood Hazard Area (SFHA) as designated by the Federal Emergency Management Agency (FEMA). According to the Flood Insurance Rate Map (FIRM) Panel 169, Map Number 06077C0169F, published by the Federal Emergency Management Agency (FEMA), with an effective date of October 16, 2009, the proposed new school campus is within an area of Zone X (Other Flood Areas) that is defined as areas of 0.2 percent annual chance flood; areas of one-percent annual-chance flood with averaged depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from one percent annual chance flood (FIRM, 2009, Figure No. 5).

Dam Failure Inundation

Based on review of the City of Lodi General Plan, Safety Element (adopted April 7, 2010) and the San Joaquin County Flood and Dam Failure Annex (2019), the proposed new school site is located within a potential dam inundation zone. Surface water stored in reservoirs on the Calaveras, Mokelumne, and Stanislaus River systems present a potential risk to inhabitants of the City of Lodi's Planning Area. Dams that present a threat of inundation to the site include Camanche, Camanche South and North Dikes, and Pardee.

Expansive Soils

Clayey sand was identified below the approximate 13½-foot depth in soil test Boring No. B1. Although the predominant silty sand soils encountered in the borings are considered not potentially expansive, this localized clayey sand may be potentially expansive, which nevertheless is considered low due to its considerable depth. This assessment is for general evaluation purposes



only and not a substitute for a specific determination of the expansion potential through laboratory testing of the subsurface soils.

Corrosive/Reactive Geochemistry of Geologic Subgrade

"Corrosion of metals is an electrochemical process involving oxidation (anodic) and reduction (cathodic) reactions on metal surfaces. For metals in soil or water, corrosion is typically a result of contact with soluble salts found in the soil or water. This process requires moisture to form solutions of the soluble salts. Factors that influence the rate and amount of corrosion include the amount of moisture, the conductivity of the solution (soil and/or water), the hydrogen activity of the solution (pH), and the oxygen concentration (aeration). Other factors such as soil organic content, soil porosity, and texture indirectly affect corrosion of metals in soil by affecting the other factors listed above." (CalTrans, 2003)

According to the corrosion guidelines by CalTrans (2003), for structural elements, CalTrans considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less.

Since precise corrosion testing of the subsurface soils on the site is beyond the scope of this report, the following is a general evaluation of the resistance to corrosion potential for galvanized steel in the various soils: According to the soil class evaluation by Testing Engineers (2020), the corrosion resistance of the clayey sand and sandy silt at various depths in some of the borings is considered fair to good; and the corrosion resistance of the predominant silty sand encountered in all the borings is considered good to excellent.

Hazardous Materials

No methane gas, hydrogen-sulfide gas, or tar seeps are known or have been reported on, or near, the subject property according to our review of the GeoTracker (2022) website.

Naturally Occurring Asbestos (NOA)

We reviewed the Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California (CGS, 2008b). Asbestos is the generic term for the naturally occurring fibrous (asbestiform) varieties of six silicate minerals (croicidolite, tremolite, actinolite, anthophyllite, amosite, and chrysotile). These asbestiform minerals are naturally occurring in igneous ultramafic rock formations such as dunite, pyroxenite, peridotite, and hornblendite, which form below the Earth's surface at high temperatures and then exposed by uplift and erosion. Chrysotile, the most common asbestos mineral in California, forms fibrous crystals in small veins in the altered metamorphic rock serpentinite. According to the USGS Open-File Report 2011-1188, Reported



Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California (Van Gosen and Clinkenbeard, 2011), the project site does not lie within an area mapped as containing Naturally Occurring Asbestos (NOA).

Radon Gas

Radon is a naturally occurring, colorless and tasteless gas produced in soil or rock by the decay of uranium and radium; radon is a known cause of lung cancer in the United States. Sections 307 and 309 of the Indoor Radon Abatement Act of 1988 (IRAA) directed EPA to list and identify areas of the U.S. with the potential for elevated indoor radon levels. EPA's Map of Radon Zones (EPA, 2019) assigns each of the 3,141 counties in the U.S. to one of three zones based on radon potential. San Joaquin County and the project site are located in Zone 3 for radon potential. Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L and are anticipated to have a low potential for radon.

Regional Subsidence

Subsidence of the land surface, as a result of the activities of man, has been occurring in California for many years. Subsidence can be divided, on the basis of causative mechanisms, into four types: groundwater withdrawal subsidence, hydrocompaction subsidence, oil and gas withdrawal subsidence, and peat oxidation subsidence (CDMG, 1973). According to CDMG (1973) and USGS (2022d), the site lies east and southeast, and outside, of known areas of subsidence from groundwater withdrawal and peat oxidation. Specifically, the eastern boundary of the nearest mapped area of subsidence, due to peat oxidation loss, is located about 7 miles west of the site. Therefore, the potential for subsidence at the site due to these four types of causes is considered low.

Hydrocollapse

Hydrocollapse can occur in loose alluvial fan soils due to anthropic use of water. Due to the age, composition and relatively high density of the native soils and geologic materials encountered during our field exploration below the approximate 5-foot depth, it is our opinion that hydrocollapse of these on-site soils as the result of rain or irrigation water percolation is unlikely. However, the loose silty sand in the upper approximately 5 feet of the native soils as encountered in most of our borings may be susceptible to hydrocollapse.

Clays and Cyclic Softening

Dense clayey sand was encountered below the approximate 13½-foot depth in our soil test Boring No. B1. Due to the high density of this material and the lack of soft clays in the upper approximately 10 feet of the soil profile, the potential for cyclic softening at the site is considered very low.



Groundwater

Groundwater was not encountered in any of the four (4) soil test borings to the maximum explored depth of approximately 16½ feet in our Boring Nos. B1 and B4. Based on research of the California Department of Water Resources water data library website (CDWR, 2022), groundwater Station Well 381376N1212740W001, located about 1 mile northwest from the site, reported a historic high groundwater depth of 21.59 feet bgs (below the ground surface) on January 1, 1927. However, the latest record on March 24, 2022 reported a groundwater depth of 48.56 feet bgs at groundwater Station Well 381337N1212757W001, located about ³/₄ mile west from the site. Localized perched groundwater can develop on the site and is usually associated with landscape irrigation or excessively heavy rainfall.

CONCLUSIONS AND RECOMMENDATIONS

- The site is located about 37 kilometers (23 miles) southwest of the nearest known active fault segment of the Foothills Fault system. The nearest potentially active fault, the Great Valley 6 (Midland alt 1) fault, is located approximately 34 kilometers (21 miles) west of the site.
- 2. The site is underlain by undivided alluvial deposits of the Pleistocene age Modesto Formation, upper member, which are generally considered not susceptible to seismically induced liquefaction or settlement. Based on the predominantly medium dense to very dense silty sand and very stiff sandy silt of these deposits below the approximate 4½-foot depth encountered in the borings, and despite the reported historic high groundwater depth of approximately 21½ feet, the susceptibility to liquefaction and settlement of these sediments is considered low.
- 3. The subject site is considered susceptible to potential dam failure inundation from the Camanche, Camanche South and North Dikes, and Pardee Dams.
- 4. The loose silty sand as encountered in the upper approximately 5 feet of the native soils in most of our borings may be susceptible to hydrocollapse.

LIMITATIONS

This geologic hazards study report is prepared for the exclusive use of the Lodi Unified School District, and their representatives and direct clients. The opinions expressed herein are for the purpose of evaluating potential geologic hazards affecting the subject site. This study is limited to the review of available technical published and unpublished literature. This report is intended for use only by the client named above for the purpose stated; no other use of the report is authorized, and transfer to any other person or agency without notification or authorization by Terracon is not advisable. No warranties, express or implied, are given as to the geology, soils, or foundation conditions of the subject property.



Appendix A - REFERENCES

- American Society of Civil Engineers (ASCE), 2022, ASCE 7 Hazard Tool, website: https://asce7hazardtool.online.
- Boulanger, R.W., and Idriss, I.M. (ASCE), 2007, Evaluation of Cyclic Softening in Silts and Clays: Journal of Geotechnical and Geoenvironmental Engineering, Vol. 133, Issue 6, dated June 2007.
- California Department of Transportation (CalTrans), 2003, Corrosion Guidelines, Version 1.0: Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Technology Branch, 47 p., dated September 2003.
- California Department of Water Resources (CDWR), 2022, Water Data Library, website: https://wdl.water.ca.gov
- California Division of Mines and Geology (CDMG), 1973, Urban Geology Master Plan for California, Bulletin 198, p. 43-48.
- California Division of Mines and Geology, 1996, Probabilistic Seismic Hazard Assessment for the State of California: Open-File Report 96-08, updated 2002 fault tables from the CGS website at: <u>http://consrv.ca.gov/cgs/rghm/psha/index.htm.</u>
- California Division of Oil, Gas, and Geothermal Resources (DOGGR), 2007, Map 611, website: <u>ftp://ftp.consrv.ca.gov/pub/oil/maps</u>
- California Geological Survey, 2002, California Geomorphic Provinces: California Geological Survey Note 36.
- California Geological Survey, 2008a, Guidelines for Evaluating and Mitigating Seismic Hazards in California: California Geological Survey Special Publication 117A, 102 p.
- California Geological Survey, 2008b, Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California: California Geological Survey Special Publication 124.
- California Geological Survey (CGS), Revised 2018, Earthquake Fault Zones: A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California: Special Publication 42.
- California Geological Survey, 2019, Checklist for Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings: California Geological Survey Note 48, dated November 2019.



REFERENCES (continued)

- California Geological Survey (CGS), 2022, Ground Motion Interpolator, website: <u>https://www.conservation.ca.gov/cgs/SiteAssets/ground-motion-interpolator-for-embedding-</u> alt-layout.aspx.
- Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Wills, C.J., 2003, The revised 2002 California probabilistic seismic hazard maps, June 2003: California Geologic Survey, 12 p., Appendix A.
- City of Lodi, 2010, City of Lodi General Plan, Chapter 8- Safety, adopted April 7, 2010.
- Dawson, T., 2009, Preliminary Geologic Map of the Lodi 30' x 60' Quadrangle, California: California Geological Survey, scale 1:100,000.
- Environmental Protection Agency (EPA), 2019, EPA Map of Radon Zones By U.S. County, EPA 402/F19/004, June 2019.
- Flood Insurance Rate Map (FIRM), 2009, Federal Emergency Management Agency (FEMA), Map Number 06077C0169F, San Joaquin County, California and Incorporated Areas, Panels 169 of 950, dated October 16, 2009.
- GeoTracker, 2022, environmental cleanup sites and facilities, website: <u>https://geotracker.waterboards.ca.gov/map/</u>
- Jennings, C.W., and Bryant, W.A., 2010, Fault Activity Map of California: California Geological Survey, Geologic Data Map No. 6, scale 1:750,000.
- Miller, C. D., 1989, Potential Hazards from Future Volcanic Eruptions in California: U.S. Geological Survey Bulletin 1847, 17 p., 2 tables, 1 plate.
- Northern California Earthquake Data Center (NCEDC), 2022, Northern California Earthquake Catalog Search, website: <u>http://quake.geo.berkeley.edu/ncedc/catalog-search.html</u>

San Joaquin County, 2019, Flood and Dam Failure Hazard Annex, dated March 2019, 55 p.

Testing Engineers, Inc., 2020, Corrosive Soils: Causes, Effects and Mitigation by Hossein Arbabi, website: <u>http://www.testing-engineers.com/case1.html</u>.

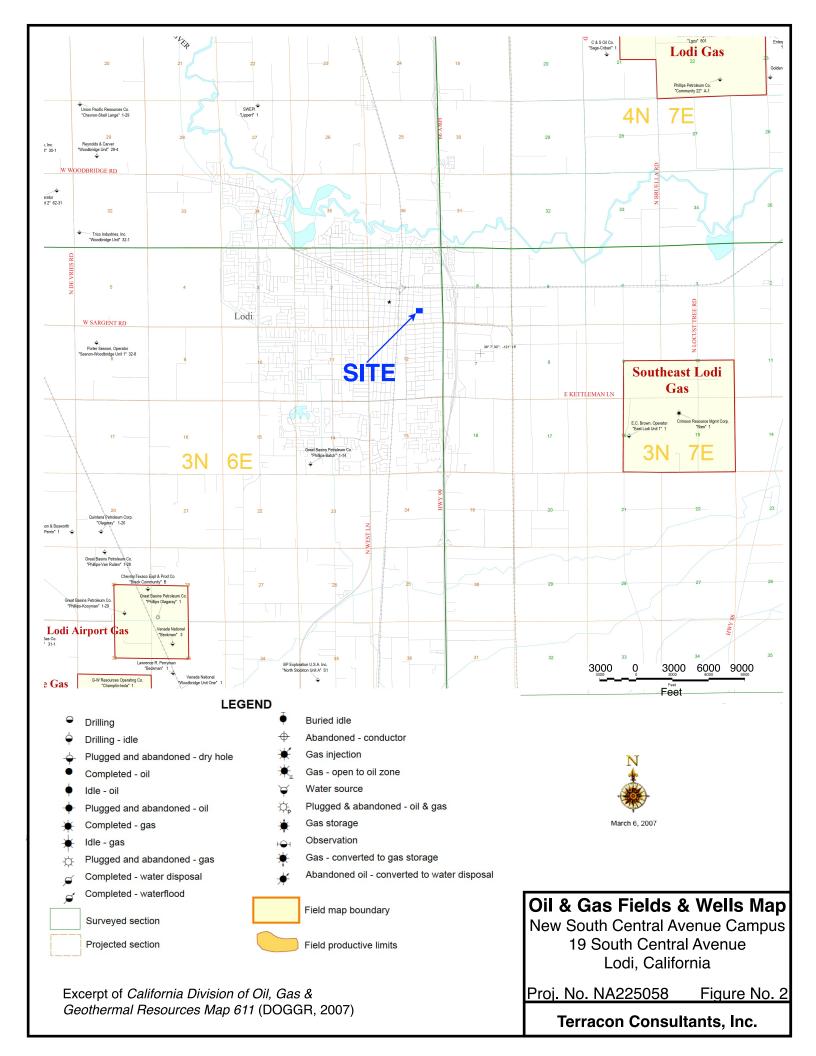
U.S. Geological Survey, 2018, Topographic Map of the Lodi North 7.5-Minute Quadrangle, California, scale 1:24,000.

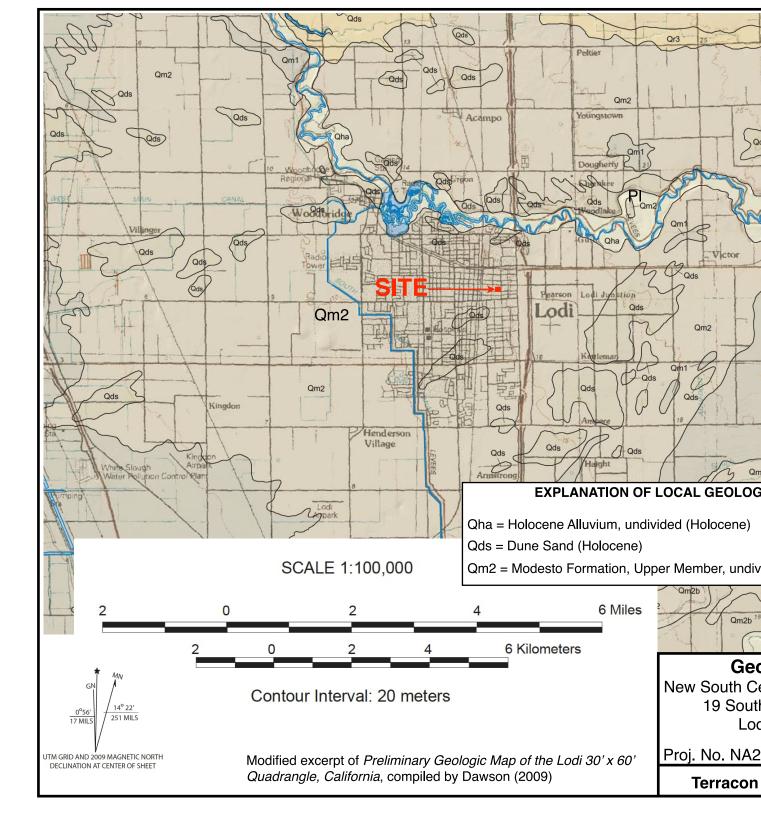


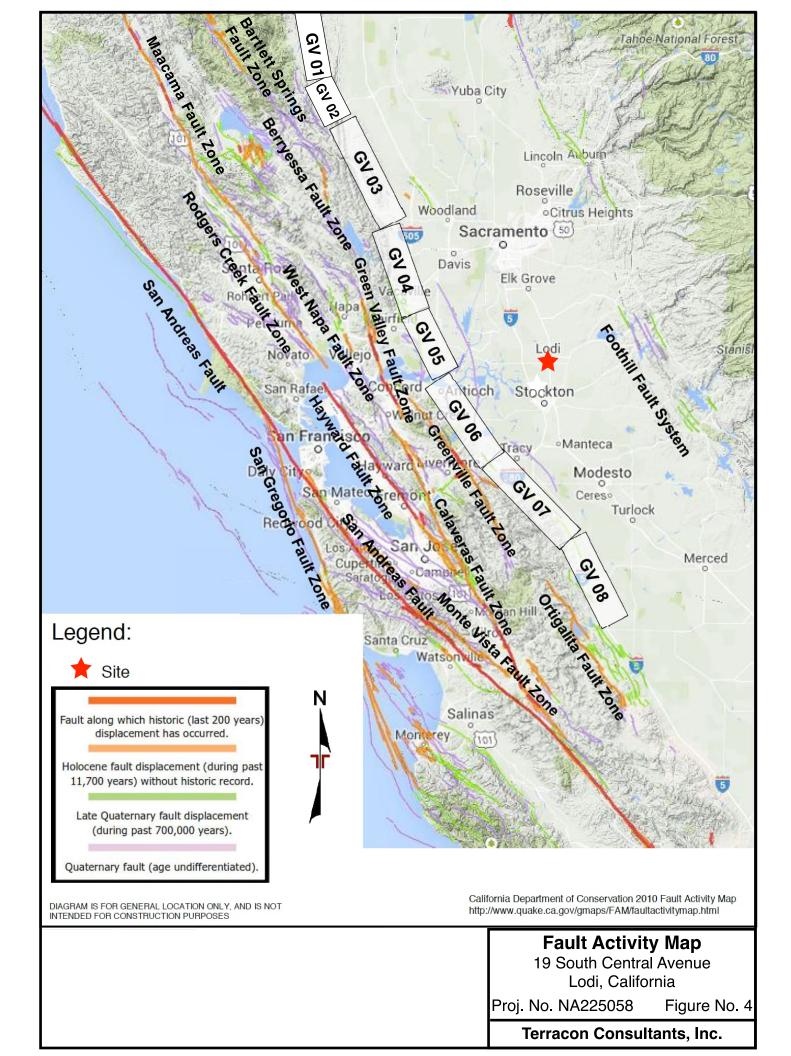
REFERENCES (continued)

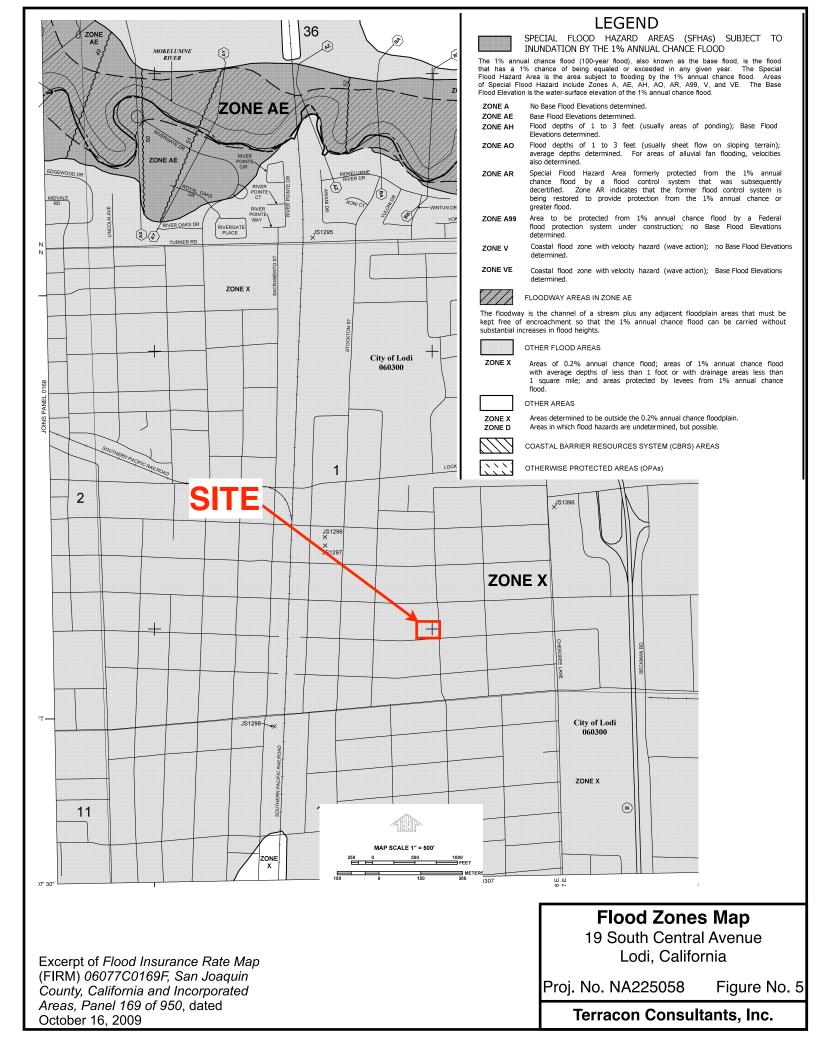
- U.S. Geological Survey, 2022a, Earthquake search website: https://earthquake.usgs.gov/earthquakes/search/.
- U.S. Geological Survey, 2022b, Earthquake hazard program website: <u>https://earthquake.usgs.gov/learn/topics/shakingsimulations/hayward/M7.2.php</u>.
- U.S. Geological Survey, 2022c, Unified Hazard Tool (USGS website: https://earthquake.usgs.gov/hazards/interactive/.
- U.S. Geological Survey, 2022d, Areas of Land Subsidence in California, website: https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html.
- Van Gosen, B.S., and Clinkenbeard, J.P., 2011, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California: U.S. Geological Survey Open-File Report 2011-1188, 22 p., 1 pl.
- Wakabayashi, J. and Smith, D.L., 1994, Evaluation of Recurrence Intervals, Characteristic Earthquakes, and Slip Rates Associated with Thrusting along the Coast Range-Central Valley Geomorphic Boundary, California: Bulletin of the Seismological Society of America, Vol. 84, No. 6, p. 1960-1970.
- Woodward-Clyde Consultants, 1978, Stanislaus Nuclear Project Site Suitability: Site Safety Report (Unsubmitted) for Pacific Gas and Electric Company; Foothills fault study, San Francisco California.









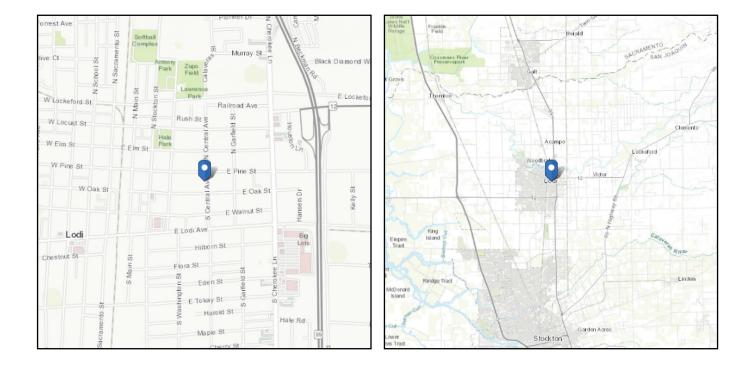




ASCE 7 Hazards Report

Standard:ASCE/SEI 7-16Risk Category:IVSoil Class:D - Stiff Soil

Elevation: 51.68 ft (NAVD 88) **Latitude:** 38.1334 **Longitude:** -121.2656





Site Soil Class:	D - Stiff Soil		
Results:			
S _S :	0.605	S _{D1} :	N/A
S ₁ :	0.254	T _L :	12
F _a :	1.316	PGA :	0.254
F _v :	N/A	PGA _M :	0.341
S _{MS} :	0.797	F _{PGA} :	1.346
S _{M1} :	N/A	l _e :	1.5
S _{DS} :	0.531	C _v :	1.103
Ground motion hazard analysis	may be required. See AS	SCE/SEI 7-16 Section	11.4.8.
Data Accessed:	Wed Aug 03 2022		
Date Source:	USGS Seismic Desig	<u>in Maps</u>	



The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Location

ASCE 7 Hazards Report

Standard: ASCE/SEI 7-16

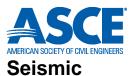
Risk Category: IV

Soil Class:

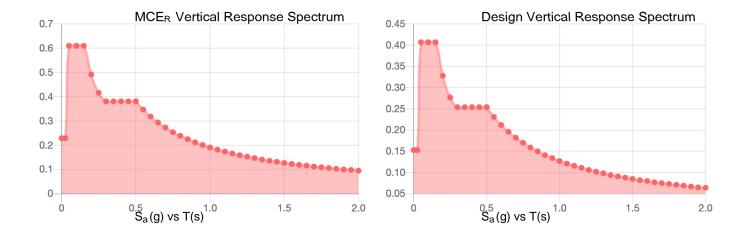
: IV L C - Very Dense L Soil and Soft Rock

Elevation: 51.68 ft (NAVD 88) Latitude: 38.1334 Longitude: -121.2656





Site Soil Class: Results:	C - Very Dense	Soil and Soft Rock		
Ss :	0.605	S _{D1} :	0.254	
S ₁ :	0.254	Τ _L :	12	
F _a :	1.258	PGA :	0.254	
F _v :	1.5	PGA M:	0.304	
S _{MS} :	0.762	F _{PGA} :	1.2	
S _{M1} :	0.382	l _e :	1.5	
S _{DS} :	0.508	C _v :	1.001	
Seismic Design Categor	y D			
0.8 MCE _R Re	esponse Spectrum	0.6	Design Response	Spectrum
0.7		0.5		
0.6		t		
0.5		0.4		
0.4		0.3		
0.3		0.2		
0.2				
0.1		0.1		



Data Accessed:

Wed Aug 03 2022

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.



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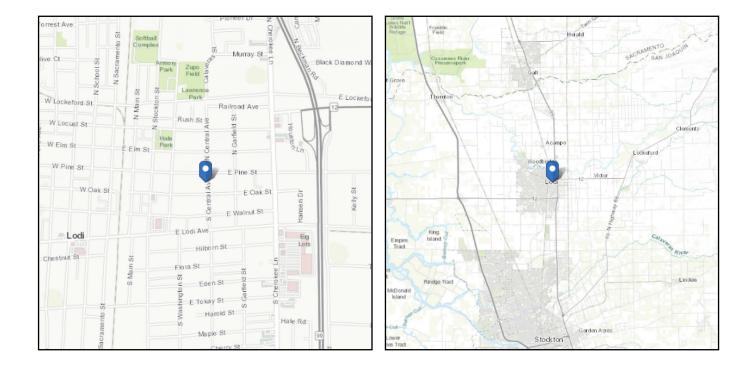
ASCE 7 Hazards Report

Standard:ASCE/SEI 7-16Risk Category:IVSoil Class:E - Soft Clay Soil

 Elevation:
 51.68 ft (NAVD 88)

 Latitude:
 38.1334

 Longitude:
 -121.2656





Site Soil Class:	E - Soft Clay	Soil	
Results:			
Ss :	0.605	S _{D1} :	N/A
S ₁ :	0.254	τ _L :	12
Fa:	1.531	PGA :	0.254
F _v :	N/A	PGA _M :	0.441
S _{MS} :	0.927	F _{PGA} :	1.739
S _{M1} :	N/A	l _e :	1.5
S _{DS} :	0.618	C _v :	1.103
Ground motion hazard a	analysis may be required.	See ASCE/SEI 7-16 S	ection 11.4.8.
Data Accessed:	Wed Aug 03 2	2022	
Date Source:	<u>USGS Seismi</u>	<u>c Design Maps</u>	



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U.S. Geological Survey - Earthquake Hazards Program

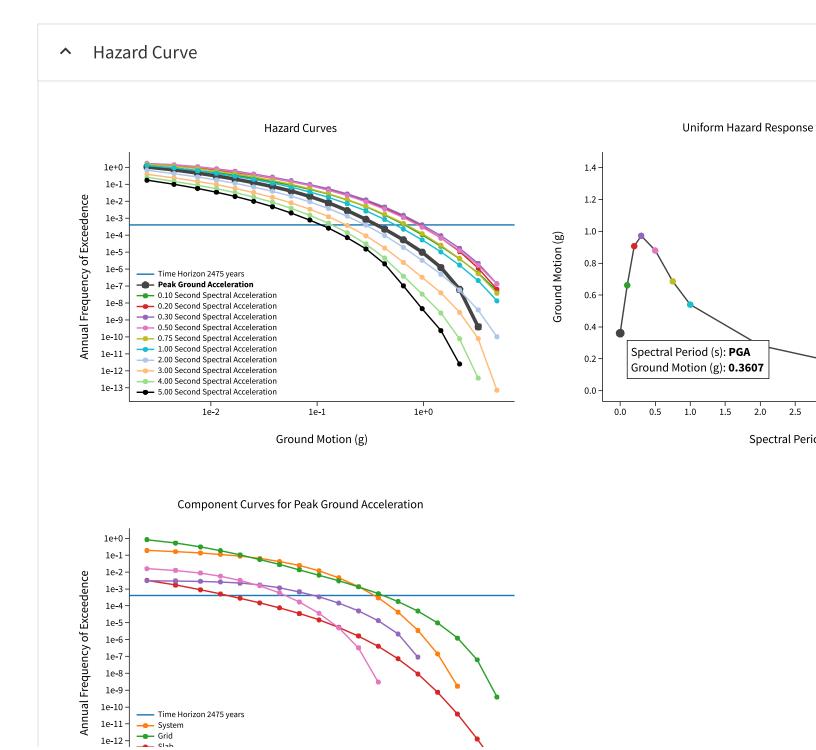
Unified Hazard Tool

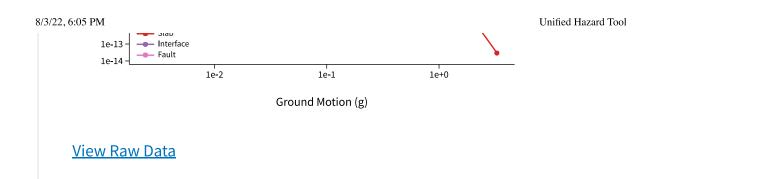
Please do not use this tool to obtain ground motion parameter values for the design code reference docun <u>U.S. Seismic Design Maps web tools</u> (e.g., the International Building Code and the ASCE 7 or 41 Standard). the two applications are not identical.

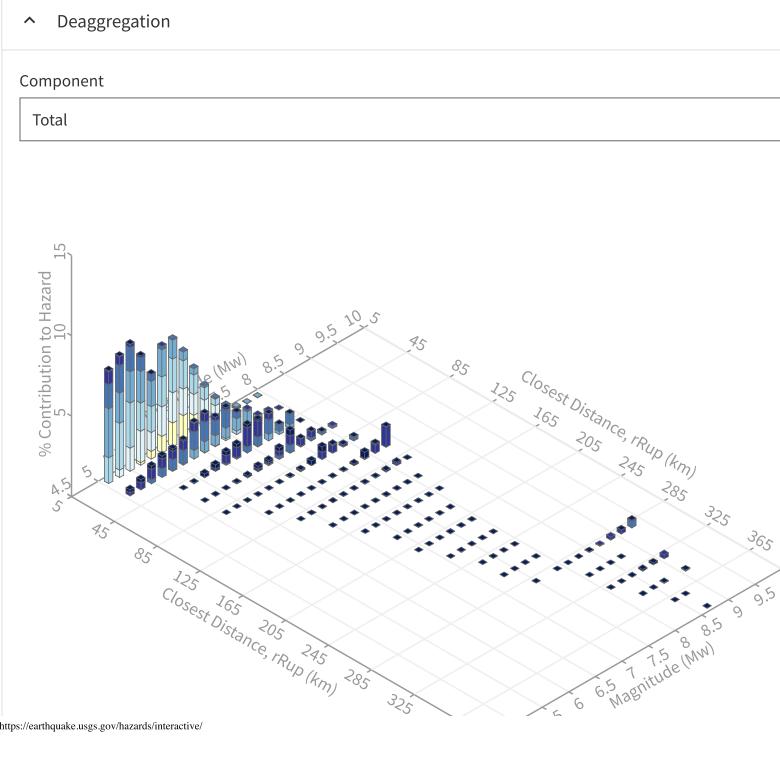
 Input 	
Edition Dynamic: Conterminous U.S. 2014 (update) (v4.2.0)	Spectral Period Peak Ground Acceleration
Latitude Decimal degrees	Time Horizon Return period in years
38.1334	2475
Longitude Decimal degrees, negative values for western longitudes -121.2656	
Site Class	
259 m/s (Site class D)	

8/3/22, 6:05 PM

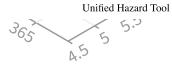
Unified Hazard Tool







8/3/22, 6:05 PM



ε3: [-1.5..-1.0) **ε4:** [-1.0..-0.5)

Summary statistics for, Deaggregation: Total

Deaggregation targets	Recovered targets
Return period: 2475 yrs	Return period: 2816.0212 yrs
Exceedance rate: 0.0004040404 yr ⁻¹	Exceedance rate: 0.00035511096 yr ⁻¹
PGA ground motion: 0.36068363 g	
Totals	Mean (over all sources)
Binned: 100 %	m: 6.31
Residual: 0 %	r: 29.5 km
Trace: 0.22 %	ε ₀ : 1.23 σ
Mode (largest m-r bin)	Mode (largest m-r- ϵ_0 bin)
m: 5.5	m: 5.09
r: 10.82 km	r: 8.44 km
ε,: 0.98 σ	ε ₀ : 1.2 σ
Contribution: 7.89 %	Contribution: 3.04 %
Discretization	Epsilon keys
r: min = 0.0, max = 1000.0, Δ = 20.0 km	ε0: [-∞2.5)
m: min = 4.4, max = 9.4, Δ = 0.2	ε1: [-2.52.0)
ε: min = -3.0, max = 3.0, Δ = 0.5 σ	ε2: [-2.01.5)

8/3/22, 6:05 PM

Unified Hazard Tool

ε5:	[-0.5 0.0)
ε6:	[0.0 0.5)
ε7:	[0.5 1.0)
ε8:	[1.0 1.5)
ε9:	[1.5 2.0)
ε10	: [2.0 2.5)
ε11	: [2.5+∞]

Deaggregation Contributors

Source Set 💪 Source	Туре	r	m	ε ₀	lon	
UC33brAvg_FM32 (opt)	Grid					
PointSourceFinite: -121.266, 38.174		6.68	5.70	0.40	121.266°W	
PointSourceFinite: -121.266, 38.174		6.68	5.70	0.40	121.266°W	
PointSourceFinite: -121.266, 38.192		7.92	5.75	0.55	121.266°W	
PointSourceFinite: -121.266, 38.192		7.92	5.75	0.55	121.266°W	
PointSourceFinite: -121.266, 38.201		8.59	5.78	0.63	121.266°W	
PointSourceFinite: -121.266, 38.201		8.59	5.78	0.63	121.266°W	
PointSourceFinite: -121.266, 38.273		14.39	6.02	1.13	121.266°W	
PointSourceFinite: -121.266, 38.273		14.39	6.02	1.13	121.266°W	
PointSourceFinite: -121.266, 38.246		12.14	5.93	0.96	121.266°W	
PointSourceFinite: -121.266, 38.246		12.14	5.93	0.96	121.266°W	
PointSourceFinite: -121.266, 38.219		9.97	5.84	0.77	121.266°W	
PointSourceFinite: -121.266, 38.219		9.97	5.84	0.77	121.266°W	
PointSourceFinite: -121.266, 38.300		16.69	6.11	1.27	121.266°W	
PointSourceFinite: -121.266, 38.300		16.69	6.11	1.27	121.266°W	
UC33brAvg_FM31 (opt)	Grid					
PointSourceFinite: -121.266, 38.174		6.68	5.70	0.39	121.266°W	
PointSourceFinite: -121.266, 38.174		6.68	5.70	0.39	121.266°W	
PointSourceFinite: -121.266, 38.192		7.92	5.75	0.55	121.266°W	
PointSourceFinite: -121.266, 38.192		7.92	5.75	0.55	121.266°W	
PointSourceFinite: -121.266, 38.201		8.58	5.78	0.63	121.266°W	
PointSourceFinite: -121.266, 38.201		8.58	5.78	0.63	121.266°W	
PointSourceFinite: -121.266, 38.273		14.39	6.02	1.13	121.266°W	
PointSourceFinite: -121.266, 38.273		14.39	6.02	1.13	121.266°W	
PointSourceFinite: -121.266, 38.246		12.14	5.93	0.96	121.266°W	
PointSourceFinite: -121.266, 38.246		12.14	5.93	0.96	121.266°W	
PointSourceFinite: -121.266, 38.219		9.96	5.84	0.77	121.266°W	
PointSourceFinite: -121.266, 38.219		9.96	5.84	0.77	121.266°W	
PointSourceFinite: -121.266, 38.300		16.69	6.11	1.27	121.266°W	
PointSourceFinite: -121.266, 38.300		16.69	6.11	1.27	121.266°W	
UC33brAvg_FM32	System					
Greenville (No) [5]		57.71	7.19	2.08	121.797°W	

Unified Hazard Tool

Source Set 🕒 Source	Туре	r	m	ε ₀	lon	lat
San Andreas (Peninsula) [8]		117.75	8.16	2.33	122.393°W	37.
Great Valley 06 Midland alt2 [0]		36.47	7.14	1.52	121.680°W	38.
JC33brAvg_FM31	System					
Great Valley 06 (Midland) alt1 [4]		34.14	6.98	1.64	121.649°W	38.
Mount Diablo Thrust South [0]		52.54	7.11	2.06	121.778°W	37.
Mount Diablo Thrust North CFM [0]		56.02	7.31	1.96	121.896°W	37.
San Andreas (Peninsula) [8]		117.75	8.17	2.33	122.393°W	37.

incompli

BMP Inspection Report

General Site Information										
Date of Inspection	06-15-2023			-	Time of Ir	spection	11:01	L AM		
Project Name	Lodi Demo Forr	ner Serna	Charter School	F	Project Le	evel / Type	Risk I	Level 2		
Approximate area of site exposed					WD	ID #	55390	C400546		
Stage of Construction	Other: Comple	ted								
Inspection Type	Weekly Quarterly V			uring St	orm	Post Storm	Contai	ined Stormwater Release		
Were photos taken?	Were photos taken? Yes Is there any reason a visual inspection cannot be performed at this time? No									
Inspector Name	Spencer Chen									
		14		Date Signed			06-15-2023			
Signature	Serre (er-		Time Signed			11:12 AM			
			Site Weather Infor	mation	I					
Current Conditions	Chance of Rain	Today	Chance of Rain Tom	nce of Rain Tomorrow Chance of Rain in 2 Da			ays Chance of Rain in 3 Day			
Sunny	1%		None predicted	l	Ν	one predicted		None predicted		
Last Storm			Current Storm	U			Upcoi	pcoming Storm		
Start and End Date and Time: N	I/A - N/A	Start Date	e and Time: N/A			Start Date and T	ime: I	None predicted		
Days Since Last Storm:	Storm Duration: No							e predicted		
Amount of Precipitation: N/A		Total Rair	Int of F	of Rainfall: None predicted						
			Deficiencies	;						
Deficiency / Corrective Action Date Identified										

General Comments

Demolition activities have been completed.

Site has finished grading.

Site is closed upon inspection.

Will be transferred back to school district.

Compliance Checklist	Yes	No	N/A
General			
Is the project SWPPP and BMP plan up to date, available on-site, and being properly implemented?			
Good Housekeeping for Construction Materials			
Are all stockpiled materials covered and bermed if not being actively used?			\boxtimes
Are all construction materials properly stored and inventoried?			\boxtimes
Material storage yard is clean and organized with materials stored appropriately?			\boxtimes
Good Housekeeping for Waste Management			
Are portable toilets and rinse stations cited properly and equipped with secondary containment?	\boxtimes		
Are trash bins and waste disposal containers covered at the end of each day or prior to rain? Comments: None available			\boxtimes
Are washout areas (e.g. concrete) contained and installed appropriately with adequate freeboard?			\boxtimes
Are all waste bins, portable toilets, or washouts free of any leaks, spills or washout on the ground?	\boxtimes		
Are nearby storm drains, ditches, or off-site conveyances free of spills, leaks, or wash water?	\boxtimes		
Good Housekeeping for Vehicle Storage and Maintenance			
Are all construction vehicles stored, fueled, and washed properly, according to permit requirements?			\boxtimes
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters?			\boxtimes
Non-Stormwater Management			
Are non-stormwater discharges properly controlled and monitored?			\boxtimes
Erosion Control			
Are wind erosion controls effectively implemented?			\boxtimes
Are all inactive areas of soil disturbance properly protected with erosion controls?			\boxtimes
Are erosion control BMPs in place for active areas?			\boxtimes
Erosion control BMPs are installed properly and not in need of maintenance?			\boxtimes
Sediment Control			
Are appropriate perimeter controls established and effective in controlling erosion and sediment discharges from the site? Comments: Wattles in place	\boxtimes		
Are all entrances and exits stabilized and effective in controlling sediment discharges from the site?			\boxtimes
If sediment basins are installed on site, are they designed appropriately and properly maintained?			\boxtimes
Storm drain inlets and conveyances are protected with sediment controls with no maintenance needed? Comments: We recommend storm drain protection near construction areas.			
Linear sediment control along toe of slope, face of slope at grade breaks (risk 2 or 3)?			\boxtimes
Run-On and Run-Off Controls			
Is run-on to the site effectively managed and directed away from all disturbed areas?			\boxtimes
Dewatering activities in progress and compliant with discharge parameters?			X

Comments: Perimeter control looks good



Comments: Site is complete



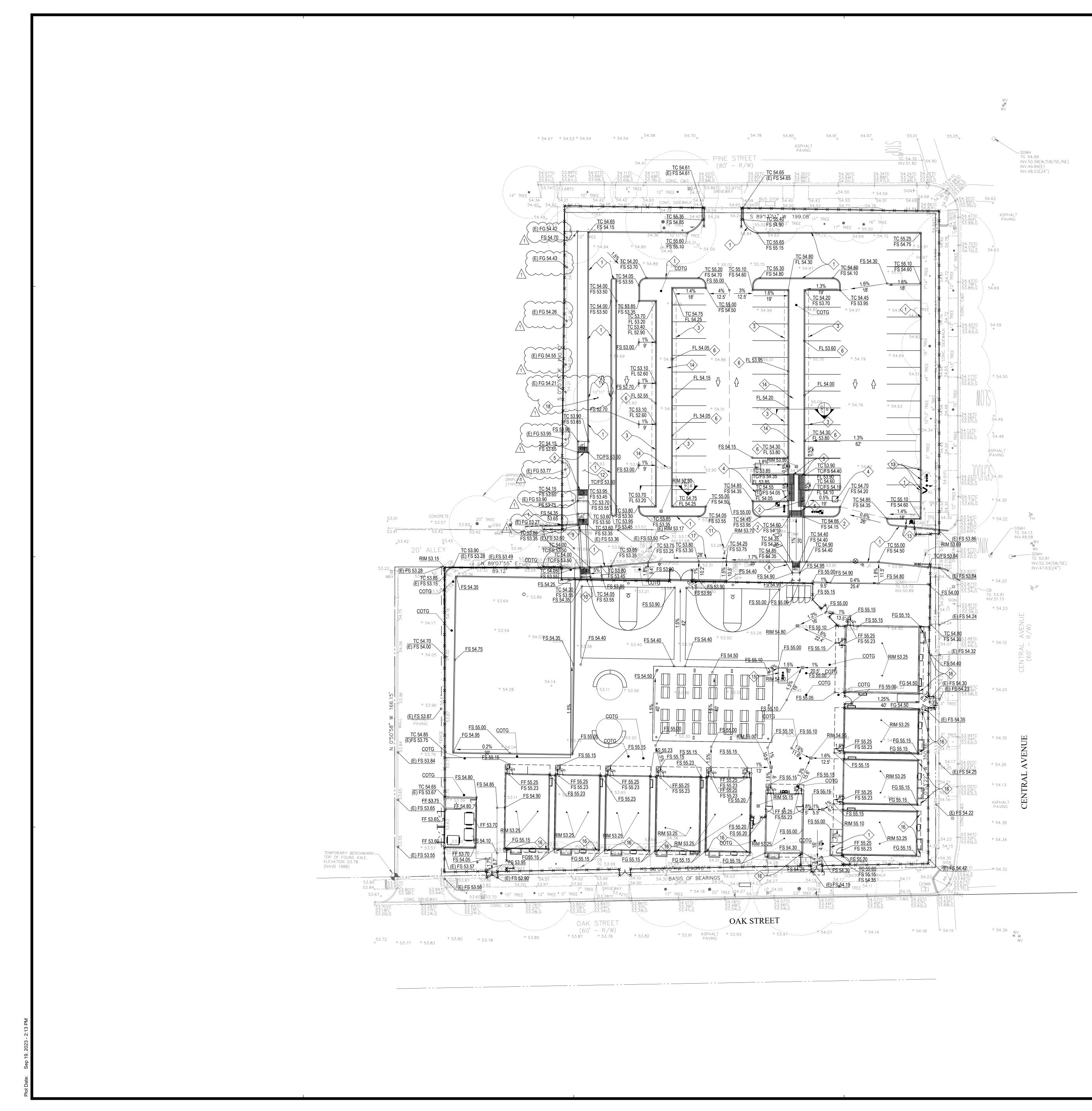
Comments: No activity on site.



NOAA Weather Forecast Table for 95240

Data For: 06/15/2023

									Forec	ast Cre	eated a	t: Jun 1	5, 2023	3 11:03	am PD	Т											
	Thu Jun 15 Fri Jun 16 Sat Jun 17 Sun Jun 18 Mon Jun 19 Tue Jun 20 Wed Jun 21 3 AM 9 AM 3 PM 9 AM 3 PM 9 PM 3 AM 9 PM 3 AM 9 AM 3 PM 9 PM 3 AM 9 PM 3 AM 9 PM 3 AM 9 AM 3 PM 9 PM																										
	3 AM	9 AM 3 P	M 9 PM	3 AM	9 AM	3 PM	9 PM	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M
Temp (high)		89°			8	9°		90°			90°			81°			77°				8	1°			8	6°	
Temp (low)		56°			5	6°			5	8°			5	1°			50)°			5	1°					
Chance of Precip	0%	0%	1%	1%	0	%	0%	0%	0	%	0%	0%	0	%	0%	0%	10	%	0%	0%	0	%	0%	0%	0	%	0%
Precip Amount		0.00" 0.0	0.00'	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"																	
Snow Amount		0.00" 0.0	0.00'	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"																	
		Thu Jun 1				un 16				un 17				Jun 18			Mon J					un 20				Jun 21	
	3 AM	9 AM 3 P	M 9 PM	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M	3 AM	9 AM	3 PM	9 P M
Temperature		89°	56°	56°	8	9°	56°	56°	9	0°	58°	58°	8	1°	51°	51°	71	7°	50°	50°	8	1°	51°	51°	8	6°	
Dewpoint		59	° 59°	52°	53°	54°	57°	52°	53°	57°	57°	53°	50°	51°	50°	46°	44°	45°	45°	45°	43°	44°	39°	45°	44°	47°	
Humidity		40	% 52%	75%	72%	34%	47%	74%	73%	37%	34%	63%	74%	48%	35%	62%	77%	45%	33%	62%	77%	41%	23%	54%	74%	41%	
Wind Speed (kn.)		9	13	7	5	9	12	4	5	9	12	7	6	10	13	9	6	10	12	8	4	9	11	7	4	9	
Wind Direction		29)° 280°	320°	290°	290°	270°	340°	310°	250°	270°	250°	230°	240°	250°	230°	220°	250°	270°	250°	290°	300°	300°	270°	300°	290°	



GRA	DING LEGEND
X	X.XX GRADE ELEVATION
X	SLOPE AND DIRECTION
GRA	DING KEYNOTES
$\langle 1 \rangle$	INSTALL NEW 6" CURB, SEE DETAIL 2/C6.0
2	INSTALL NEW FLUSH CURB, SEE DETAIL 1/C6.0
3	INSTALL CURB AND GUTTER, SEE DETAILS 3 AND 4/C6.0
4	INSTALL ADA PARKING STALL, SEE ARCHITECTURAL PLAN FOR DETAILS
5	INSTALL TRUNCATED DOMES, SEE DETAIL 11/C6.0
6	INSTALL CURB OPENING, SEE DETAIL 14/C6.0
$\langle \gamma \rangle$	ACCESSIBLE LOADING ZONE, SEE DETAIL 13/C6.0
8	ACCESSIBLE RAMP, SEE DETAIL 16/C6.0
9	ACCESSIBLE RAMP, SEE DETAIL 6/C6.1
(10)	ACCESSIBLE RAMP, SEE DETAIL 8/C6.1
$\langle 11 \rangle$	ADJUST EXISTING CATCH BASIN RIM TO GRADE
(12)	ACCESSIBLE RAMP, SEE DETAIL 11/C6.1
13	INSTALL BOLLARD, SEE DETAIL 10/C6.1
14	BIORETENTION AREA, SEE DETAIL 16/C6.1
15	NEW DRINKING FOUNTAIN, SEE ARCHITECTURAL PLAN FOR DETAILS
(16)	INSTALL SPLASH BLOCKS AT DOWNSPOUTS, SEE DETAIL 16/C6.1
17	INSTALL NEW ROLLED CURB, SEE DETAIL 11/C6.1
	TREE TO BE REMOVED

~~~~~/1

#### BASIS OF BEARINGS:

THE BEARING OF SOUTH 88°06'50" WEST, TAKEN ON THE NORTHERLY RIGHT-OF-WAY LINE OF OAK STREET, AS SHOWN ON THAT CERTAIN RECORD OF SURVEY FILED SEPTEMBER 18, 2002 IN BOOK 35 OF SURVEYS AT PAGE 45, OFFICIAL RECORDS OF SAN JOAQUIN COUNTY WAS USED AS THE BASIS OF BEARINGS FOR THIS SURVEY.

#### FLOOD ZONE NOTE:

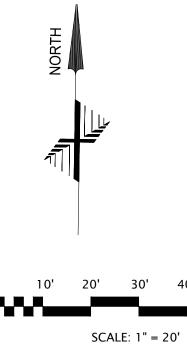
THE SUBJECT PROPERTY LIES ENTIRELY WITHIN FLOOD ZONE "X", SHADED, BASED ON FLOOD INSURANCE RATE MAP 06077C0169F, DATED OCTOBER 16, 2009.

#### **BENCHMARK:**

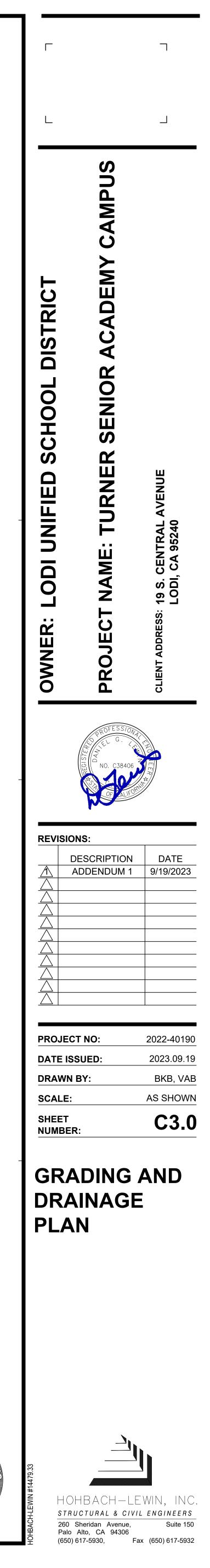
THE DATUM USED FOR THIS SURVEY IS NAVD 1988 DERIVED BY THE USE OF RTK GPS.

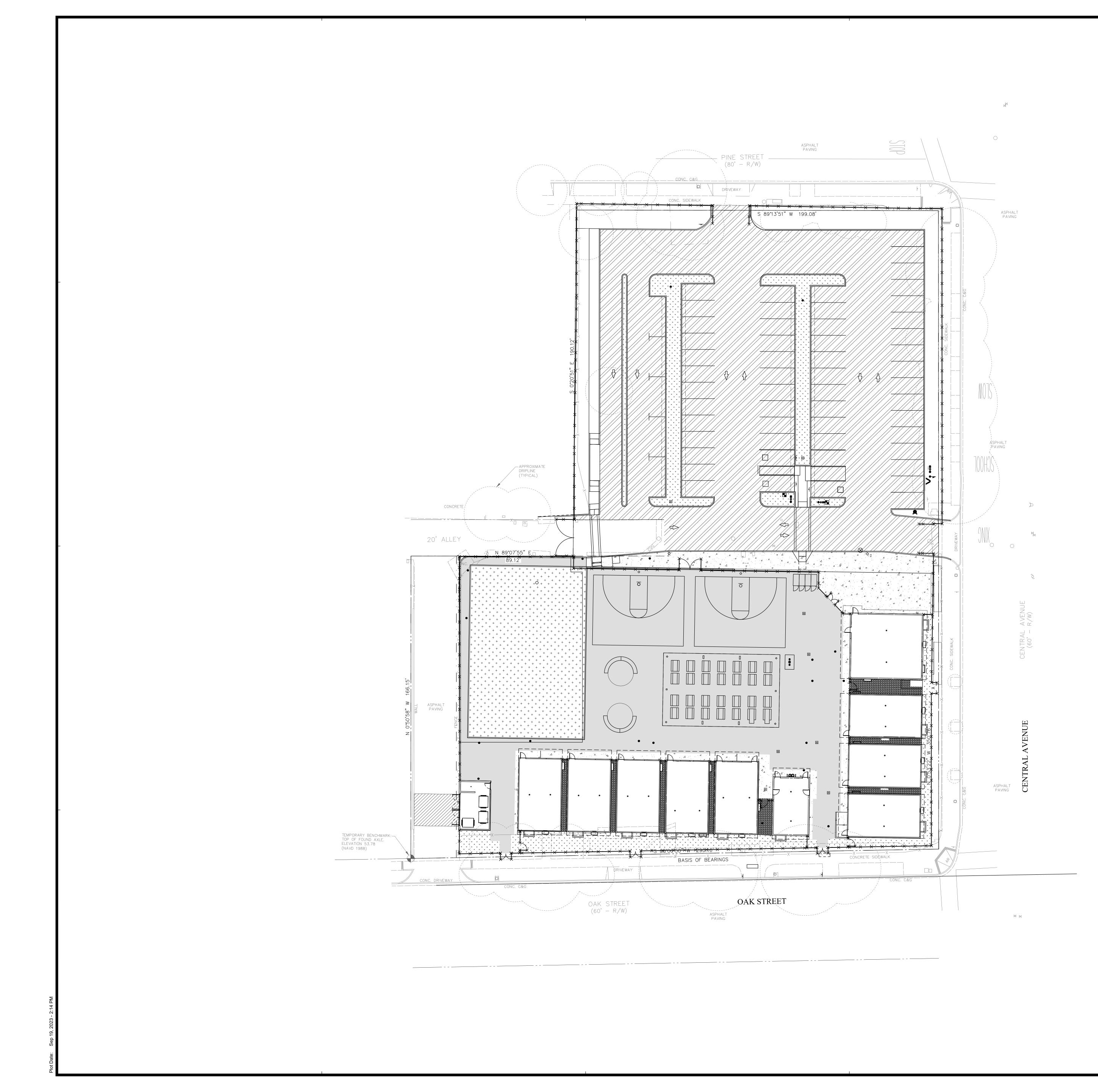
#### DISCLAIMER

HOHBACH-LEWIN WILL NOT BE GIVING ANYMORE CONTROL INFORMATION THAN WHAT IS SHOWN ON THE PLANS. IT'S THE CONTRACTOR'S RESPONSIBILITY TO CHECK INTO THE BASIS OF BEARING AND BENCHMARK USED FOR THE TOPOGRAPHIC SURVEY. HOHBACH-LEWIN WILL NOT BE GIVING ANY CONTROL POINTS FOR STAKING.



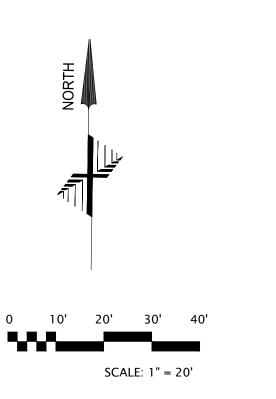




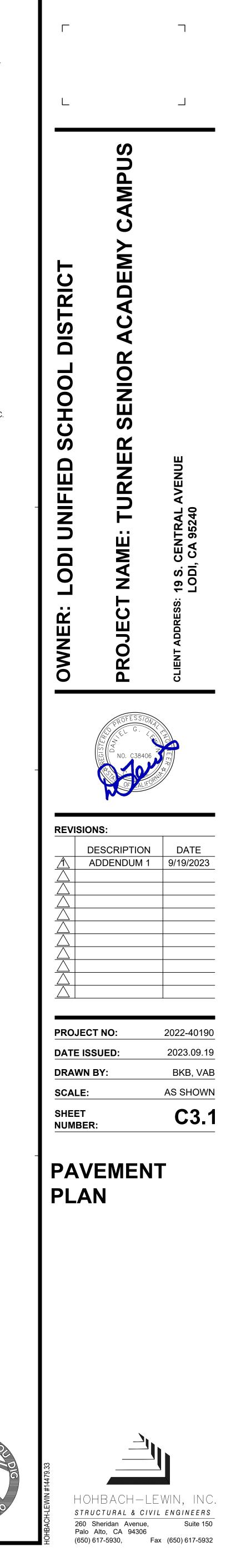


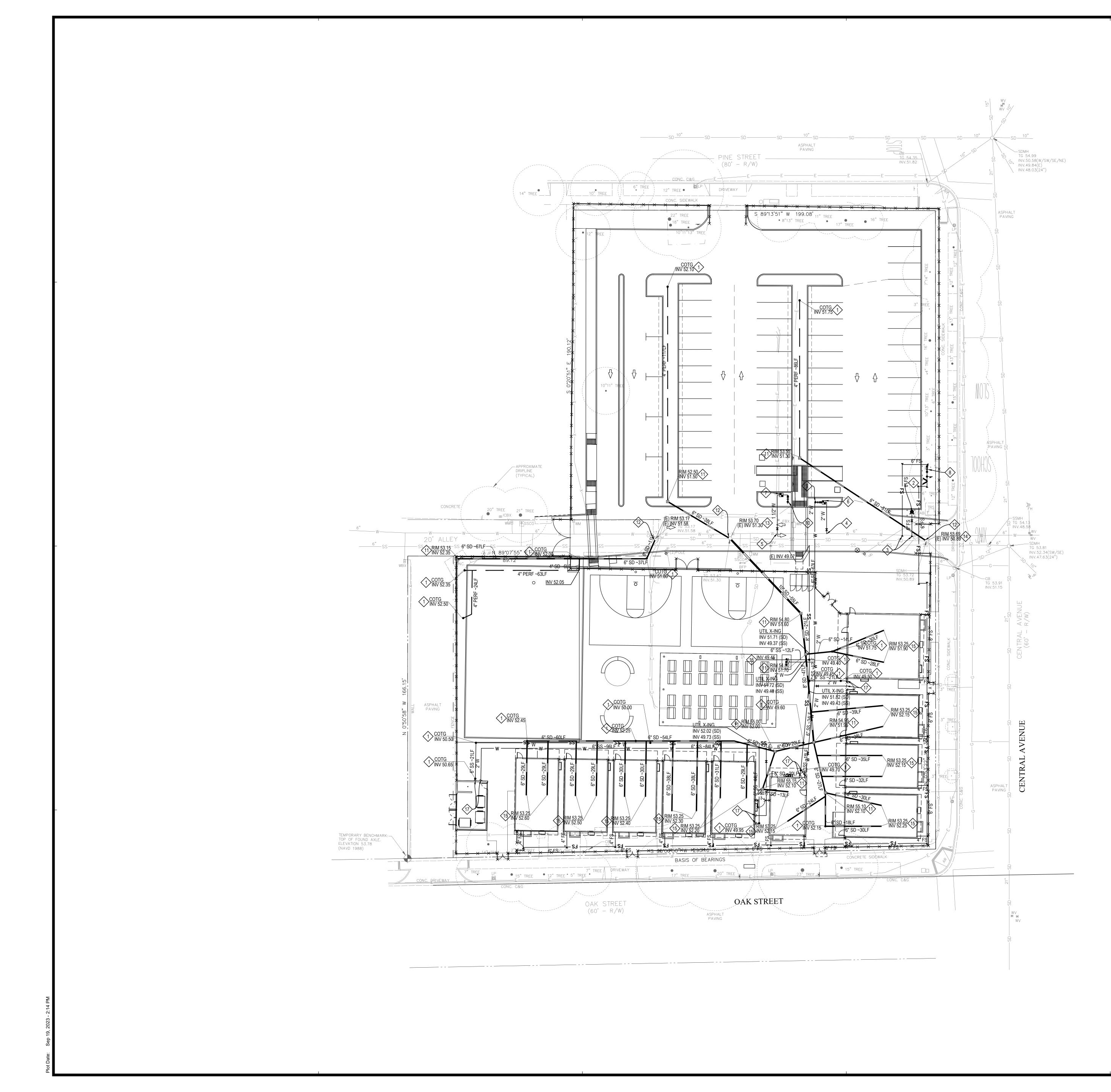
#### PAVEMENT LEGEND

| PAVEMENT S                  | SECTION TO BE APPROVED BY G   | EOTECHNICAL ENGINEER.                                                                                                          |
|-----------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                             | ONCRETE PAVING IN VEHICULAR   | 28-DAY COMPRESSIVE STRENGTH OF AT LEAST<br>TRAVEL AREA TO MEET ADTT (AVERAGE DAILY                                             |
| 4<br>7<br>8                 | SIDEWALK CONCRETE             | 5" CONCRETE W/ #4 @ 12" O.C. E.W. OVER 4"<br>CLASS 2 BASEROCK COMPACTED TO 95% R.C.<br>OVER NATIVE SOILS COMPACTED TO 90% R.C. |
|                             | AC PAVEMENT                   | 3" AC PAVEMENT OVER 4" CLASS 2 BASEROCK<br>COMPACTED TO 95% R.C. OVER 90% R.C.<br>COMPACTED NATIVE SOILS                       |
|                             | VEHICULAR AC                  | 4" AC PAVEMENT OVER 7" CLASS 2 BASEROCK<br>COMPACTED TO 95% R.C. OVER 90% R.C.<br>COMPACTED NATIVE SOILS                       |
|                             | VEHICULAR CONCRETE            | 6" CONCRETE W/ #4 @ 12" O.C. E.W. OVER 4"<br>CLASS 2 BASEROCK COMPACTED TO 95% R.C.<br>OVER NATIVE SOILS COMPACTED TO 90% R.C. |
| * * * *<br>* * *<br>* * * * | LANDSCAPE AREA                |                                                                                                                                |
| + + +                       | ARTIFICIAL TURF, SEE LANDS    | CAPE PLANS                                                                                                                     |
|                             | CLASS 2 BASE ROCK<br>PATHWAYS | 6" CLASS 2 BASE ROCK COMPACTED TO 95% R.C.<br>OVER NATIVE SOILS COMPACTED TO 90% R.C.                                          |



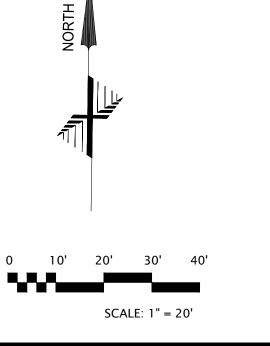




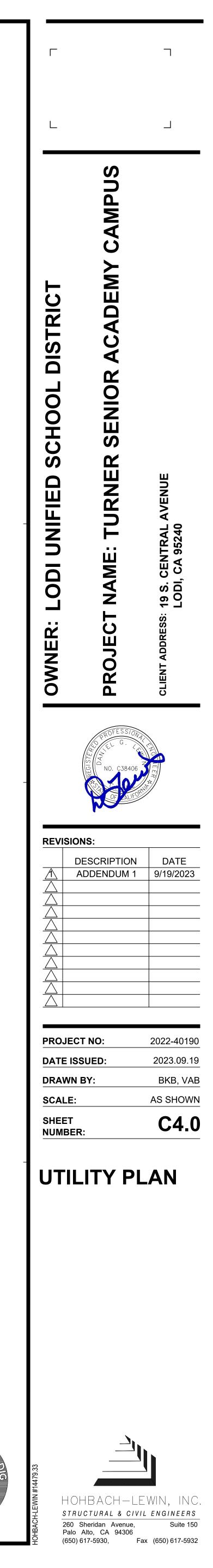


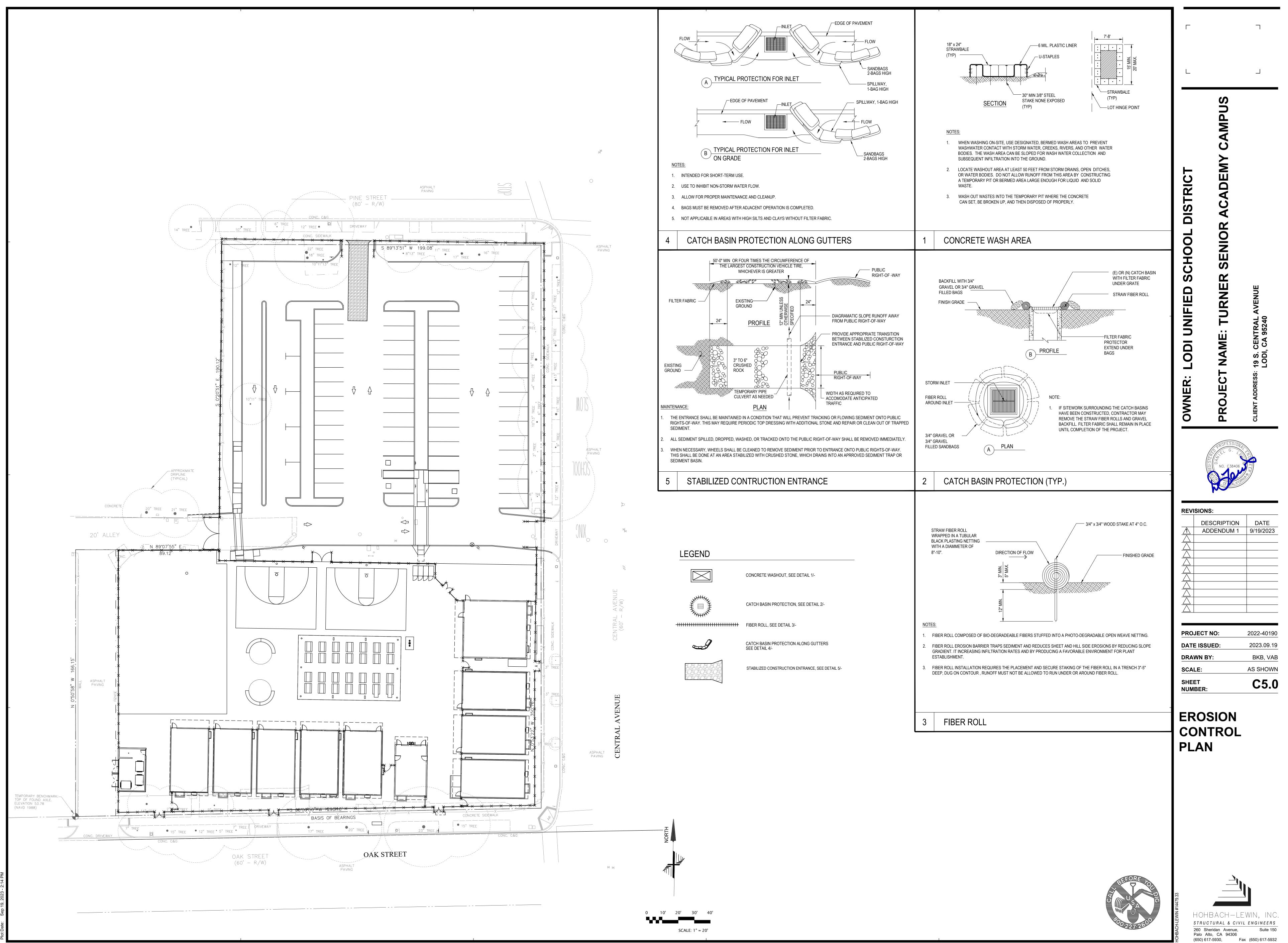
| UTIL                           | ITY LEGEND                                                                         |
|--------------------------------|------------------------------------------------------------------------------------|
| ¥                              | FIRE HYDRANT                                                                       |
| M                              | WATER VALVE                                                                        |
|                                | WATER METER                                                                        |
| $(\bigcirc)$                   | STORM DRAIN MANHOLE                                                                |
|                                | BACKFLOW PREVENTER                                                                 |
| 0                              | CATCH BASIN                                                                        |
|                                | AREA DRAIN                                                                         |
| •                              | CLEANOUT TO GRADE                                                                  |
| Λ                              | FIRE DEPARTMENT CONNECTION                                                         |
|                                | THRUST BLOCKS                                                                      |
| -                              | POST INDICATOR VALVE                                                               |
| UTIL                           | ITY KEYNOTES                                                                       |
| $\langle 1 \rangle$            | CLEANOUT TO GRADE, SEE DETAIL 5/C6.0                                               |
| 2>                             | FIRE HYDRANT, PER CITY STANDARDS, SEE STD 401/C6.2                                 |
| 3>                             | NEW 6" FIRE SERVICE CONNECTION PER CITY<br>STANDARDS, SEE STD 407/C6.2             |
| 4                              | NEW 2" WATER CONNECTION PER CITY STANDARDS,<br>SEE STD 412/C6.2                    |
| 5                              | NEW 1 1/2" WATER CONNECTION PER CITY<br>STANDARDS, SEE STD 412/C6.2                |
| 6                              | 2" WATER METER PER CITY STANDARDS                                                  |
| $\langle \overline{1} \rangle$ | 1 1/2" WATER METER PER CITY STANDARDS                                              |
| 8                              | 6" FEBCO LF850 DOUBLE DETECTOR CHECK VALVE<br>PER CITY STANDARDS, SEE STD 411/C6.2 |
| 9                              | 2" BACKFLOW DEVICE PER CITY STDS                                                   |
| (10)                           | 1 1/2" IRRIGATION BACKFLOW DEVICE, PER CITY<br>STANDARDS                           |
|                                | NEW 12X12 CATCH BASIN, SEE DETAIL 1/C6.1                                           |
| (12)                           | CONNECT TO EXISTING DRAIN INLET                                                    |
| 13                             | EXISTING DRAIN INLET, RIM TO BE ADJUSTED TO GRADE                                  |
| (14)                           | EXISTING MANHOLE, RIM TO BE ADJUSTED TO GRADE                                      |
| (15)                           | NEW AREA DRAIN, SEE DETAIL 9/C6.1                                                  |
| (16)                           | CONNECT UTILITY TO DRINKING FOUNTAIN, SEE                                          |

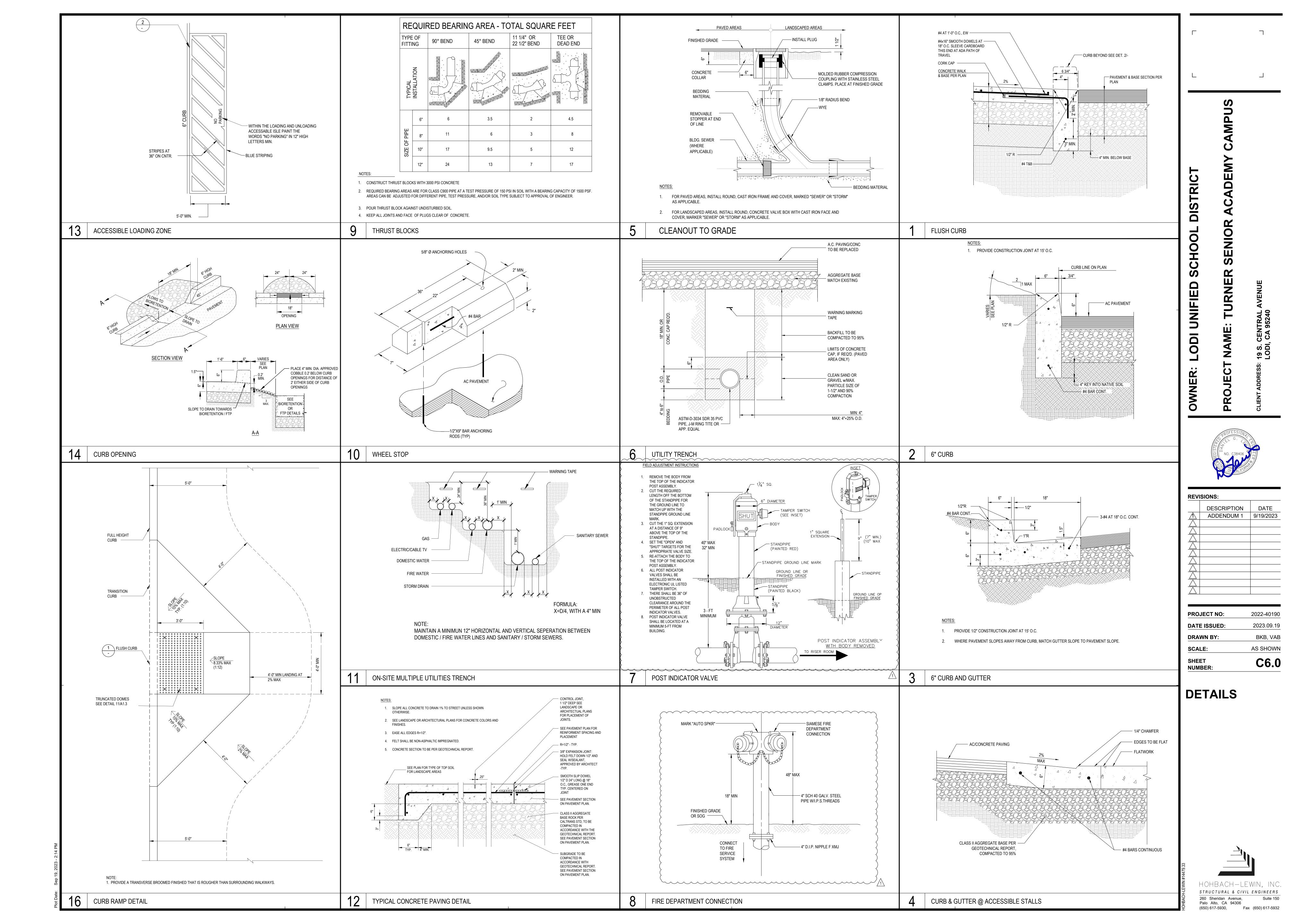
- ARCHITECTURAL PLANS FOR DETAILS SEE PLUMING PLANS FOR CONTINUATION OF UTILITY
- UTILITY NOTES
- 1. CONTRACTOR SHALL VERIFY (POTHOLE IF NECESSARY) SIZE, MATERIAL, LOCATION AND DEPTH OF ALL SYSTEMS THAT ARE TO BE CONNECTED TO OR CROSSED PRIOR TO THE TRENCHING OR INSTALLATION OF PROPOSED UTILITIES, AND INFORM ENGINEER OF ANY CONFLICTS BEFORE PROCEEDING WITH WORK.
- 2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES, INVERTS AND LOCATIONS PRIOR TO BEGINNING ANY WORK ON THIS SITE.

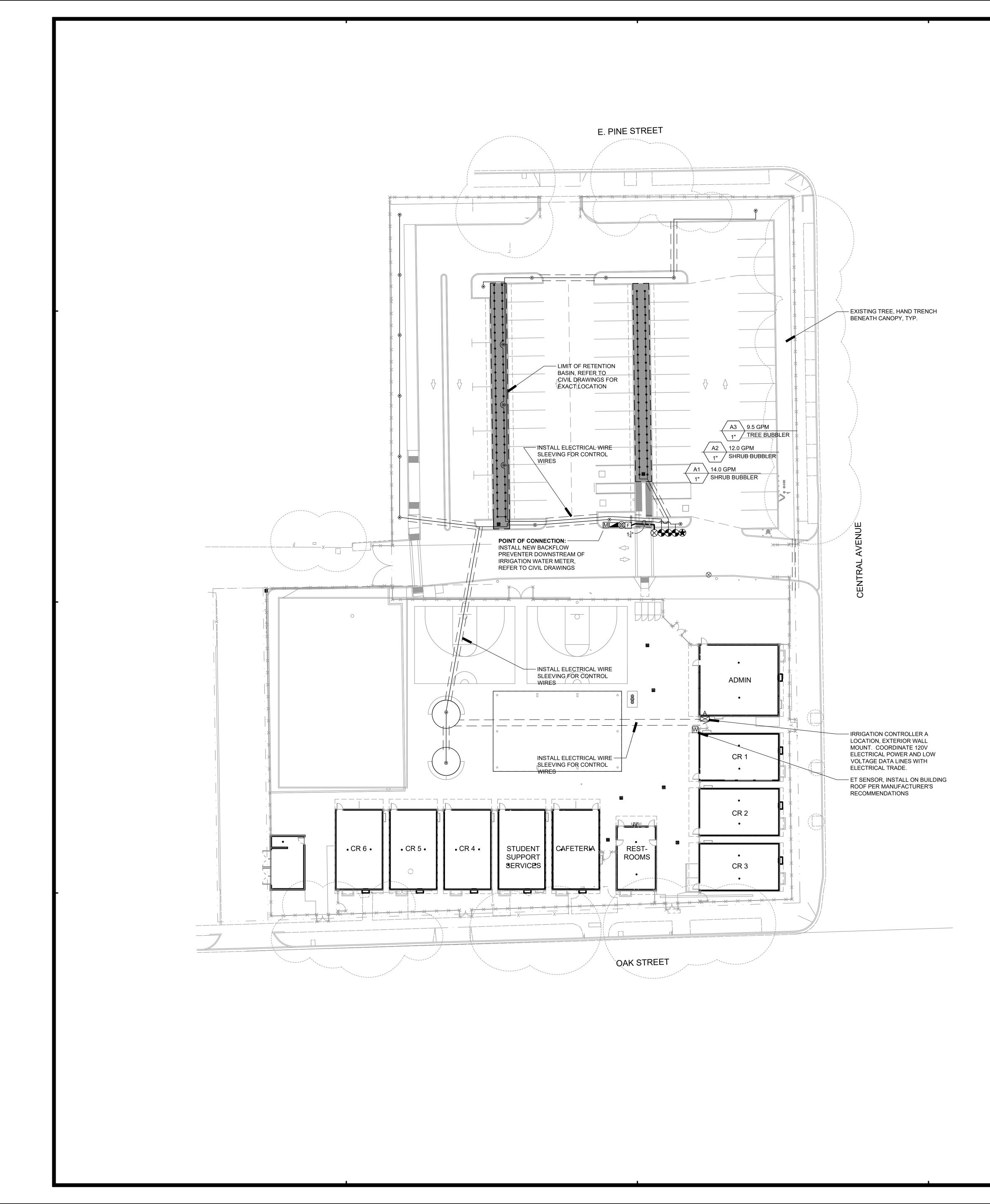












#### IRRIGATION NOTES

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

#### Ulis**m** (

ALISSA J. NOGUEZ, CALIFORNIA LANDSCAPE ARCHITECT #3676

- THESE NOTES ARE FOR GENERAL REFERENCE IN CONJUNCTION WITH AND AS A SUPPLEMENT TO THE WRITTEN SPECIFICATIONS, DETAILS, ADDENDA AND CHANGE ORDERS ASSOCIATED WITH THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL BECOME FAMILIAR WITH THE LOCATION OF EXISTING AND PROPOSED UNDERGROUND SERVICES. CONTACT UNDERGROUND SERVICE ALERT (USA) AT (800) 642-2444 PRIOR TO BEGINNING WORK. CONTACT OWNER'S REPRESENTATIVE SHOULD ANY CONFLICTS ARISE.
- 4. THE IRRIGATION SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODES AND REGULATIONS. CONTRACTOR TO CONFORM TO THE REQUIREMENTS OF NFPA 24, SECTION 8.1, MINIMUM 'DEPTH-OF-COVER' (36 INCHES) FOR PIPE TO INCLUDE FIRE LANE ROUTES OF ACCESS.
- 5. THIS SYSTEM IS DESIGNED TO OPERATE AT 60 PSI AND 14.0 GPM FROM THE POINT OF CONNECTION. CONTRACTOR SHALL VERIFY PRESSURE AND FLOW PRIOR TO BEGINNING OF WORK. CONTACT OWNER'S REPRESENTATIVE IMMEDIATELY SHOULD CONFLICTS ARISE. 6. THE IRRIGATION SYSTEM DESIGN IS DIAGRAMMATIC. WHERE PIPING, VALVES, ETC. ARE SHOWN OUTSIDE OF PLANTING AREAS, THE
- INTENT IS FOR PIPING, VALVES, ETC. TO BE INSTALLED WITHIN PLANTING AREAS UNLESS OTHERWISE NOTED AND DETAILED. 7. CONTRACTOR SHALL COORDINATE IRRIGATION INSTALLATION WITH OTHER TRADES. CONTRACTOR TO COORDINATE AND VERIFY ALL
- SLEEVING, PIPING, ELECTRICAL SUPPLY, POINT OF CONNECTION, ETC. 8. CONTRACTOR IS RESPONSIBLE FOR COMPLETE AND UNIFORM COVERAGE OF PLANTING AND TURF AREAS. CONTRACTOR TO THROTTLE THE FLOW CONTROL AT EACH VALVE TO OBTAIN OPTIMUM OPERATING PRESSURE FOR EACH CIRCUIT. ADJUST SPRAY HEADS AND NOZZLES FOR OPTIMUM COVERAGE WHILE PREVENTING OVERSPRAY ONTO WALKWAYS AND STRUCTURES. ADDITIONALLY, CONTRACTOR SHALL ADJUST ALL VALVES, NOZZLES, AND HEADS FOR OPTIMUM COVERAGE, AVOIDING MISTING, OVERSPRAY, OR UNDERSPRAY.
- 9. LATERAL LINES TO BE SIZED PER PIPE SIZING CHART.
- 10. CONTRACTOR TO MAINTAIN AS-BUILT DRAWING SET TO BE AVAILABLE ON SITE AT ALL TIMES AND AT TIME OF SUBSTANTIAL COMPLETION REVIEW. CONTRACTOR SHALL PREPARE REDUCED, COLOR-CODED PLANS, LAMINATE, AND PLACE (1) IN CONTROLLER ENCLOSURE AND DELIVER (1) TO OWNER'S REPRESENTATIVE AFTER APPROVAL OF RECORD DRAWING SUBMITTAL AND PRIOR TO FINAL COMPLETION.
- 11. CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN TRENCHING AROUND EXISTING TREES AND SHRUBS. CONTRACTOR SHALL HAND TRENCH WHEN TRENCHING ACROSS ROOTS 2" AND LARGER TO PRESERVE ROOT SYSTEM. ROOTS SMALLER THAN 2" MAY BE TRIMMED. DO NOT TEAR ANY ROOTS.
- 12. THE CONTRACTOR SHALL BE RESPONSIBLE UNDER THIS CONTRACT FOR REPAIRING OR REPLACING, AT THEIR OWN EXPENSE, SURFACE AND SUBSURFACE SITE FEATURES TO REMAIN, INCLUDING BUT NOT LIMITED TO ANY STRUCTURES, FENCES, WALLS, PAVING SURFACES, PLANT MATERIAL AND/OR TREES DAMAGED OR DESTROYED, BOTH ON THIS PROPERTY OR THOSE PROPERTIES ADJACENT TO THIS SITE. THE DAMAGED ITEM(S) WILL BE RESTORED TO THEIR ORIGINAL CONDITION OR REPLACED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.
- 13. REFER TO SPECIFICATIONS SECTION AND IRRIGATIONS DETAILS ON SHEETS L3.2. 01 56 39 TEMPORARY TREE AND PLANT PROTECTION 32 84 00 PLANTING IRRIGATION

#### HYDROZONES:

LOW

HIGH

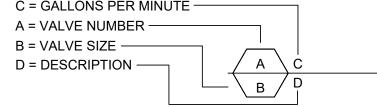
MODERATE



- 1. HYDROZONES BASED ON PLANT SPECIES WATER USE FOR ZONE 1 PER WUCOLS IV, 2014. 2. HYDROZONE NUMBERS CORRESPOND TO VALVE NUMBERS.
- TREE HYDROZONE AREAS ESTIMATED FROM MATURE CANOPY SIZE BY SPECIES. 4. ESTIMATED TOTAL WATER USE FOR THIS SITE IS APPROXIMATELY 162,797GAL/YEAR.
- 5. THE WATER SUPPLY TYPE FOR THIS SITE IS POTABLE. 6. THE LOCAL WATER PURVEYOR FOR THIS SITE IS LODI UTILITIES.
- 7. PROPERTY OWNER CONTACT INFORMATION: LODI UNIFIED SCHOOL DISTRICT.
- C = GALLONS PER MINUTE -----

XXXXXXXXX SPECIAL

•••



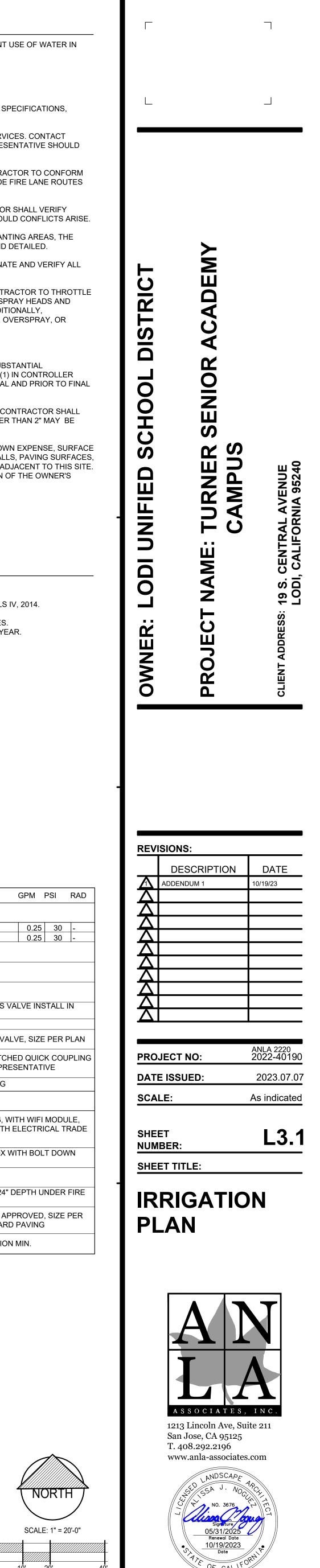
| LATERAL PIPE SI | ZE |
|-----------------|----|
| CHART, SCH 40 F | VC |

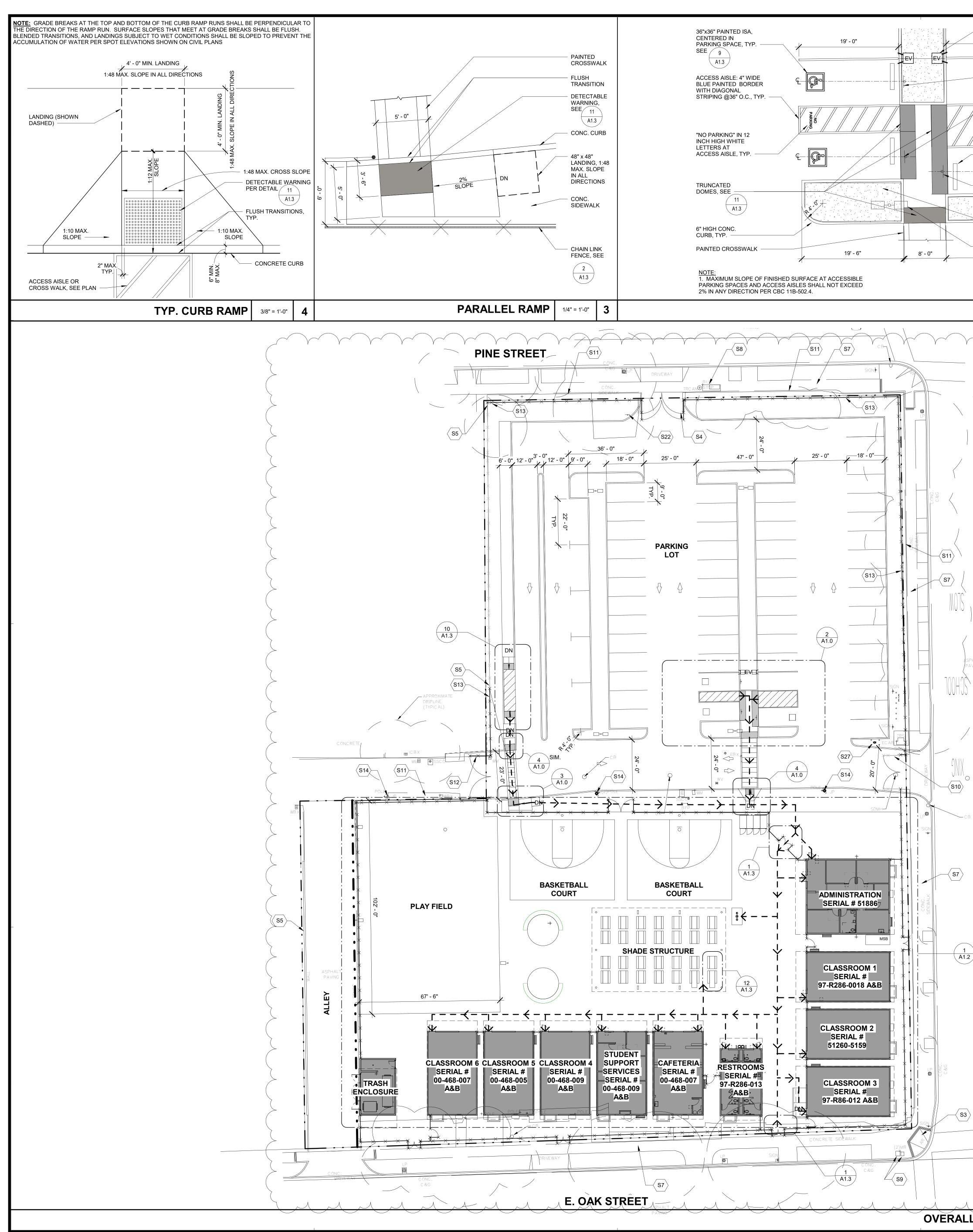
| GALLONS PER MINUTE | PIPE SIZE |
|--------------------|-----------|
| 0 - 7.00 GPM       | 3/4"      |
| 8.00 - 12.00 GPM   | 1"        |
| 13.00 - 22.00 GPM  | 1-1/4"    |
| 23.00 - 30.00 GPM  | 1-1/2"    |
| 31.00 - 50.00 GPM  | 2"        |
| 51.00 - 70.00 GPM  | 2-1/2"    |
| 71.00 - 110.00 GPM | 3"        |
|                    |           |

#### **IRRIGATION LEGEND**

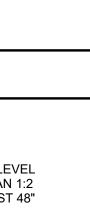
| SYM       | MODEL                 | MANUF.          | DESCRIPTION                                                                                                              | GPM      | PSI    | RAI   |
|-----------|-----------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------|----------|--------|-------|
| BUBBI     | LERS                  |                 |                                                                                                                          |          |        |       |
| •         | FB-25-PC              | RAINBIRD        | SHRUB BUBBLER, INSTALL ONE PER SHRUB                                                                                     | 0.25     | 30     | -     |
| ۲         | FB-25-PC              | RAINBIRD        | TREE BUBBLER, INSTALL TWO PER TREE                                                                                       | 0.25     | 30     | -     |
| VALV      | ES                    |                 |                                                                                                                          |          |        |       |
| Μ         | -                     | -               | IRRIGATION WATER METER, REFER TO CIVIL DRAWINGS                                                                          |          |        |       |
|           | 825Y-1"               | FEBCO           | REDUCED PRESSURE BACKFLOW PREVENTER                                                                                      |          |        |       |
| 8         | 2160                  | GRISWOLD        | MASTER CONTROL VALVE, 1" SIZE, NORMALLY OPEN BRASS V/<br>RAINBIRD VALVE BOX WITH BOLT DOWN LID                           | ALVE IN  | STALL  | IN    |
| $\otimes$ | T-113                 | NIBCO           | BRONZE BALL VALVE, LINE SIZE, 2" AND SMALLER LINE                                                                        |          |        |       |
| $\bullet$ | PEB-PRS-D             | RAINBIRD        | PRESSURE REGULATING ELECTRONIC REMOTE CONTROL VAL                                                                        | VE, SIZ  | E PER  | PLAN  |
| ۲         | 44-LRC - 44-K KEY-SH1 | RAINBIRD        | QUICK COUPLING VALVE WITH RUBBER CAP, PROVIDE MATCH<br>KEY AND HOSE SWIVEL (1 PER 5 VALVES) TO OWNER'S REPRE             |          |        | JPLIN |
| S         | -                     | -               | SPLICE BOX, PLASTIC IN LANDSCAPE, CONCRETE IN PAVING                                                                     |          |        |       |
| CONT      | ROLLERS / SENSORS     |                 |                                                                                                                          |          |        |       |
| A         | ESP8LXME/F            | RAINBIRD        | 8 STATION IRRIGATION CONTROLLER WITH FLOW SENSING, W<br>EXTERIOR WALL MOUNT, COORDINATE POWER SUPPLY WITH                |          |        |       |
| F         | FS100B                | RAINBIRD        | 1" FLOW SENSOR, INSTALL IN RAINBIRD PLASTIC VALVE BOX W                                                                  | /ITH BOI | _T DOV | VN    |
| PIPIN     | G                     |                 |                                                                                                                          |          |        |       |
|           |                       |                 | -PRESSURIZED LATERAL LINE, PURPLE COLOR, 18" DEPTH, 24" [<br>DARD PAVING, NSF APPROVED, SIZE PER CHART                   | DEPTHU   | INDER  | FIRE  |
| _         |                       |                 | .1/2") CLASS 315 (3" TO 4") PVC PRESSURIZED MAINLINE, NSF API<br>OLOR, 24" DEPTH, 36" DEPTH UNDER FIRE LANE AND STANDARD |          |        | PER   |
|           |                       | SCH 40 PVC SLEE | EVES, SIZE AS REQUIRED, 3" MIN. IN SIZE, (2) IN EACH LOCATION                                                            | MIN.     |        |       |
|           |                       |                 |                                                                                                                          |          |        |       |

|                           | Califo                 | rnia Wate           | r Efficient Lar              | ndscape   | Worksheet      |                    |                               |
|---------------------------|------------------------|---------------------|------------------------------|-----------|----------------|--------------------|-------------------------------|
| Reference Evapotranspirat | ion (ET <sub>o</sub> ) | 46.7 Proj           |                              | ject Type | Schoo          | l                  | 0.65                          |
| Hydrozone # / Planting    | Plant Factor           | Irrigation          | Irrigation                   | ETAF      | Landscape      | ETAF x             | Estimated Total               |
| De scription <sup>a</sup> | (PF)                   | Method <sup>b</sup> | Efficiency (IE) <sup>c</sup> | (PF/IE)   | Area (Sq. Ft.) | Area               | Water Use (ETWU) <sup>d</sup> |
| Regular Landscape A       | reas                   |                     |                              |           |                |                    |                               |
| A1, Shrub Bubbler         | 0.3                    | Drip                | 0.81                         | 0.37      | 977            | 362                | 10477                         |
| A2, Shrub Bubbler         | 0.3                    | Drip                | 0.81                         | 0.37      | 790            | 293                | 8472                          |
| A3, Tree Bubbler          | 0.3                    | Drip                | 0.81                         | 0.37      | 13414          | 4968               | 143848                        |
|                           |                        |                     |                              | Totals    | 15181          | 5623               | 162797                        |
| Special Landscape Ai      | reas                   |                     |                              |           |                |                    |                               |
|                           |                        |                     |                              | 1         |                | 0                  | 0                             |
|                           |                        |                     |                              | Totals    | 0              | 0                  | 0                             |
|                           |                        |                     |                              |           | ETV            | VU Total           | 162797                        |
|                           |                        | М                   | aximum Allov                 | ved Wate  | er Allowance ( | MAWA) <sup>e</sup> | 285708                        |
| ETAF Calculations         |                        |                     |                              |           |                |                    |                               |
| Regular Landscape Are     | eas                    |                     |                              |           |                |                    |                               |
| Total ETAF x Area         | 5623                   |                     |                              |           |                |                    |                               |
| Total Area                | 15181                  |                     |                              |           |                |                    |                               |
| Average ETAF              | 0.37                   |                     |                              |           |                |                    |                               |
|                           |                        |                     |                              |           |                |                    |                               |
| All Landscape Areas       |                        |                     |                              |           |                |                    |                               |
| Total ETAF x Area         | 5623                   |                     |                              |           |                |                    |                               |
| Total Area                | 15181                  |                     |                              |           |                |                    |                               |
| Average FTAF              | 0.37                   |                     |                              |           |                |                    |                               |



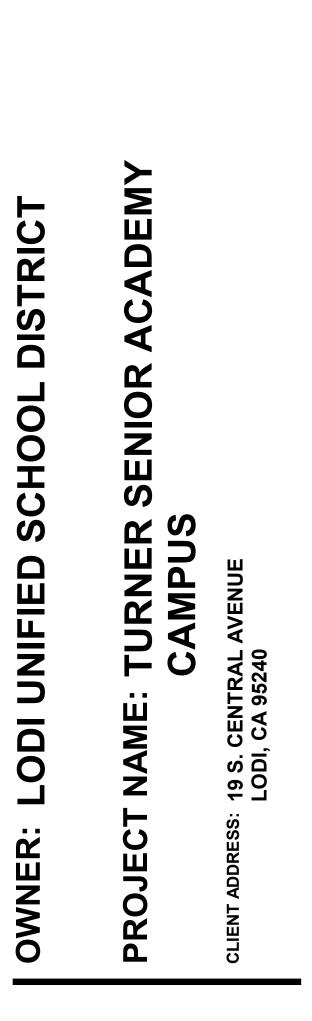


|                                           | <ul> <li>DUAL EV CHARGER,<br/>SERVING BOTH ADJACENT<br/>STALLS, TYP.</li> <li>ACCESSIBLE PARKING SIGN<br/>CENTERED ON PARKING<br/>SPACE, SEE<br/>(A1.3)</li> <li>WHEEL STOP, TYP.</li> <li>ACCESSIBLE VAN PARKING<br/>SIGN CENTERED CENTERED<br/>ON PARKING SPACE, SEE<br/>(7)<br/>A1.3)</li> <li>PLANTED AREA, SEE<br/>LANDSCAPE DRAWINGS</li> <li>(N) LUMINAIRE, SEE<br/>ELECTRICAL DRAWINGS</li> <li>(N) LUMINAIRE, SEE<br/>ELECTRICAL DRAWINGS</li> <li>(N) LUMINAIRE, SEE</li> <li>ESSIBLE PARKING 1/8" = 1'-0" 2</li> </ul> | 2<br>NOT USED<br>S2 NOT USED<br>S3 (E) CURB RAMP<br>S4 (E) GATE TO BE RELOCATED<br>S5 (E) CHAIN LINK FENCE TO REMAIN<br>S7 (E) CONC. SIDEWALK TO REMAIN, TYP.<br>S8 (E) BUS STOP SHELTER<br>S9 (E) MAILBOX<br>S10 (E) GATE<br>S11 (E) CHAIN LINK FENCE TO BE REMOVED<br>S12 (N) 20-0° WIDE GATE, SEE $\begin{pmatrix} 3 \\ A1.3 \end{pmatrix}$<br>S13 (N) CHAIN LINK FENCE, SEE $\begin{pmatrix} 2 \\ A1.3 \end{pmatrix}$<br>S14 (E) UTILITY POLE<br>S16 (E) FIRE HYDRANT<br>S22 (N) TOW AWAY SIGN, SEE $\begin{pmatrix} 6 \\ A1.3 \end{pmatrix}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASPHALT<br>PAVING<br>OF<br>ST<br>ST<br>ST |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (N) FIRE HYDRANT, SEE CIVIL DRAWINGS<br>(N) FIRE HYDRANT, SEE CIVIL DRAWINGS<br>OVERALL SITE PLAN KEYNOTES<br>PARKING SPACE ANALYSIS<br>PER CBC TABLE 11B-208.2<br>PARKING SPACES<br>510 -<br>ACCESSIBLE SPACES<br>2 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                               |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | VAN ACCESSIBLE SPACES       1       1         TOTAL SPACES       69       3         PARTH OF TRAVEL<br>PATH OF TRAVEL | JPT LEVEL<br>THAN 1:2<br>LEAST 48"<br>ING SLOPE<br>ATED (SEC<br>RUCTIONS TO<br>GREATER<br>VE FINISH<br>TWEEN<br>TATEMENT:<br>IN COMPLIANT<br>ACCESIBILITY<br>RATIONS,<br>SN OF THIS<br>PONENTS OR<br>COMPLIANT 1)<br>ARY TO BRING<br>DPE OF THIS<br>CATIONS<br>Y<br>HE POT THAT<br>VALUATION<br>SO INDICATED<br>F THE<br>BE<br>ERANCES,<br>PART OF THIS<br>T. |
| OVERALL SITE PLAN AND                     | PATH OF TRAVEL 1" = 20'-0" 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | × × × ×       (E) CHAIN LINK FENCE OR GATE             × × × ×          (N) CHAIN LINK FENCE OR GATE <b>1</b> SITE PLAN LEGEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                               |



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| DESCRIPTION | DATE     |
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| Addendum 1  | 10/20/23 |
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| PROJECT NO:  | 2022-40190   |
|--------------|--------------|
| DATE ISSUED: | 7/7/2023     |
| SCALE:       | As indicated |
|              |              |

## SHEET NUMBER: SHEET TITLE:

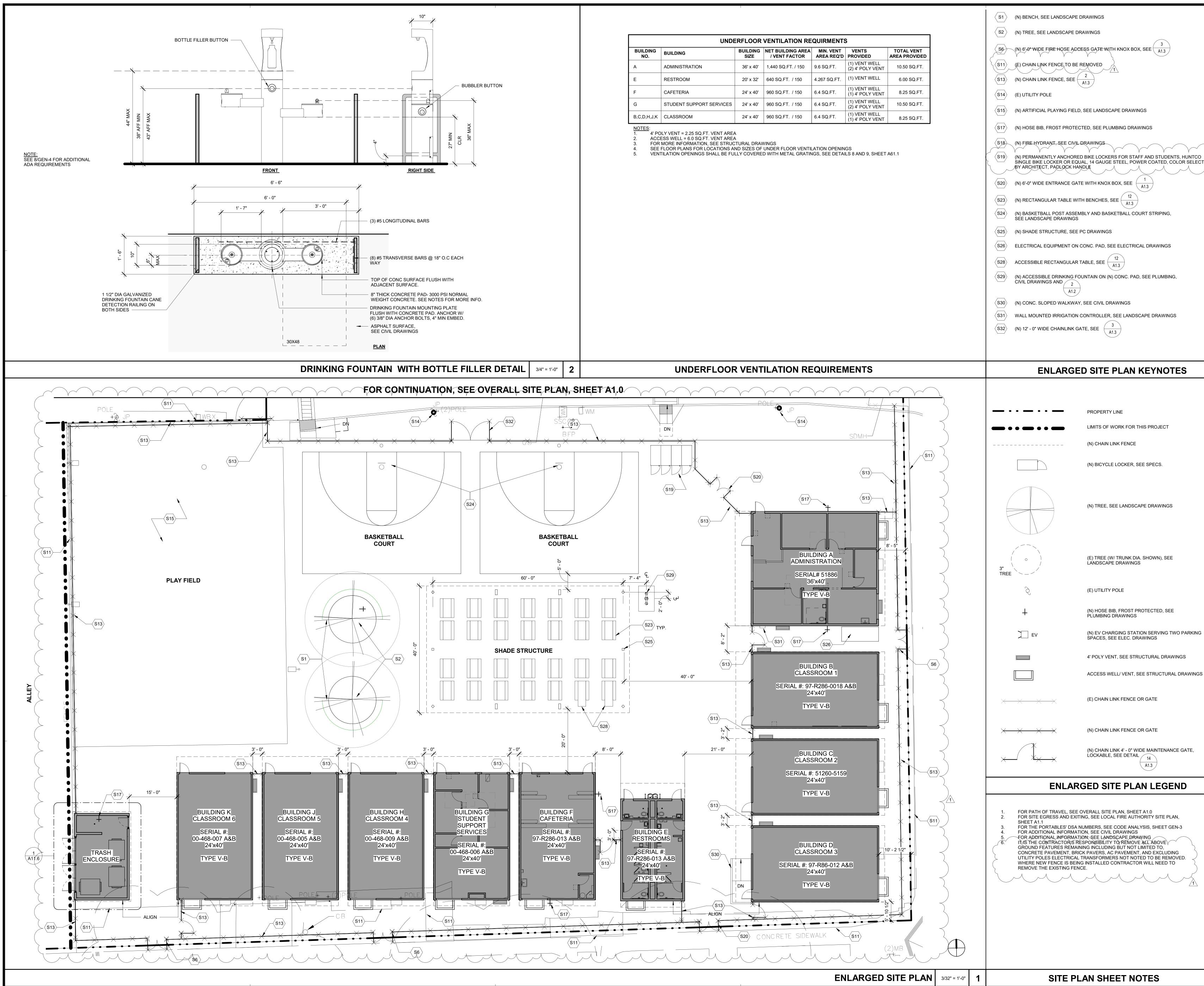
A1.0

**OVERALL SITE PLAN & PATH OF TRAVEL** 



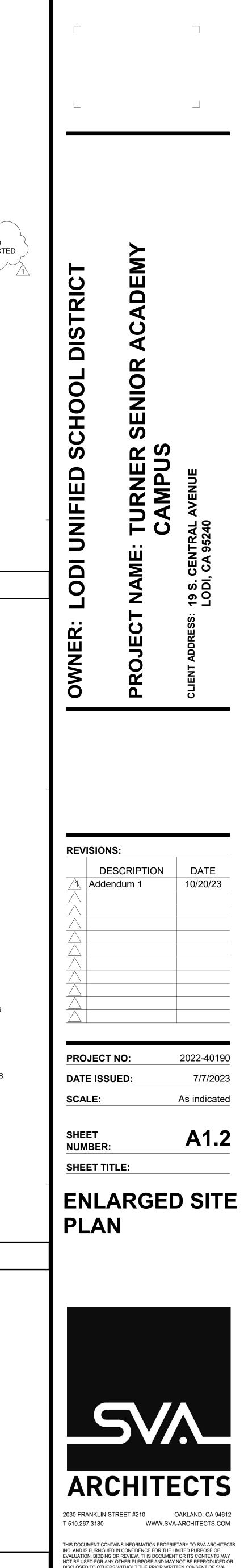
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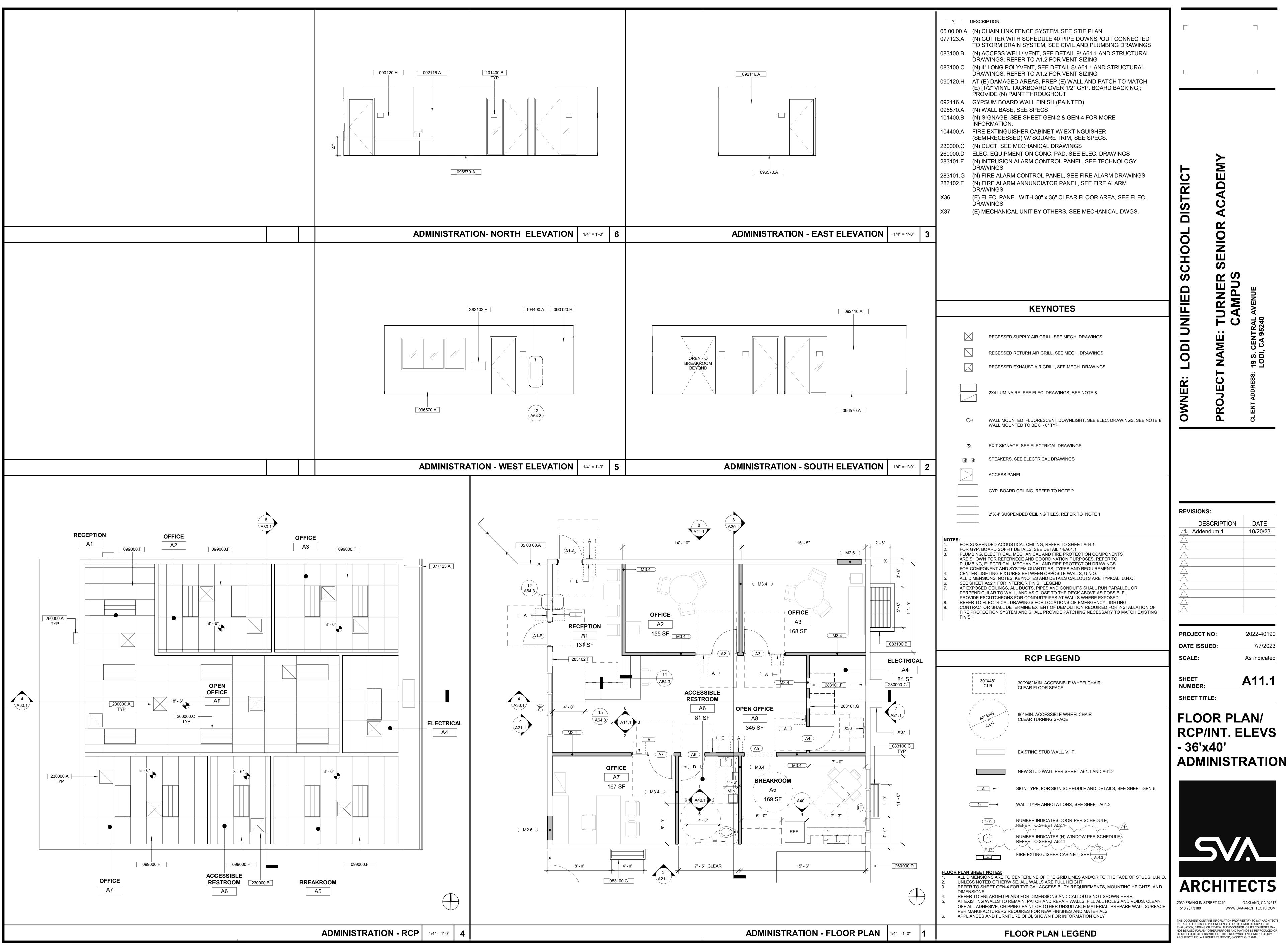


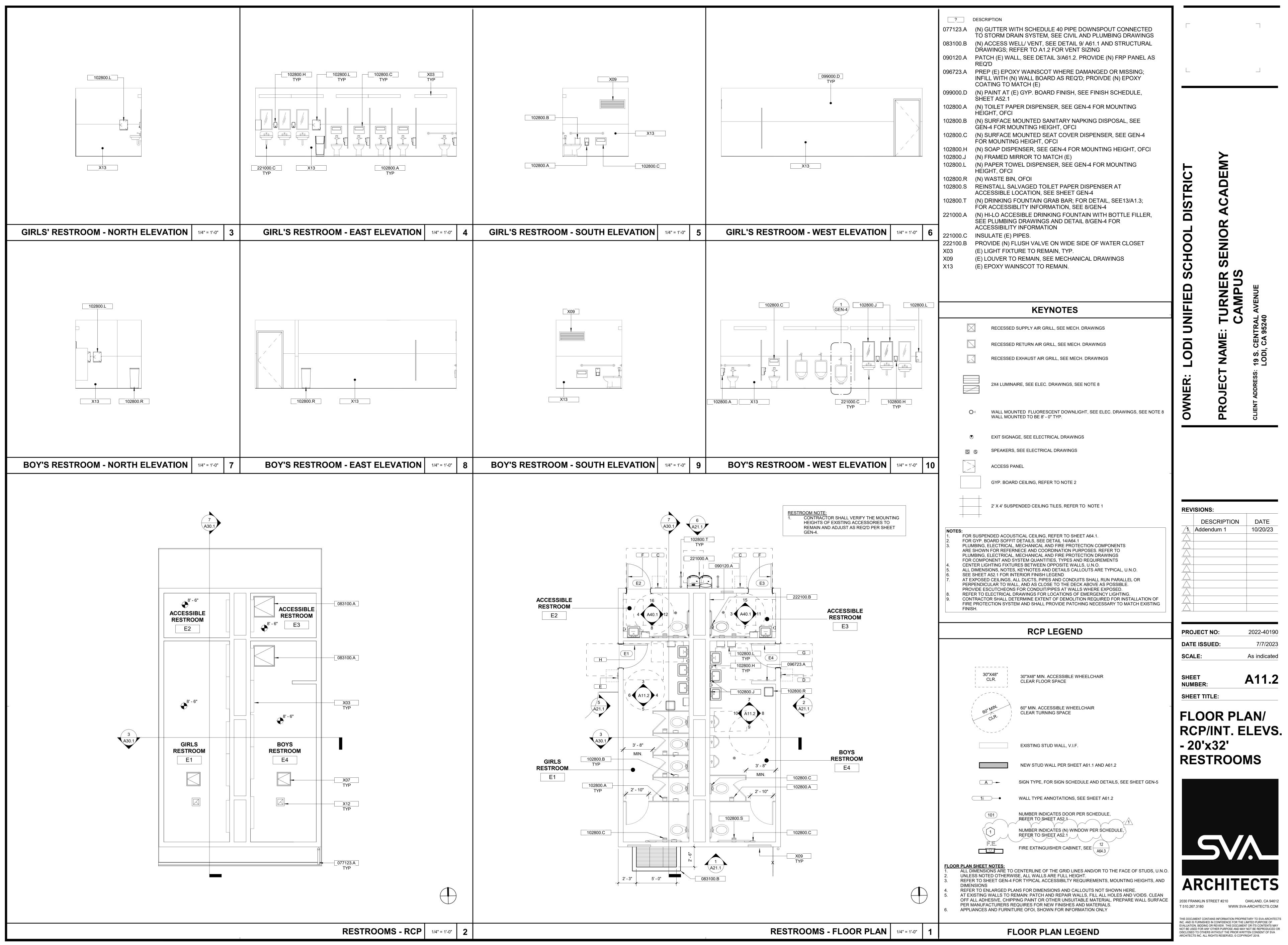
| ILATION REQUIRMENTS |                         |                                   |                             |  |  |  |  |  |  |
|---------------------|-------------------------|-----------------------------------|-----------------------------|--|--|--|--|--|--|
| UILDING AREA        | MIN. VENT<br>AREA REQ'D | VENTS<br>PROVIDED                 | TOTAL VENT<br>AREA PROVIDED |  |  |  |  |  |  |
| SQ.FT. / 150        | 9.6 SQ.FT.              | (1) VENT WELL<br>(2) 4' POLY VENT | 10.50 SQ.FT.                |  |  |  |  |  |  |
| Q.FT. / 150         | 4.267 SQ.FT.            | (1) VENT WELL                     | 6.00 SQ.FT.                 |  |  |  |  |  |  |
| Q.FT. / 150         | 6.4 SQ.FT.              | (1) VENT WELL<br>(1) 4' POLY VENT | 8.25 SQ.FT.                 |  |  |  |  |  |  |
| Q.FT. / 150         | 6.4 SQ.FT.              | (1) VENT WELL<br>(2) 4' POLY VENT | 10.50 SQ.FT.                |  |  |  |  |  |  |
| Q.FT. / 150         | 6.4 SQ.FT.              | (1) VENT WELL<br>(1) 4' POLY VENT | 8.25 SQ.FT.                 |  |  |  |  |  |  |

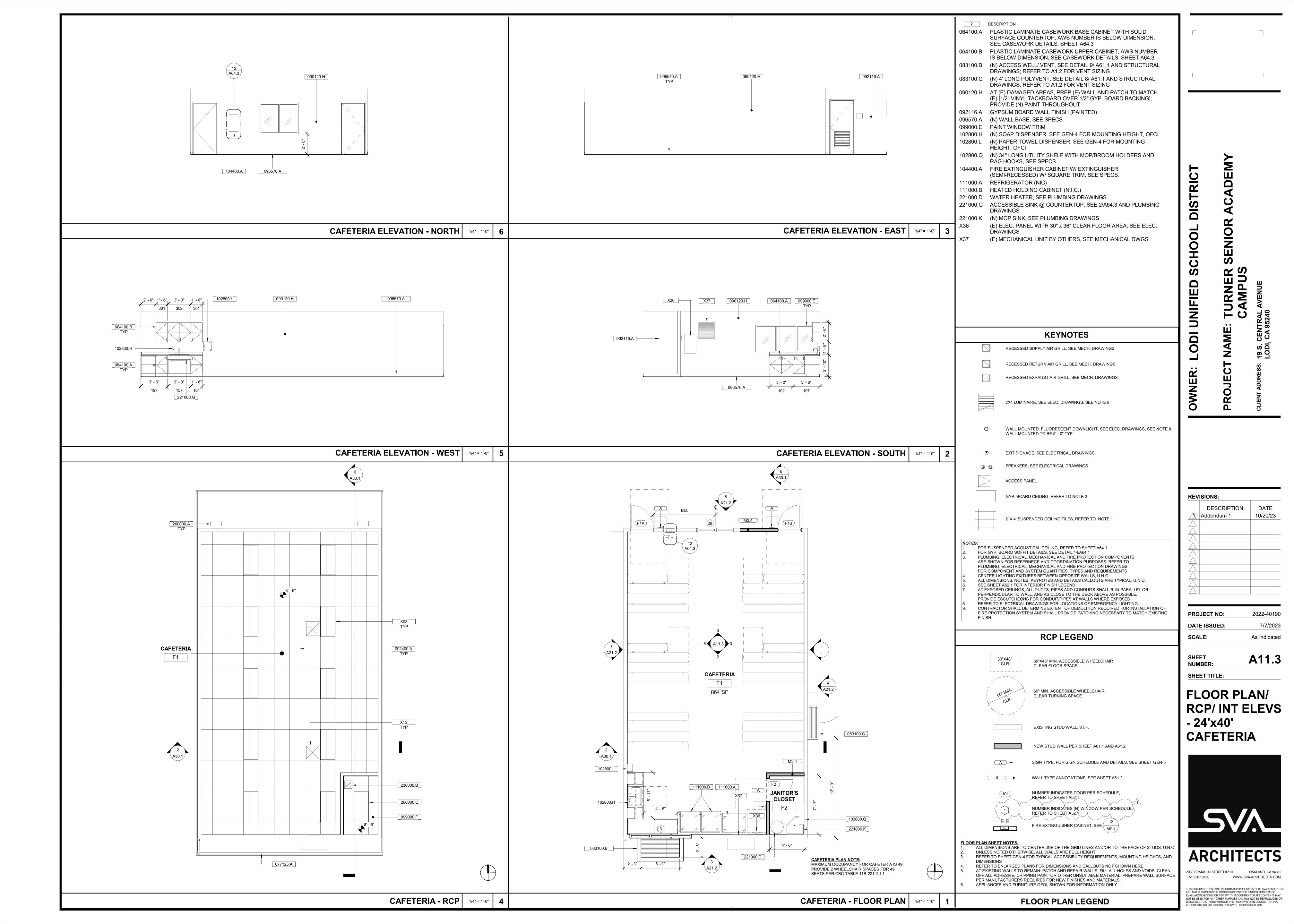
|      | S1          | (N) BENCH, SEE LANDSCAPE DRAWINGS                                                                                                                                                |
|------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <b>S2</b>   | (N) TREE, SEE LANDSCAPE DRAWINGS                                                                                                                                                 |
| (    | S6          | (N) 6'-0" WIDE FIRE HOSE ACCESS GATE WITH KNOX BOX, SEE                                                                                                                          |
| 5    | (S11)       | (E) CHAIN LINK FENCE TO BE REMOVED                                                                                                                                               |
|      | <b>S13</b>  | (N) CHAIN LINK FENCE, SEE $\begin{pmatrix} 2 \\ A1.3 \end{pmatrix}$                                                                                                              |
|      | <b>S14</b>  | (E) UTILITY POLE                                                                                                                                                                 |
|      | <b>S15</b>  | (N) ARTIFICIAL PLAYING FIELD, SEE LANDSCAPE DRAWINGS                                                                                                                             |
|      | <b>S17</b>  | (N) HOSE BIB, FROST PROTECTED, SEE PLUMBING DRAWINGS                                                                                                                             |
|      | S18         | (N) FIRE HYDRANT, SEE CIVIL-DRAWINGS                                                                                                                                             |
| <br> | <b>S19</b>  | (N) PERMANENTLY ANCHORED BIKE LOCKERS FOR STAFF AND STUDENTS, HUNTCO<br>SINGLE BIKE LOCKER OR EQUAL, 14 GAUGE STEEL, POWER COATED, COLOR SELECTE<br>BY ARCHITECT, PADLOCK HANDLE |
|      | S20         | (N) 6'-0" WIDE ENTRANCE GATE WITH KNOX BOX, SEE 1<br>A1.3                                                                                                                        |
|      | <b>S23</b>  | (N) RECTANGULAR TABLE WITH BENCHES, SEE 12<br>A1.3                                                                                                                               |
|      | <b>S24</b>  | (N) BASKETBALL POST ASSEMBLY AND BASKETBALL COURT STRIPING,<br>SEE LANDSCAPE DRAWINGS                                                                                            |
|      | <b>S25</b>  | (N) SHADE STRUCTURE, SEE PC DRAWINGS                                                                                                                                             |
|      | <b>S26</b>  | ELECTRICAL EQUIPMENT ON CONC. PAD, SEE ELECTRICAL DRAWINGS                                                                                                                       |
|      | <b>S28</b>  | ACCESSIBLE RECTANGULAR TABLE, SEE                                                                                                                                                |
|      | <b>S29</b>  | (N) ACCESSIBLE DRINKING FOUNTAIN ON (N) CONC. PAD, SEE PLUMBING,<br>CIVIL DRAWINGS AND                                                                                           |
|      |             |                                                                                                                                                                                  |
|      | <s30></s30> | (N) CONC. SLOPED WALKWAY, SEE CIVIL DRAWINGS                                                                                                                                     |
|      | <b>S31</b>  | WALL MOUNTED IRRIGATION CONTROLLER, SEE LANDSCAPE DRAWINGS                                                                                                                       |
|      | <b>S32</b>  | (N) 12' - 0" WIDE CHAINLINK GATE, SEE $\begin{pmatrix} 3 \\ A1.3 \end{pmatrix}$                                                                                                  |

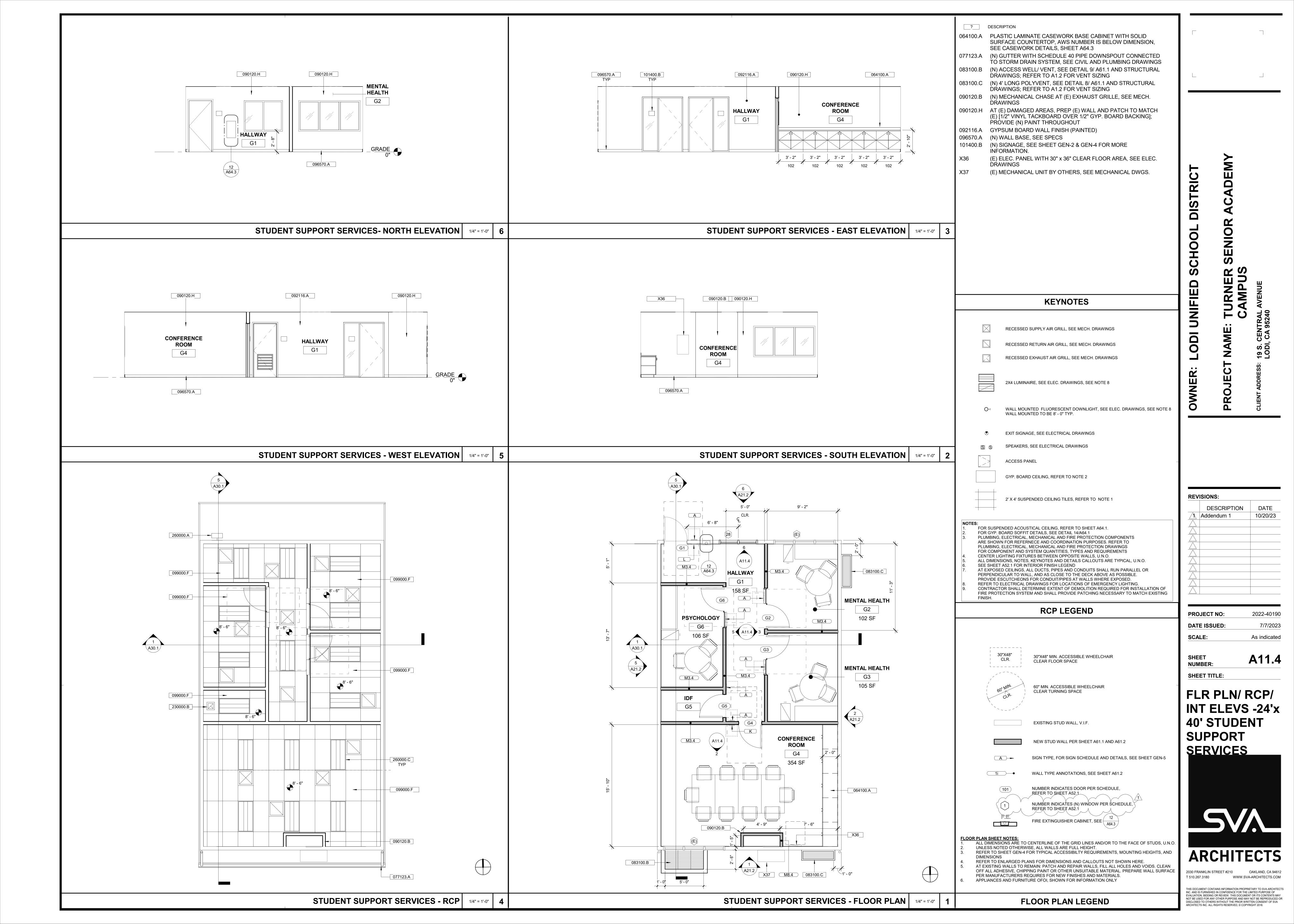


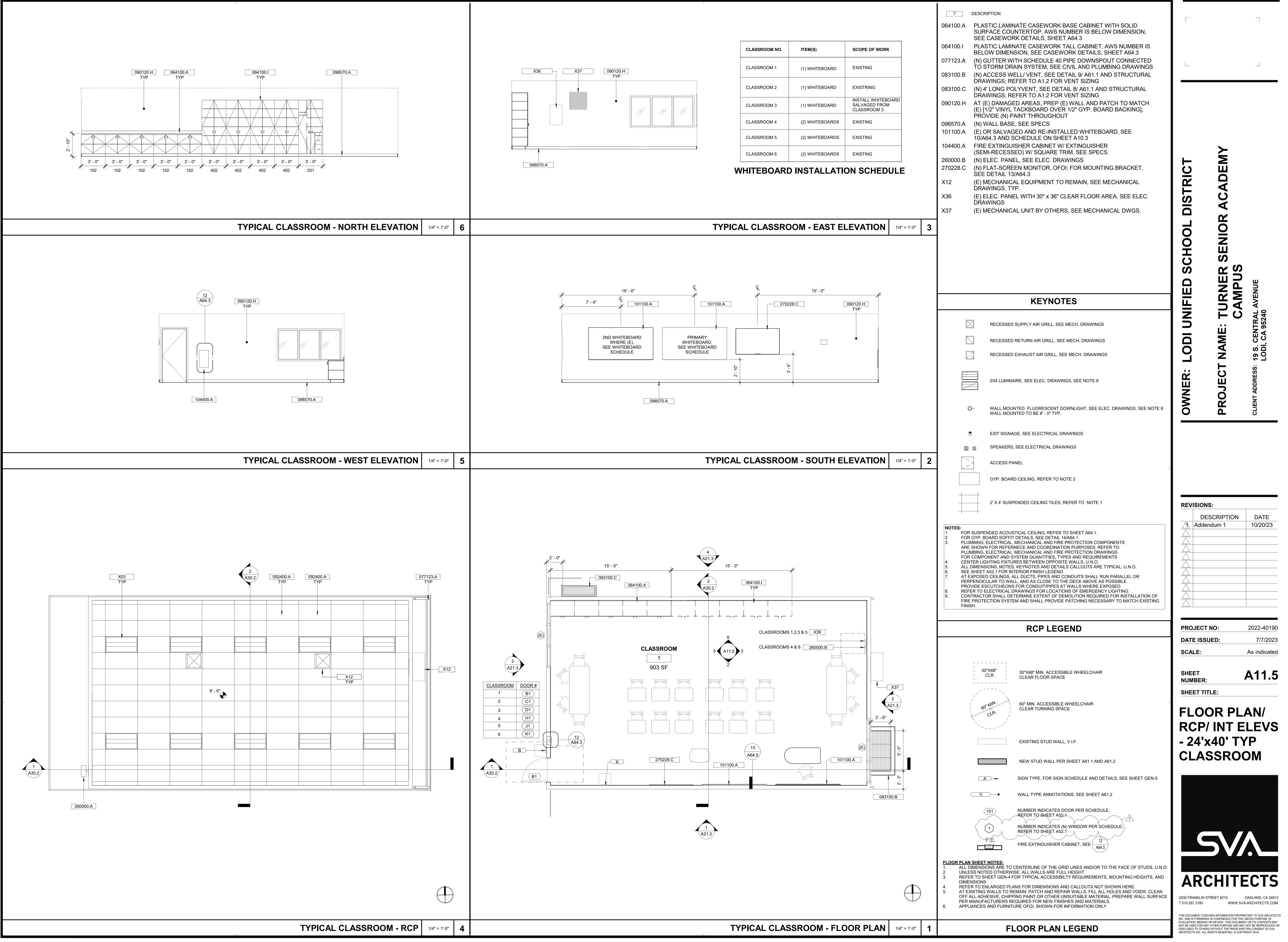
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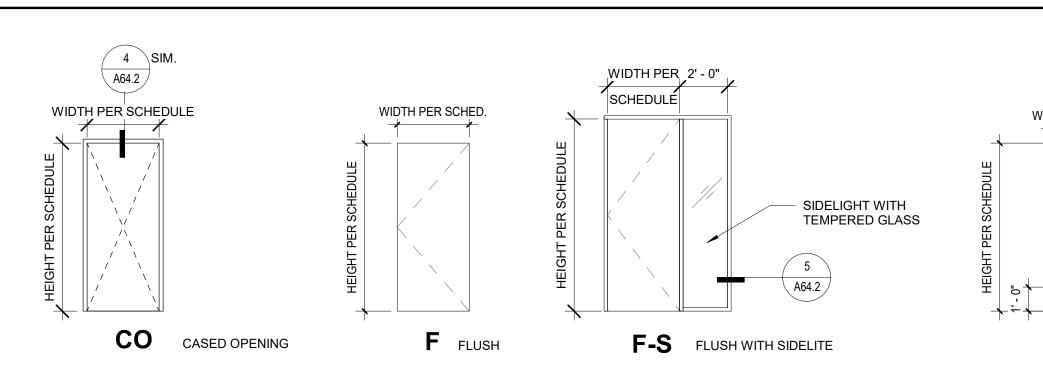






| CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         PATCH DAMAGED AREA. MATERIAL & FINISH TO           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         MATCH (E)         LV           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         LV         LV         LV           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         LV           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         LV           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         LV         LV           CLASSROOM         LVT1         RB         (E)         (E) TWC         (E) ACT         LV         LV         RB         GYP         PT         ACT         RD         GYP         PT         ACT         RD         GYP         PT         ACT         RD         GYP         RG         GYP         PT         ACT         RD         GYP         RD         GYP         ACT         CD         MATCH (E)         RD         GYP         RD         GYP         ACT         GD         GU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | F |                    |           | ILING  | CE      | 'ALL     | W        | BASE OR  |         |                     |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------|-----------|--------|---------|----------|----------|----------|---------|---------------------|----------|
| CLASSROOM         LVT1         RB         (E)         (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   | NTS                | COMMENT   | FINISH | MATERIA | . FINISH | MATERIAL | WAINSCOT | FLOOR   | NAME                | #        |
| CLASSROOM       LVT1       RB       (E)       (E)       NCT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   | TERIAL & FINISH TO |           |        | (E) ACT | (E) TWC  | (E)      | RB       | LVT1    | CLASSROOM           |          |
| CLASSROOM       LVT1       RB       (E)       (E)       NCC       (E) ACT       (E)       (E)       NCC       (E)       ACT       (E)       (E)       NCC       NCC       (E)       NCC       (E)       NCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |                    |           |        | (E) ACT | (E) TWC  | (E)      | RB       | LVT1    | CLASSROOM           |          |
| CLASSROOM       LVT1       RB       (E)       (E)       WC       (E) ACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                    |           |        | (E) ACT | (E) TWC  | (E)      | RB       | LVT1    | CLASSROOM           |          |
| CLASSROOM         LVT1         RB         (E)         (E) ACT         Image: Class of the second secon                                                                                                                                                                                                               |   |                    |           |        |         |          |          |          |         |                     |          |
| RECEPTION         LVT2         RB         GVP         PT         ACT         ACCESSIBLE RESTROOM         EVP         WR. GYP         PT         ACT         ACCESSIBLE RESTROOM         EVPY         EVP         WR. GYP         PT         ACT         ACT         ACCESSIBLE RESTROOM         (E) EPY         (E) EPY         (E) (E) FRP         (E) GYP         PT         AATCH (E) AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |                    |           |        |         |          |          |          |         |                     |          |
| OFFICE       LVT2       RB       GYP       PT       ACT         OFFICE       LVT2       RB       GYP       PT       ACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |                    |           |        |         |          |          |          |         |                     |          |
| OFFICE       LVT2       RB       OYP       PT       ACT       ACT         ELECTRICAL       LVT2       RB       GYP       PT       ACT       Image: Construction of the construction o                                                                                                                                                                                                                                                                                                                |   |                    |           |        |         |          |          |          |         |                     | .1       |
| ELECTRICAL       LV12       RB       GYP       PT       ACT       ACT       BREAKROOM       LV12       RB       GYP       PT       ACT       BREAKROOM       LV12       RB       GYP       PT       ACT       BREAKROOM       EPY       WR GYP       FRP       GYP       GYP       GYP       ACT       ACCESSIBLE RESTROOM       EPY       WR GYP       FR       GYP       ACT       MCT       MCT       MCT       MCT       MCT       GIRLS RESTROOM       (E) EPY       (E) EPY       (E) CYP       PT       ACT       ACCESSIBLE RESTROOM       (E) EPY       (E) CYP       PT       AATCH (E)       ACCESSIBLE RESTROOM       (E) EPY       (E) CYP       PT       MATCH (E)       MATCH (E)       ACCESSIBLE RESTROOM       (E) EPY       (E) CYP       PT       PATCH DAMAGED AREA. MATERIAL & FINISH TO       MATCH (E)       MATCH (E) </td <td></td> <td>2</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |                    |           |        |         |          |          |          |         |                     | 2        |
| BREAKROOM     LV12     RB     GYP     PT     ACT     ACT     ACCESSIBLE RESTROOM     EPY     EPY     WR. GYP     FRP     GYP     ACT     ACCESSIBLE RESTROOM     EPY     RB     GYP     PT     ACT     ACCESSIBLE RESTROOM     (E) EPY     (E) EPY     (E) (E) FRP     (E) GYP     PT     AATCH (ACH)     AATCH (ACH)     ACT     ACT     ACT     ATCH DAMAGED AREA. MATERIAL & FINISH TO     AATCH (E)     ACT     ACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | , |                    |           |        |         |          |          |          |         |                     | .3<br>.4 |
| ACCESSIBLE RESTROOM       EPY       EPY       WR GYP       FFPP       GYP       ACT       Image: Construction of the construction of                                                                                                                                                                                                                                         |   |                    |           |        |         |          |          |          |         |                     | .5       |
| OFFICE     LVT2     RB     GYP     PT     ACT       OPEN OFFICE     LVT2     RB     GYP     PT     ACT       GIRLS RESTROOM     (E) EPY     (E) EPY     (E) EPY     (E) EPY     (E) FRP     (E) GYP     PT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     PATCH DAMAGED AREA. MATERIAL & FINISH TO       ACCESSIBLE RESTROOM     (E) EPY     (E) EPY     (E) FRP     (E) GYP     PT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       BOYS RESTROOM     (E) EPY     (E) EPY     (E)     (E) FRP     (E) GYP     PT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       BOYS RESTROOM     (E) EPY     (E) EPY     (E)     (E) FRP     (E) GYP     PT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       JANITOR'S CLOSET     EPY     EPY     GYP     FR     ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     GY       JANITOR'S CLOSET     EPY     EPY     GYP     FR     ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     GY       MENTAL HEALTH     LV2     RB     GYP     PT     ACT     PT     ACT       MENTAL HEALTH     LV2     RB     GYP     PT     ACT     PT     ACT       JDF     LV2     RB     GYP     PT     ACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |                    |           |        |         |          |          |          |         |                     | .5<br>.6 |
| OPEN OFFICE       LVT2       RB       GYP       PT       ACT       MATCH (E)       MATCH (E)       MATCH (E)       MATCH (E)       FINISH TO       FINISH TO       FINISH TO       FINISH TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |                    |           |        |         |          |          |          |         |                     | 0<br>7   |
| GIRLS RESTROOM       (E) EPY       (E) EPY       (E) FPP       (E) GYP       PT       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       MATCH (E)       MATCH (E)       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       MATCH (E)       EP       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       WAI         BOYS RESTROOM       (E) EPY       (E) EPY       (E) (E) FRP       (E) GYP       PT       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       WAI         CAFETERIA       LV1       RB       (E)       (E) TWC       (E) ACT       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       WAI         JANITOR'S CLOSET       EPY       EPY       GYP       FRP       ACT       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       GYP         JANITOR'S CLOSET       EPY       EPY       GYP       FT       ACT       PATCH DAMAGED AREA. MATERIAL & FINISH TO       GYP         MENTAL HEALTH       LV2       RB       GYP       PT       ACT       PT       GYP         PSYCHOLOGY       LV2       RB       GYP       PT       ACT       TM       CEII         AC       FYSCHOLOGY       LV2       RB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |                    |           |        |         |          |          |          |         |                     | 8        |
| ACCESSIBLE RESTROOM (E) EPY (E) EPY (E) EPY (E) (E) FRP (E) GYP PT PATCH DAMAGED AREA. WATERIAL & FINISH TO<br>MATCH (E)<br>BOYS RESTROOM (E) EPY (E) EPY (E) EPY (E) (E) FRP (E) GYP PT PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)<br>CAFETERIA LV1 RB (E) (E) TWC (E) ACT PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)<br>JANITOR'S CLOSET EPY EPY GYP FRP ACT<br>HALLWAY CPT RB GYP PT ACT<br>MENTAL HEALTH LV2 RB GYP PT ACT<br>CONFERENCE ROOM LV2 RB GYP PT ACT<br>IDF LV2 RB GYP PT ACT<br>SYCHOLOGY LV2 RB GYP PT ACT<br>CONFERENCE ROOM LV2 RB GYP PT ACT<br>MENTAL HEALTH CV2 RB GYP PT ACT<br>GYR ACT<br>SYCHOLOGY LV2 RB GYP TO ACT SYCHOLOGY | V | TERIAL & FINISH TO |           | PT     |         |          |          |          |         |                     | 1        |
| Boys RESTROOM     (E) EPY     (E) EPY     (E)     (E) FRP     (E) GYP     PT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)       CAFETERIA     LV1     RB     (E)     (E) TWC     (E) ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     GY       JANITOR'S CLOSET     EPY     EPY     GYP     FRP     ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     GY       JANITOR'S CLOSET     EPY     EPY     GYP     FRP     ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)     GY       JANITOR'S CLOSET     EPY     EPY     GYP     FR     ACT     PATCH DAMAGED AREA. MATERIAL & FINISH TO       MENTAL HEALTH     LV2     RB     GYP     PT     ACT     PT     PT       CONFERENCE ROOM     LV2     RB     GYP     PT     ACT     PT       IDF     LV2     RB     GYP     PT     ACT     PT       PSYCHOLOGY     LV2     RB     GYP     PT     ACT     PT       GY     GY     FR     GYP     FR     GY     FR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   | TERIAL & FINISH TO |           | PT     | (E) GYP | (E) FRP  | (E)      | (E) EPY  | (E) EPY | ACCESSIBLE RESTROOM | 2        |
| DOTOTICSTICOM       (C) ETT       (C)       (C) TY       (C) STF       FT       INTOTIONALID ANCAC WATCH OR CALL ATTINIST TO<br>MATCH (E)         CAFETERIA       LV1       RB       (E)       (E) TWC       (E) ACT       PATCH DAMAGED AREA. MATERIAL & FINISH TO<br>MATCH (E)         JANITOR'S CLOSET       EPY       EPY       GYP       FRP       ACT       International Action of MATCH (E)         HALLWAY       CPT       RB       GYP       PT       ACT       International Action of MATCH (E)         MENTAL HEALTH       LV2       RB       GYP       PT       ACT       International Action of MATCH (E)       PT         CONFERENCE ROOM       LV2       RB       GYP       PT       ACT       International Action of MATCH (E)       PT         IDF       LV2       RB       GYP       PT       ACT       International Action of MATCH (E)       International Action of MATCH (E)       Tw         PSYCHOLOGY       LV2       RB       GYP       PT       ACT       International Action of MATCH (E)       International Action of MATCH (E)       Tw         PSYCHOLOGY       LV2       RB       GYP       PT       ACT       International Action of MATCH (E)       Action of MATCH (E)       Action of MATCH (E)         GY       MATCH (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |                    | MATCH (E) |        |         |          |          |          | . ,     |                     | 3        |
| JANITOR'S CLOSET       EPY       EPY       GYP       FRP       ACT       MATCH (E)         JANITOR'S CLOSET       EPY       EPY       GYP       FRP       ACT       Image: Construction of a constructin o construction of a constructin of a const                                                                                                                                                                                                                                                                                                                |   |                    | MATCH (E) | PT     |         |          |          |          |         |                     | 1        |
| HALLWAY       CPT       RB       GYP       PT       ACT       Image: Content of the co                                                                                                                                                                                                                                |   | TERIAL & FINISH TO |           |        |         |          |          |          |         |                     |          |
| MALTAL         ICAL         OT         ICAL         ICAL <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |                    |           |        |         |          |          |          |         |                     | 2        |
| MENTAL HEALTH         LV2         RB         GYP         PT         ACT         Image: Conference Room         Reserve Room         Conference Room         Reserve Room <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td>1</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |                    |           |        |         |          | -        |          |         |                     | 1        |
| CONFERENCE ROOM       LV2       RB       GYP       PT       ACT       Image: Contract of the contract of                                                                                                                                                                                                                                 |   |                    |           |        |         |          |          |          |         |                     | 2<br>3   |
| IDF       LV2       RB       GYP       PT       ACT       Image: Contract of the state of                                                                                                                                                                                                                                |   |                    |           |        |         |          |          |          |         |                     | 4        |
| PSYCHOLOGY LV2 RB GYP PT ACT TW<br>CEII<br>AC<br>FF<br>GY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |                    |           |        |         |          |          |          |         |                     | i5       |
| Two for the formula of the formula o                                                                                                                                           |   |                    |           |        |         |          |          |          |         |                     | 6        |
| AC<br>FF<br>GY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |                    |           | -      |         |          |          |          |         |                     |          |
| FF<br>GY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                    |           |        |         |          |          |          |         |                     |          |
| GY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |                    |           |        |         |          |          |          |         |                     |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |                    |           |        |         |          |          |          |         |                     |          |
| PT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |                    |           |        |         |          |          |          |         |                     |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |                    |           |        |         |          |          |          |         |                     |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |                    |           |        |         |          |          |          |         |                     |          |

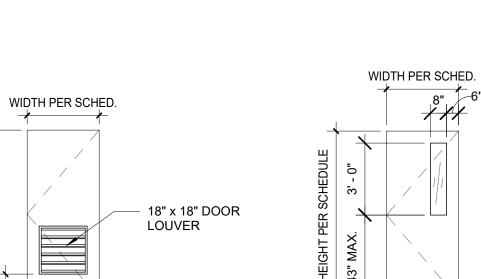
|        |                          |                    |                    |        |                  | F         | INISH SC        | HEDUL         | E           |                       |     |    |                        |             | INTERIOR FINISH LEGEND                    |
|--------|--------------------------|--------------------|--------------------|--------|------------------|-----------|-----------------|---------------|-------------|-----------------------|-----|----|------------------------|-------------|-------------------------------------------|
|        |                          |                    |                    |        |                  |           |                 |               |             | DOOR SCHED            | ULE |    |                        |             |                                           |
|        | Phase Created            | WIDTH              | HEIGH              | T TYPE | DOOR<br>MATERIAL | FINISH    | FR/<br>MATERIAL | AME<br>FINISH | HEAD DETAIL | DETAI<br>TRANSOM JAMB |     |    | HARDWARE<br>D GROUP PH | FIRE RATING | REMARKS                                   |
|        |                          | -                  | -                  |        |                  |           |                 |               |             | 0                     |     |    |                        |             |                                           |
| 1-A    | Construction             | 3' - 0"            | 7' - 0"            | F      | HM               | FPFF      |                 | FPFF          | 2           | 3                     |     | 1  | 1                      |             |                                           |
| -В     | New<br>Construction      | 3' - 0"            | 7' - 0"            | F      | HM               | FPFF      | HM              | FPFF          | 2           | 3                     |     | 1  | 2                      |             |                                           |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | HM              | FPFF          | 4           | 4                     | 5   | 6F | 4                      |             |                                           |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | HM              | FPFF          | 4           | 4                     | 5   | 6F | 4                      |             |                                           |
|        |                          | 3' - 0"            | 7' - 0"            | F      | SWC              | FPFF      | HM              | FPFF          | 4           | 4                     |     | 6F | 4                      |             |                                           |
|        | New                      | 4' - 0"            | 7' - 0"            | СО     |                  |           | НМ              | FPFF          | 4           | 4                     |     |    |                        |             |                                           |
| ;      |                          | 3' - 0"            | 7' - 0"            | F      | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     |     | 6F | 5                      |             |                                           |
|        |                          | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     | 5   | 6F | 4                      |             |                                           |
|        | Construction<br>Existing | 3' - 0"            | 6' - 8"            | F      | HM               | P         | HM              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
|        | Existing                 | 3' - 0"            | 6' - 8"            | F      | НМ               | P         | НМ              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
| 1<br>I | <b>U</b>                 | 3' - 0"<br>3' - 0" | 6' - 8"<br>7' - 0" | F      | HM<br>HM         | P<br>FPFF | HM<br>HM        | P<br>FPFF     | 2           | 3                     |     | 6C | 7<br>2A                |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
|        | Construction             |                    |                    |        |                  |           |                 |               |             |                       |     |    |                        |             |                                           |
| 2      | New<br>Construction      | 3' - 0"            | 7' - 0"            |        | HM               | FPFF      |                 | FPFF          | 2           | 3                     |     | 6C | 2B                     |             |                                           |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | L      | HM               | FPFF      | HM              | FPFF          | 2           | 3                     |     | 6C | 2B                     |             |                                           |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | F      | НМ               | FPFF      | HM              | FPFF          | 2           | 3                     |     | 6C | 2A                     |             |                                           |
| A      | 0                        | 3' - 0"            | 6' - 8"            | F      | НМ               | Р         |                 | FPFF          |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
| В      | New<br>Construction      | 3' - 0"            | 7' - 0"            | F      | HM               | FPFF      | HM              | FPFF          | 2           | 3                     |     | 1  | 7                      |             |                                           |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | L      | НМ               | FPFF      | HM              | FPFF          | 4           | 4                     |     | 6F | 3                      |             |                                           |
| 1      |                          | 3' - 0"            | 6' - 8"            | F      | HM               | FPFF      | НМ              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
|        | New<br>Construction      | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     | 5   | F6 | 4                      |             |                                           |
|        |                          | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     | 5   | 6F | 4                      |             |                                           |
|        |                          | 3' - 0"            | 7' - 0"            | N      | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     |     | 6F | 4                      |             |                                           |
| 5      | New                      | 3' - 0"            | 7' - 0"            | L      | SWC              | FPFF      | НМ              | FPFF          | 4           | 4                     |     | 6F | 6                      |             |                                           |
|        |                          | 3' - 0"            | 7' - 0"            | F-S    | SWC              | FPFF      | HM              | FPFF          | 4           | 4                     | 5   | 6F | 4                      |             |                                           |
|        | Construction<br>Existing | 3' - 0"            | 6' - 8"            | F      | HM               | P         | HM              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
|        | U U                      | 3' - 0"            | 6' - 8"            | F      | HM               | Р         | HM              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |
|        |                          | 3' - 0"            | 6' - 8"            | F      | HM               | P         | HM              | P             |             |                       |     |    | 7                      |             | ADJUST DOOR TO HANG STRAIGHT AS REQUIRED. |

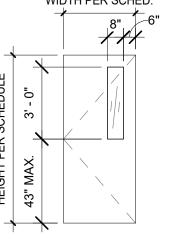


#### DOOR LEGEND

LOUVER

5





N NARROW LITE



#### INTERIOR FINISH | EGEND

#### CEILINGS

- SEE SPECS

- ACT 2' x 4' SUSPENDED ACOUSTICAL CEILING

- FF FACTORY FINISH, SEE SPECS
- GYP GYPSUM BOARD CEILING 1/2" GYP. BD. @ +8'-6"
- PT INTERIOR DRYWALL PAINT EGGSHELL/ FLAT SHERWIN-WILLIAMS | PROMAR 200 ZERO VOC | B30W02651



- LVT1 VINYL TILE FLOORING METROFLOR | DEJA NEW | COLOR: WAXED GRIEGE - DN1445117
- LVT2 VINYL FLOORING METROFLOR | DEJA NEW | COLOR: FUMED - DN529113

DUR-A-FLEX, INC. | DUR-A-QUARTZ | COLOR T.B.D.

- EPY EPOXY FLOOR COATING
- BASE RB RESILIENT BASE, BURKE FLOORING, BURKE BASE RUBBER WALL BASE, TYPE TS

## WAINSCOT

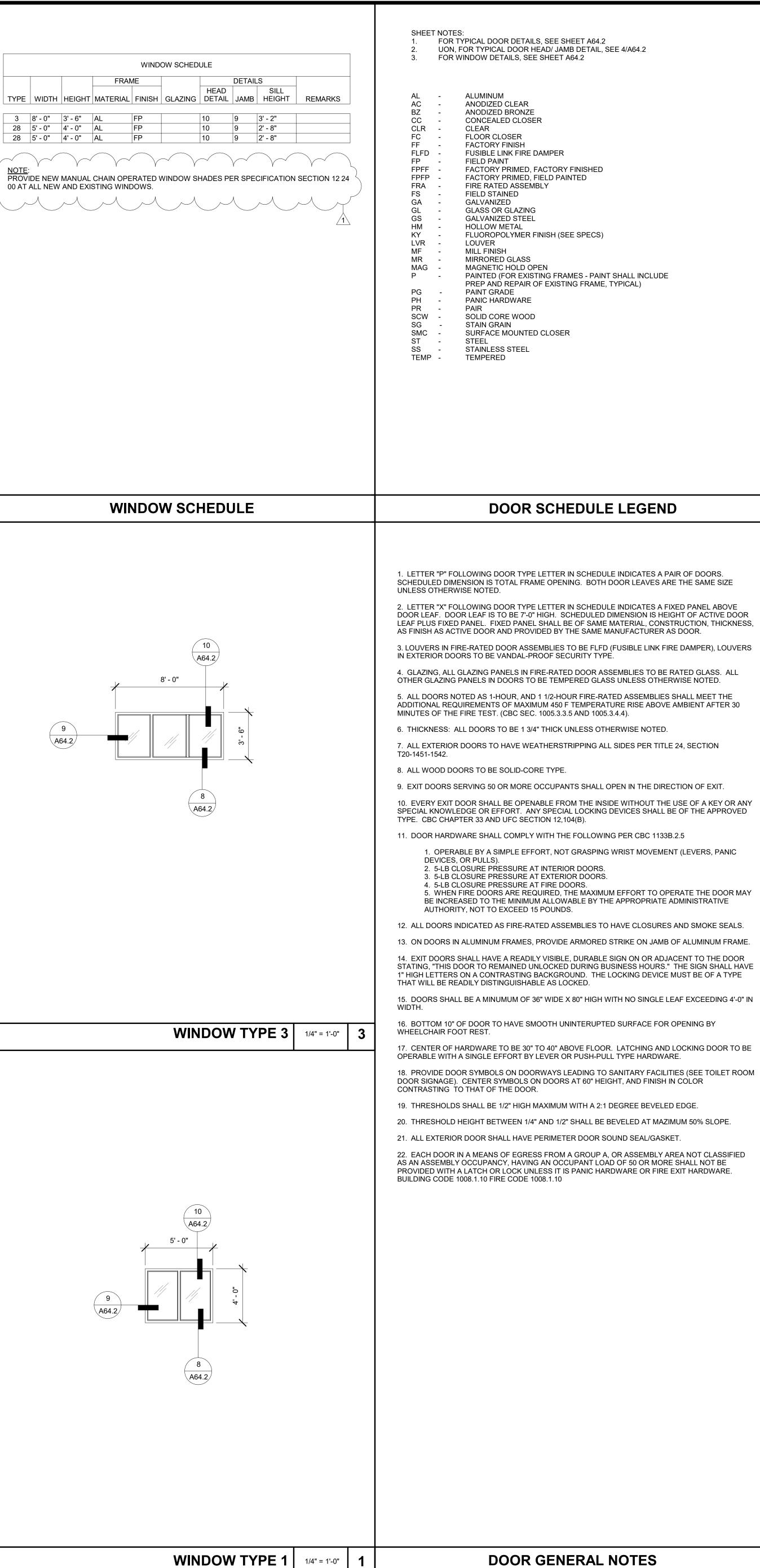
- EPY EPOXY FLOOR COATING
- DUR-A-FLEX, INC. | DUR-A-QUARTZ | COLOR T.B.D.

#### WALLS

GYP GYPSUM BOARD

SEE SPEC

- FRP FIBERGLASS REINFORCED PANEL OVER 1/2" WATER RESISTANT GYP. BD. (W.R. GYP.) DUR-A-FLEX, INC. | DUR-A-QUARTZ | COLOR T.B.D.
- PT INTERIOR DRYWALL PAINT EGGSHELL/ FLAT SHERWIN-WILLIAMS | PROMAR 200 ZERO VOC | B30W02651
- TWC TACKABLE COMPOSITE WALL COVERING, DECOR, BULLETIN BOARD, COLOR: OYSTER





|                     | DESCRIPTION | DATE     |
|---------------------|-------------|----------|
| ∕1∖                 | Addendum 1  | 10/20/23 |
| $ \land $           |             |          |
|                     |             |          |
| $\wedge$            |             |          |
| $\overline{\wedge}$ |             |          |

| PROJECT NO:  | 2022-40190   |
|--------------|--------------|
| DATE ISSUED: | 7/7/2023     |
| SCALE:       | 1/4" = 1'-0" |
|              |              |

#### SHEET NUMBER:

SHEET TITLE:

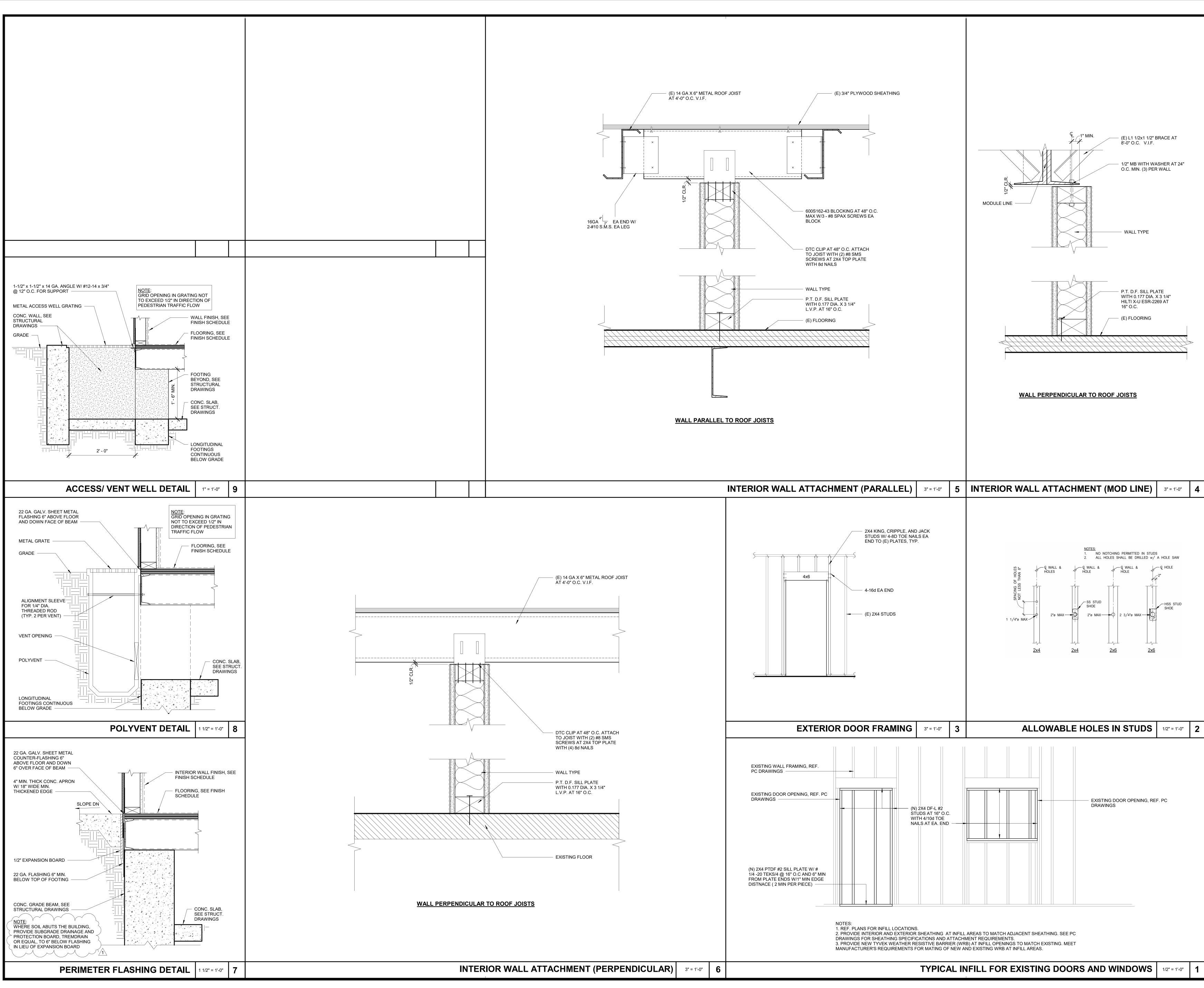
A52.1

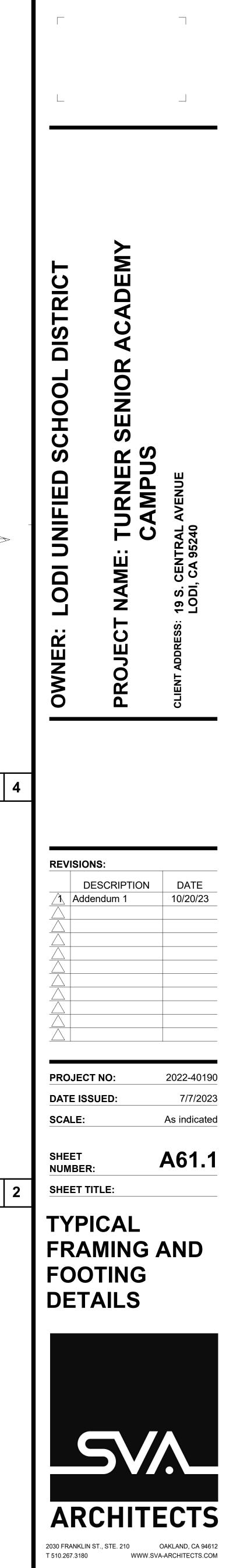
DOOR & WINDOW/ FINISH SCHEDULE



2030 FRANKLIN STREET #210 OAKLAND, CA 94612 WWW.SVA-ARCHITECTS.COM T 510.267.3180

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# TURNER SENIOR ACADEMY CAMPUS

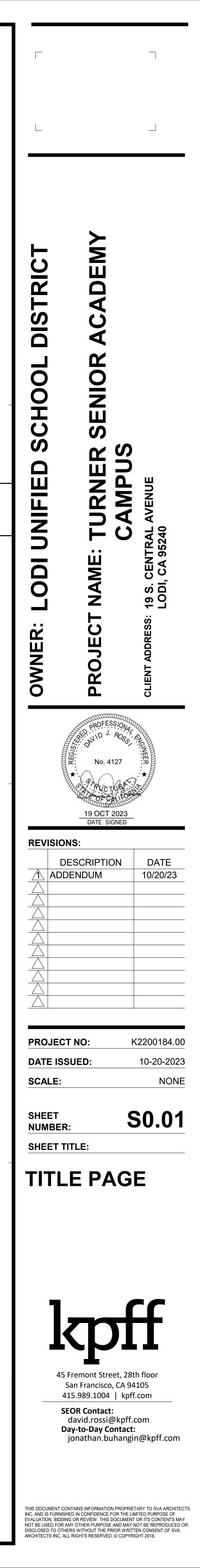
## ABBREVIATIONS

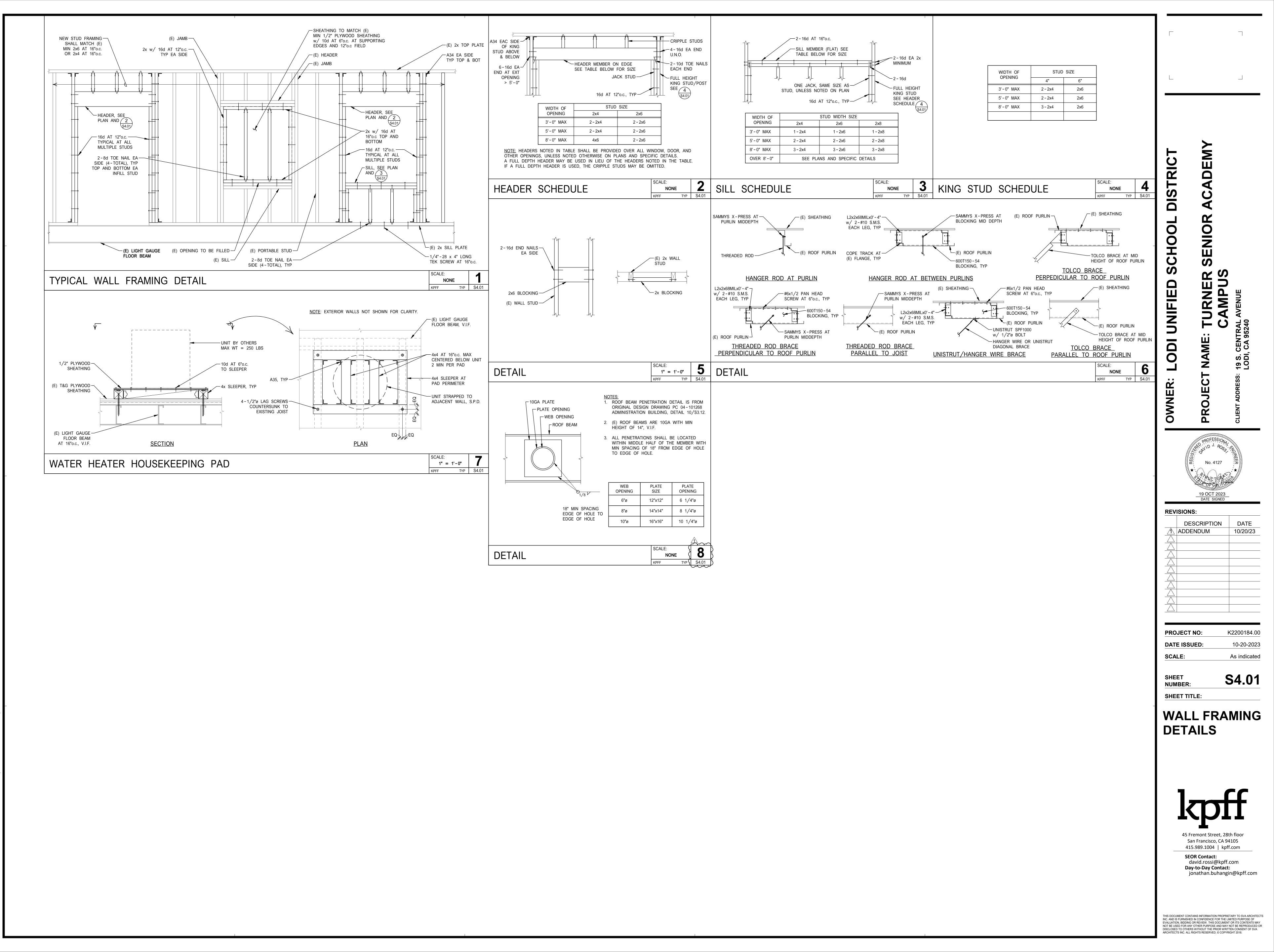
| A.B.                                                                                                                                                                                                                                                                                                                                                    | Anchor Bolt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F.O. STUD                                                                                                                                                                                                                                                                                         | Face of Stud                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACI                                                                                                                                                                                                                                                                                                                                                     | American Concrete Institute                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FRMG                                                                                                                                                                                                                                                                                              | Framing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A.D.                                                                                                                                                                                                                                                                                                                                                    | Area Drain                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | F.S.                                                                                                                                                                                                                                                                                              | Far Side                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ADDL                                                                                                                                                                                                                                                                                                                                                    | Additional                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FT                                                                                                                                                                                                                                                                                                | Foot or Feet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ADJ                                                                                                                                                                                                                                                                                                                                                     | Adjacent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FTG                                                                                                                                                                                                                                                                                               | Footing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A.F.F.                                                                                                                                                                                                                                                                                                                                                  | Above Finish Floor                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| AISC                                                                                                                                                                                                                                                                                                                                                    | American Institute of Steel Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                    | GA                                                                                                                                                                                                                                                                                                | Gage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ALT                                                                                                                                                                                                                                                                                                                                                     | Alternate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GALV                                                                                                                                                                                                                                                                                              | Galvanized                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| APPROX                                                                                                                                                                                                                                                                                                                                                  | Approximately                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | G.B.                                                                                                                                                                                                                                                                                              | Grade Beam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ARCH                                                                                                                                                                                                                                                                                                                                                    | Architect or Architectural                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | GLB                                                                                                                                                                                                                                                                                               | Glued Laminated Beam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ASPH                                                                                                                                                                                                                                                                                                                                                    | Asphalt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | GLC                                                                                                                                                                                                                                                                                               | Glued Laminated Column                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ASTM                                                                                                                                                                                                                                                                                                                                                    | American Society for Testing and Materials                                                                                                                                                                                                                                                                                                                                                                                                                                                  | GR                                                                                                                                                                                                                                                                                                | Grade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| A.C.                                                                                                                                                                                                                                                                                                                                                    | Asphaltic Concrete, Air Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                           | GYP                                                                                                                                                                                                                                                                                               | Gypsum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BAL                                                                                                                                                                                                                                                                                                                                                     | Balance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | HDR                                                                                                                                                                                                                                                                                               | Header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| B.L.                                                                                                                                                                                                                                                                                                                                                    | Bottom Lower                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | HGR                                                                                                                                                                                                                                                                                               | Hanger                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| BLDG                                                                                                                                                                                                                                                                                                                                                    | Building                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | НК                                                                                                                                                                                                                                                                                                | Hook                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BLK                                                                                                                                                                                                                                                                                                                                                     | Block                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | HORIZ                                                                                                                                                                                                                                                                                             | Horizontal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BLKG                                                                                                                                                                                                                                                                                                                                                    | Blocking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | H.P.                                                                                                                                                                                                                                                                                              | High Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BM                                                                                                                                                                                                                                                                                                                                                      | Beam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | H.R.                                                                                                                                                                                                                                                                                              | Hard Rock                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B.O.                                                                                                                                                                                                                                                                                                                                                    | Bottom of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | HSS                                                                                                                                                                                                                                                                                               | Hollow Structural Section                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B.O.<br>BOT                                                                                                                                                                                                                                                                                                                                             | Bottom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | HT                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | пі                                                                                                                                                                                                                                                                                                | Height                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| B.P.                                                                                                                                                                                                                                                                                                                                                    | Break Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BRD                                                                                                                                                                                                                                                                                                                                                     | Board                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                   | Moment of Inertia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| BRG                                                                                                                                                                                                                                                                                                                                                     | Bearing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I.D.                                                                                                                                                                                                                                                                                              | Inside Diameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BRKT                                                                                                                                                                                                                                                                                                                                                    | Bracket                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I.F.                                                                                                                                                                                                                                                                                              | Inside Face                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| BTWN                                                                                                                                                                                                                                                                                                                                                    | Between                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | INFO                                                                                                                                                                                                                                                                                              | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| B.U.                                                                                                                                                                                                                                                                                                                                                    | Bottom Upper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | INSUL                                                                                                                                                                                                                                                                                             | Insulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | INT                                                                                                                                                                                                                                                                                               | Interior                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| С                                                                                                                                                                                                                                                                                                                                                       | Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CBC                                                                                                                                                                                                                                                                                                                                                     | California Building Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | JST                                                                                                                                                                                                                                                                                               | Joist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C.I.P.                                                                                                                                                                                                                                                                                                                                                  | Cast In Place                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | JT                                                                                                                                                                                                                                                                                                | Joint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C.J.                                                                                                                                                                                                                                                                                                                                                    | Construction or Control Joint                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 01                                                                                                                                                                                                                                                                                                | o o i i i i                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CLG                                                                                                                                                                                                                                                                                                                                                     | Ceiling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | KIPS                                                                                                                                                                                                                                                                                              | 1000 Pounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CL                                                                                                                                                                                                                                                                                                                                                      | Center Line                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | KSF                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NOF                                                                                                                                                                                                                                                                                               | KIPS Per Square Foot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CLR                                                                                                                                                                                                                                                                                                                                                     | Clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CMU                                                                                                                                                                                                                                                                                                                                                     | Concrete Masonry Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | L                                                                                                                                                                                                                                                                                                 | Angle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| COL                                                                                                                                                                                                                                                                                                                                                     | Column                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | LBS                                                                                                                                                                                                                                                                                               | Pounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CONC                                                                                                                                                                                                                                                                                                                                                    | Concrete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | LL                                                                                                                                                                                                                                                                                                | Live Load                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CONN                                                                                                                                                                                                                                                                                                                                                    | Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LLH                                                                                                                                                                                                                                                                                               | Long Leg Horizontal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CONSTR                                                                                                                                                                                                                                                                                                                                                  | Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LLV                                                                                                                                                                                                                                                                                               | Long Leg Vertical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CONTIN                                                                                                                                                                                                                                                                                                                                                  | Continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LONGIT                                                                                                                                                                                                                                                                                            | Longitudinal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| C.J.P.                                                                                                                                                                                                                                                                                                                                                  | Complete Joint Penetration                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | L.P.                                                                                                                                                                                                                                                                                              | Low Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CTR                                                                                                                                                                                                                                                                                                                                                     | Center                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | L.S.                                                                                                                                                                                                                                                                                              | Low Shrinkage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CTRD                                                                                                                                                                                                                                                                                                                                                    | Centered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | LSL                                                                                                                                                                                                                                                                                               | Laminated Strand Lumber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CTRSNK                                                                                                                                                                                                                                                                                                                                                  | Countersink                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | LT                                                                                                                                                                                                                                                                                                | Light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| OTTONIC                                                                                                                                                                                                                                                                                                                                                 | oountersink                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | LVL                                                                                                                                                                                                                                                                                               | Laminated Veneer Lumber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| d                                                                                                                                                                                                                                                                                                                                                       | Doppy weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LTWT                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                         | Penny weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                   | Light Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| DBL                                                                                                                                                                                                                                                                                                                                                     | Double                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR                                                                                                                                                                                                                                                                                                                                             | Double<br>Depression                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MACH                                                                                                                                                                                                                                                                                              | Machine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DBL<br>DEPR<br>D.F.                                                                                                                                                                                                                                                                                                                                     | Double<br>Depression<br>Douglas Fir                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MAS                                                                                                                                                                                                                                                                                               | Masonry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DBL<br>DEPR<br>D.F.<br>DIA or                                                                                                                                                                                                                                                                                                                           | Double<br>Depression                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MAS<br>MATL                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR<br>D.F.                                                                                                                                                                                                                                                                                                                                     | Double<br>Depression<br>Douglas Fir                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MAS                                                                                                                                                                                                                                                                                               | Masonry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DBL<br>DEPR<br>D.F.<br>DIA or                                                                                                                                                                                                                                                                                                                           | Double<br>Depression<br>Douglas Fir<br>Diameter                                                                                                                                                                                                                                                                                                                                                                                                                                             | MAS<br>MATL                                                                                                                                                                                                                                                                                       | Masonry<br>Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG                                                                                                                                                                                                                                                                                                                   | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal                                                                                                                                                                                                                                                                                                                                                                                                                                 | MAS<br>MATL<br>MAX                                                                                                                                                                                                                                                                                | Masonry<br>Material<br>Maximum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM                                                                                                                                                                                                                                                                                                            | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension                                                                                                                                                                                                                                                                                                                                                                                                                    | MAS<br>MATL<br>MAX<br>M.B.                                                                                                                                                                                                                                                                        | Masonry<br>Material<br>Maximum<br>Machine Bolt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL                                                                                                                                                                                                                                                                                                      | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load                                                                                                                                                                                                                                                                                                                                                                                                       | MAS<br>MATL<br>MAX<br>M.B.<br>MC                                                                                                                                                                                                                                                                  | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN                                                                                                                                                                                                                                                                                                | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down                                                                                                                                                                                                                                                                                                                                                                                               | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.                                                                                                                                                                                                                                                          | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.                                                                                                                                                                                                                                                                                | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric                                                                                                                                                                                                                                                                                                                                                              | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.                                                                                                                                                                                                                                          | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame                                                                                                                                                                                                                                                                                                                                                                                                                                |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do                                                                                                                                                                                                                                                                                          | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto                                                                                                                                                                                                                                                                                                                                                                                      | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR                                                                                                                                                                                                                                   | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer                                                                                                                                                                                                                                                                                                                                                                                                                |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG                                                                                                                                                                                                                                                                         | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing                                                                                                                                                                                                                                                                                                                                                   | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN                                                                                                                                                                                                                            | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum                                                                                                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG                                                                                                                                                                                                                                                                         | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing                                                                                                                                                                                                                                                                                                                                       | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC                                                                                                                                                                                                                    | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous                                                                                                                                                                                                                                                                                                                                                                                    |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA                                                                                                                                                                                                                                                            | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each                                                                                                                                                                                                                                                                                                                               | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN                                                                                                                                                                                                                            | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum                                                                                                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.                                                                                                                                                                                                                                                    | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each<br>Each Face                                                                                                                                                                                                                                                                                                          | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL                                                                                                                                                                                                             | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal                                                                                                                                                                                                                                                                                                                                                                           |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.                                                                                                                                                                                                                                            | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint                                                                                                                                                                                                                                                                                               | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)                                                                                                                                                                                                      | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal                                                                                                                                                                                                                                                                                                                                                                           |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL                                                                                                                                                                                                                                      | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each<br>Each<br>Each<br>Each<br>Each<br>Expansion Joint<br>Elevation                                                                                                                                                                                                                                                       | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.                                                                                                                                                                                              | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable                                                                                                                                                                                                                                                                                                                                                  |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC                                                                                                                                                                                                                              | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical                                                                                                                                                                                                                                                                    | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.                                                                                                                                                                                    | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract                                                                                                                                                                                                                                                                                                                               |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV                                                                                                                                                                                                              | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator                                                                                                                                                                                                                                                        | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.                                                                                                                                                                             | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV<br>EMBED                                                                                                                                                                                                     | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical                                                                                                                                                                                                                                                                    | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.                                                                                                                                                                     | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile                                                                                                                                                                                                                                                                                                       |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV                                                                                                                                                                                                              | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator                                                                                                                                                                                                                                                        | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.                                                                                                                                                                             | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number                                                                                                                                                                                                                                                                                                                     |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV<br>EMBED                                                                                                                                                                                                     | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Elevator<br>Embedment                                                                                                                                                                                                                                                 | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.                                                                                                                                                                     | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile                                                                                                                                                                                                                                                                                                       |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV<br>EMBED<br>E.N.                                                                                                                                                                                             | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail                                                                                                                                                                                                                              | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.                                                                                                                                                             | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side                                                                                                                                                                                                                                                                                          |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL                                                                                                                                                                                             | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevaton<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer                                                                                                                                                                                                      | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.                                                                                                                                                             | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side                                                                                                                                                                                                                                                                                          |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR                                                                                                                                                                             | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure                                                                                                                                                                                                                 | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.                                                                                                                                                   | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid – depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale                                                                                                                                                                                                                                                        |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS                                                                                                                                                                 | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry                                                                                                                                                                       | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.                                                                                                                                           | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale                                                                                                                                                                                                                                                        |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O. PL                                                                                                                                                      | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of Masonry<br>Edge of Plate                                                                                                                                                                 | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.                                                                                                                           | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face                                                                                                                                                                                                                         |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O. PL<br>E.O. SLAB                                                                                                                                         | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab                                                                                                                                      | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>o.c.<br>O.D.<br>O.F.<br>O.H.                                                                                                                   | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand                                                                                                                                                                                      |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O. PL<br>E.O. SLAB<br>EQ                                                                                                                                   | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevaton<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Slab<br>Equal                                                                                                                                               | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG                                                                                                           | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening                                                                                                                                                                                             |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT                                                                                                          | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevaton<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Slab<br>Equal<br>Equipment                                                                                                                                  | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.                                                                                                   | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite                                                                                                                                                                                 |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O. PL<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.                                                                                               | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevaton<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way                                                                                                                        | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB                                                                                            | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board                                                                                                                                                        |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O. PL<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP                                                                                        | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevator<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion                                                                                                                         | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.                                                                                | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder                                                                                                                               |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O. PL<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.                                                                                               | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevaton<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way                                                                                                                        | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB                                                                                            | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board                                                                                                                                                        |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT                                                                                                        | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                                            | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.                                                                    | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                                       |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT                                                                                                        | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR                               | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                   |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>FDN                                                                     | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC                                                       | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                                       |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT                                                                                                        | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR                               | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                   |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>FDN                                                                     | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC                                                       | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                   |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>FDN<br>F.F.                                                                                 | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                                            | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC<br>P/C                                                | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                                       |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>F.D.<br>F.D.<br>F.F.<br>FIN                                             | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior                                                                           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC<br>P/C<br>PCF | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist                                                                                   |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>FDN<br>F.F.<br>FIN<br>F.R.<br>F.O.                                                          | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevration<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Plate<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior<br>Floor Drain<br>Foundation<br>Finish Floor<br>Finish<br>Floor<br>Face of | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC<br>P/C<br>PCF<br>P.D.F.<br>P.D.P.                     | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist<br>Parapet<br>Piece<br>Precast<br>Pound per Cubic Foot<br>Powder Driven Fastener<br>Powder Driven Pin |
| DBL<br>DEPR<br>D.F.<br>DIA or<br>DIAG<br>DIM<br>DL<br>DN<br>do<br>D.W.F.<br>DWG<br>(E)<br>EA<br>E.F.<br>E.J.<br>EL<br>ELEC<br>ELEV<br>EMBED<br>E.N.<br>ENCL<br>ENGR<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. MAS<br>E.O.<br>E.O. SLAB<br>EQ<br>EQPT<br>E.O. SLAB<br>EQ<br>EQPT<br>E.W.<br>EXP<br>EXT<br>F.D.<br>F.D.<br>F.D.<br>F.I.<br>F.I.<br>F.I.<br>F.I. | Double<br>Depression<br>Douglas Fir<br>Diameter<br>Diagonal<br>Dimension<br>Dead Load<br>Down<br>Ditto<br>Deformed Wire Fabric<br>Drawing<br>Existing<br>Each<br>Each Face<br>Expansion Joint<br>Elevation<br>Electrical<br>Elevator<br>Embedment<br>Edge Nail<br>Enclosure<br>Engineer<br>Edge of<br>Edge of Masonry<br>Edge of Plate<br>Edge of Slab<br>Equal<br>Equipment<br>Each Way<br>Expansion<br>Exterior<br>Floor Drain<br>Foundation<br>Finish Floor<br>Finish<br>Floor           | MAS<br>MATL<br>MAX<br>M.B.<br>MC<br>M.D.<br>MECH<br>M.F.<br>MFR<br>MIN<br>MISC<br>MTL<br>(N)<br>N.A.<br>N.I.C.<br>NO.<br>N.P.<br>N.S.<br>N.T.S.<br>O.C.<br>O.D.<br>O.F.<br>O.H.<br>OPNG<br>OPP.<br>OSB<br>O.W.S.G.<br>O.W.S.J.<br>PAR<br>PC<br>P/C<br>PCF<br>P.D.F.                               | Masonry<br>Material<br>Maximum<br>Machine Bolt<br>Miscellaneous Channel<br>Mid - depth<br>Mechanical<br>Moment Frame<br>Manufacturer<br>Minimum<br>Miscellaneous<br>Metal<br>New<br>Not Applicable<br>Not In Contract<br>Number<br>No Profile<br>Near Side<br>Not To Scale<br>On Center<br>Outside Diameter<br>Outside Face<br>Opposite Hand<br>Opening<br>Opposite<br>Oriented Strand Board<br>Open Web Steel Girder<br>Open Web Steel Joist<br>Parapet<br>Piece<br>Precast<br>Pound per Cubic Foot<br>Powder Driven Fastener                      |

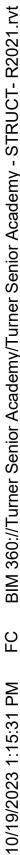
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## 19 S. CENTRAL AVENUE LODI, CA 95240

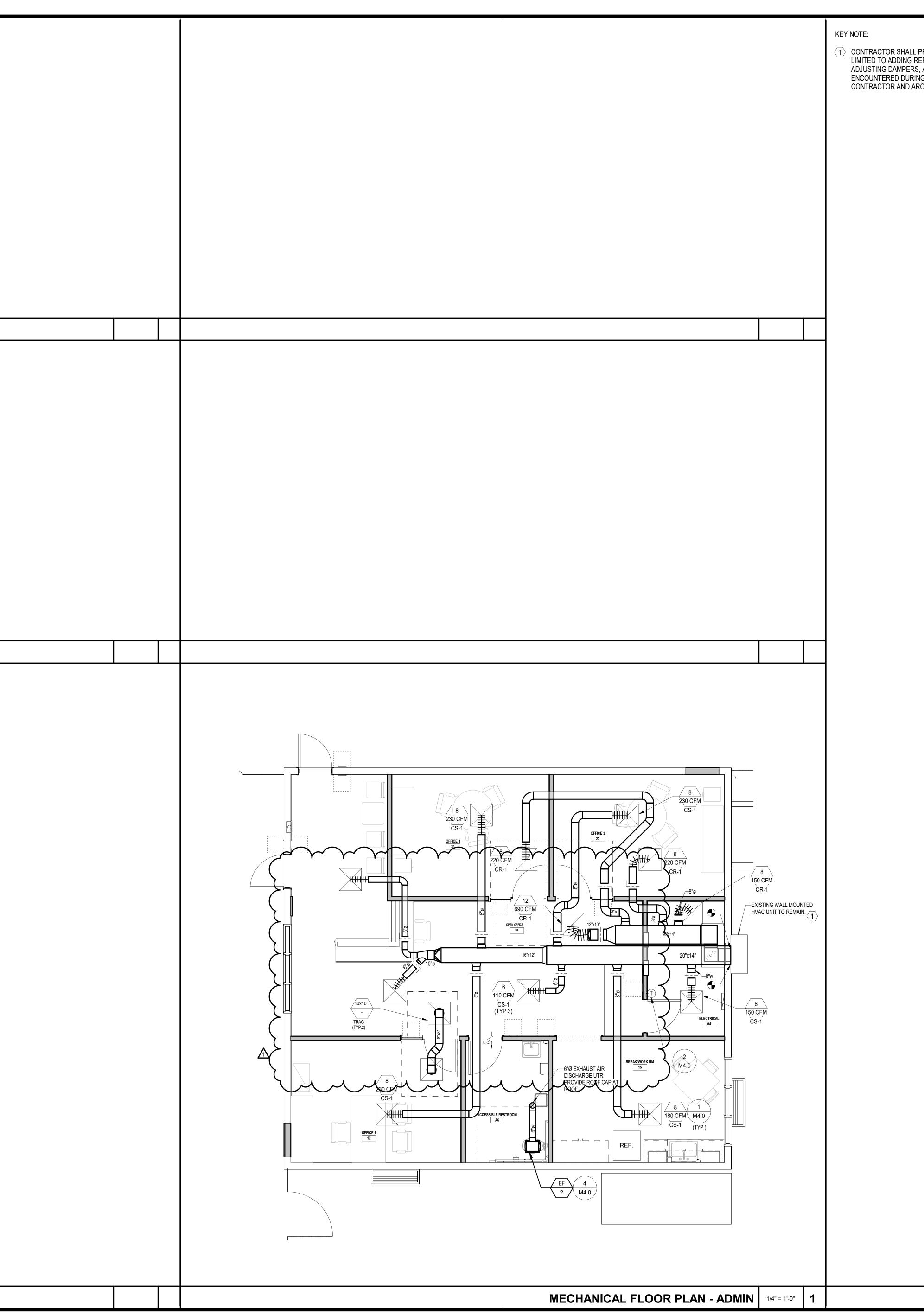
| S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SYMBOLS | SHEET INDEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| P.F     Pounds pro Linear Fool       PYWO P     Pywood       Pywood     Pywood       Pyer Pounds par Square Fool     Pyerse       Pyerse     Pounds par Square Fool       PSI     Parallel Strand Lumber       P/T     Pressure Treated       Pysare Treated     Douglas Fir       R     Radius       RAD     Radius       Station Industrain       Stati |         | SHEET INDEX       NUMBER OF THE PACE         NUMBER OF THE PACE       NUMER OF THE PACE         NUMBER OF THE PACE       NUMER OF THE PACE         NUMER OF THE PACE       NUMER OF THE PACE |



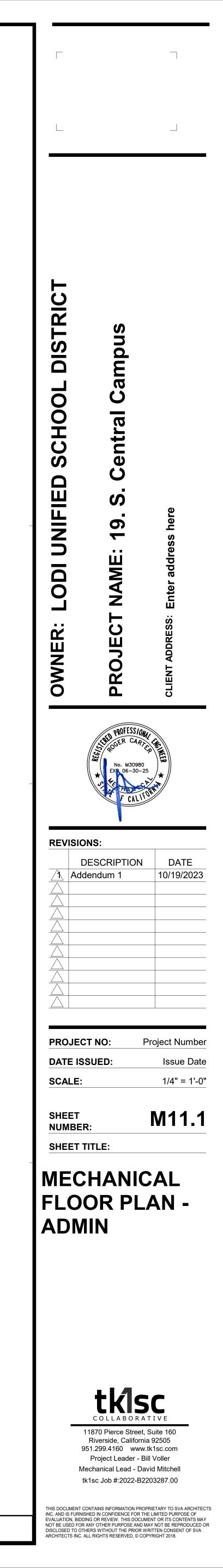


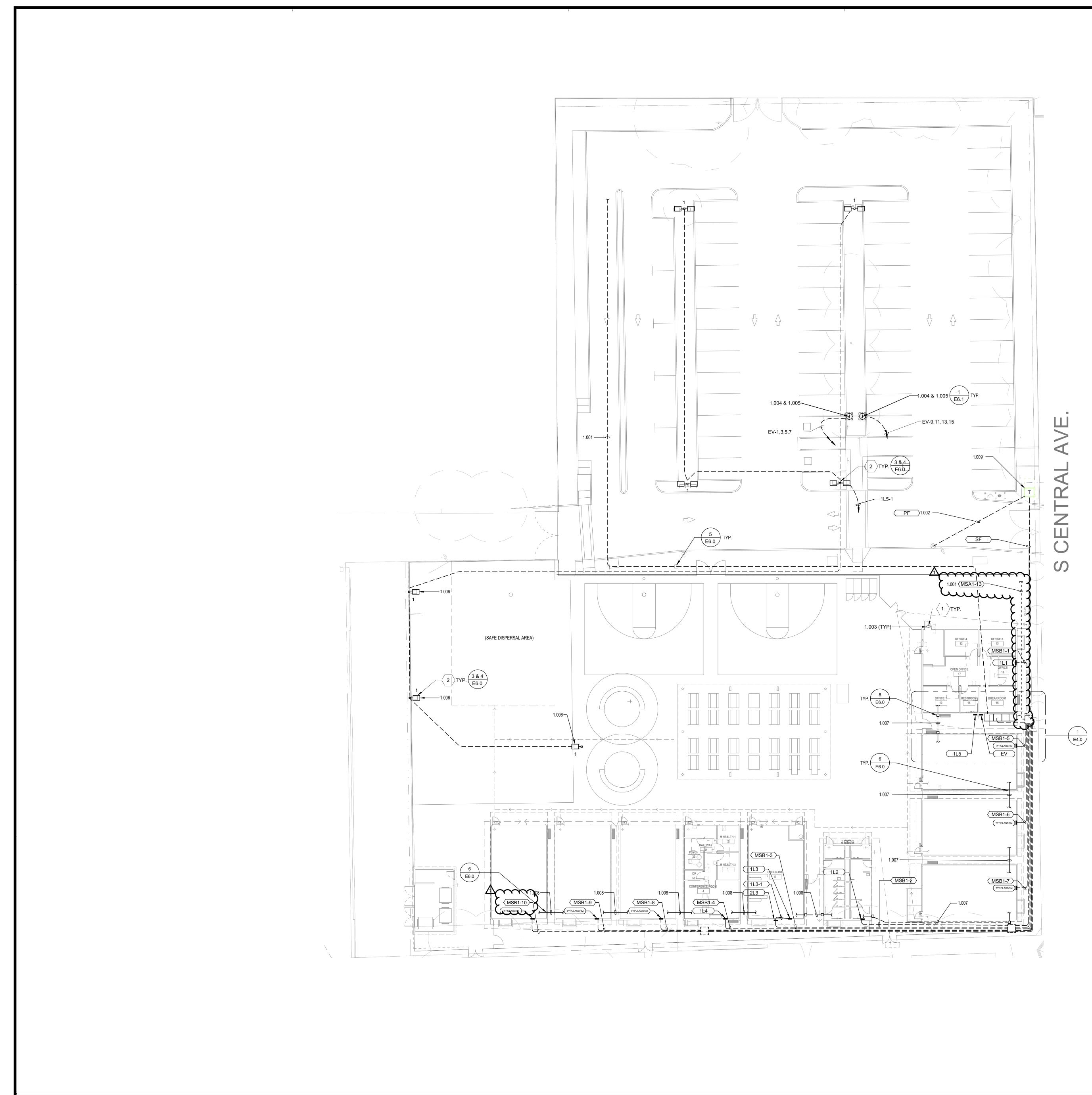


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1 CONTRACTOR SHALL PROVIDE BASIC SERVICING OF UNIT INCLUDING, BUT NOT LIMITED TO ADDING REFRIGERANT IF NECESSARY, REPLACING WORN BELTS, ADJUSTING DAMPERS, AND CHANGING FILTERS. MAKE NOTE OF ANY MAJOR ISSUES ENCOUNTERED DURING SERVICE. SUBMIT HVAC SERVICE REPORT TO GENERAL CONTRACTOR AND ARCHITECT.





## SITE UTILITY PLAN

- **CONSTRUCTION NOTES:**
- 1. CALL UNDERGROUND SERVICE ALERT (USA) AT (800) 422-4133 OR APPLICABLE STATE AND LOCAL DIG SAFE OR UNDERGROUND ALERT HOTLINES PRIOR TO CONSTRUCTION START.
- 2. COORDINATE ALL UNDERGROUND STRUCTURES AND CONDUIT ROUTING WITH LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CRITICAL
- LANDSCAPE PLANTING/HARDSCAPE AREAS.
   VAULTS, MAINTENANCE HOLES (MH'S), FORMERLY KNOWN AS MANHOLES, AND CONDUITS SHALL MAINTAIN A MINIMUM COVER OF 24" BELOW FINAL SURFACE AT ALL CONDITIONS. INCLUDE ALL COSTS IN BASE BID TO MEET UTILITY COMPANY REQUIREMENTS WHICH MAY REQUIRE GREATER MINIMUM CONDUIT DEPTHS.
- 4. VAULTS, MH'S AND PULLBOXES (PB'S) SHALL BE EQUIPPED WITH KNOCKOUT PANELS OR PRE-CAST INDIVIDUAL CONDUIT OPENINGS. CONDUITS SHALL ONLY ENTER AND EXIT ON END/SHORT WALLS. CONDUITS MAY NOT ENTER AND EXIT ON SIDE/LONG WALLS, CEILINGS OR FLOORS UNLESS OTHERWISE NOTED.
- 5. CUT DUCTS FLUSH WITH INTERIOR VAULT/MH/PB WALL.
- 6. GROUT AROUND DUCT ENTRANCES ON VAULT/MH/PB WALLS.
- 7. SLURRY BACKFILL AROUND DUCTS WITHIN 5 FEET OF VAULT/MH/PB TO PREVENT SHEARING.
- CONDUITS PASSING UNDER THE BUILDING PERIMETER SHALL BE ENCASED IN LIGHTWEIGHT CONCRETE OR WATER-IMPERVIOUS CLAY TO PREVENT WATER INFILTRATION. SEE ELECTRICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- CONDUIT BEND RADIUS FOR BUILDING ENTRANCES AND AT POLES SHALL BE A MINIMUM OF 24" FOR CONDUITS WITH LESS THAN 2" INTERNAL DIAMETER AND A MINIMUM OF 48" FOR CONDUITS WITH MORE THAN 2" INTERNAL DIAMETER.
   PREFERRED CONDUIT SWEEP RADIUS BETWEEN VAULTS IS 25 FEET. UNDER NO CIRCUMSTANCES
- SHALL THE CONDUIT SWEEP RADIUS BE LESS THAN 12.5 FEET. MAXIMUM OF 90 DEGREES PER SWEEP AND LIMITED TO NO MORE THAN (2) 90 DEGREE SWEEPS BETWEEN VAULTS.
  11. VAULTS/MH's/PB'S ARE TO BE EQUIPPED WITH RACKING, GROUNDING LUGS, AND BOLT-DOWN LIDS
- VAULTS AND MH'S TO BE EQUIPPED WITH ROUND COVERS, EXTENSION RINGS AS REQUIRED,
- LADDERS AND (3) SEGMENTS OF 6 FOOT HIGH CABLE RACKING PER EACH LONG WALL.
- 13. LABEL ALL NON-UTILITY COMMUNICATION VAULT/MH/PB COVERS WITH "COMMUNICATIONS" UNLESS OTHERWISE NOTED ON PLANS.
- 14. COORDINATE FINAL VAULT/MH/PB OPENING HEIGHT WITH G.C. PRIOR TO ROUGH-IN TO ENSURE FINAL GRADE DOES NOT SLOPE INTO VAULT/MH/PB OPENING.
- 15. CONTRACTOR TO PROVIDE A MINIMUM OF 8" DEEP COMPACTED 1/2" DIAMETER GRAVEL, UNDER ALL VAULTS, MH'S OR PB'S TO ENSURE UNIFORM DISTRIBUTION OF SOIL PRESSURE ON THE FLOOR AND BE ABLE TO DISSIPATE WATER OUT OF THE VAULT, MH OR PB.
- 16. ALL VAULTS/MH's/PB's WITHOUT GROUNDING LUGS SHALL HAVE AN 8' x 3/4" COPPER GROUND ROD DRIVEN THRU THE FLOOR TO ALLOW GROUNDING OF ITEMS WITHIN.
- ALL VAULTS/MH's/PB'S SHALL BE PROVIDED WITH TRAFFIC RATED COVERS WHEN LOCATED IN PAVED AREAS UTILIZED FOR VEHICLE TRAFFIC.
   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 MANUFACTURER OF THE ORIGINAL BARRIER PRODUCT.
- 19. THE CONTRACTOR SHALL INCLUDE IN BASE BID ALL COSTS TO COMPLY WITH ALL REQUIREMENTS FOR CONFINED SPACE ENTRY PER THE OSHA REQUIREMENTS 29 CFR-1910.146, 29 CFR-1910.268, ETC. DURING ANY CONFINED SPACE ENTRY.
- ANY DUCTS LEAVING A VAULT, MH OR PB ROUTED INTO A FACILITY SHALL BE PLUGGED AT EACH END USING REMOVABLE MECHANICAL PLUGS DESIGNED TO PREVENT WATER AND GAS FROM ENTERING THE FACILITY.
- 21. SEE ELECTRICAL SPECIFICATIONS AND PLAN DETAILS FOR ADDITIONAL REQUIREMENTS REGARDING UNDERGROUND CONDUITS AND IN-GRADE VAULT/MH/PB/JUNCTION BOXES.

#### SITE UTILITY PLAN NOTES:

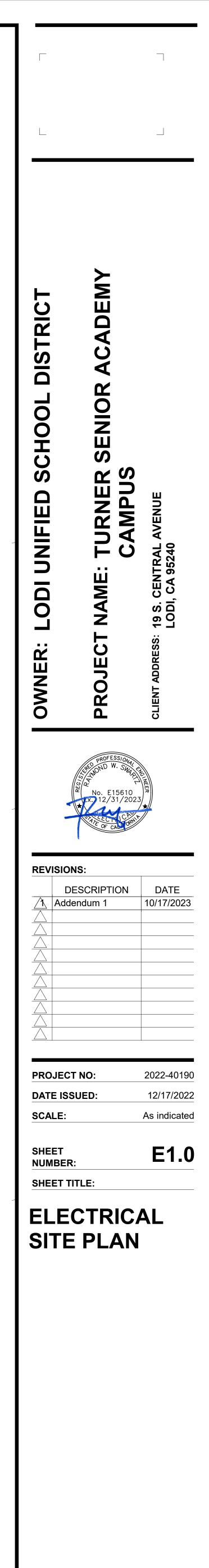
- 1. UTILITY POINTS OF SERVICE AND WORK/MATERIAL SHOWN ARE BASED UPON PRELIMINARY INFORMATION ONLY BY THE UTILITY COMPANIES AND ARE FOR BID PURPOSES ONLY.
- 2. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR FINAL AND EXACT WORK/MATERIAL REQUIREMENTS AND CONSTRUCT TO UTILITY COMPANY ENGINEERING PLANS AND SPECIFICATIONS ONLY. CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, PULL WIRES, CABLES, PULLBOXES, CONCRETE ENCASEMENT OF CONDUITS, TRANSFORMER PAD, BARRIERS, POLE RISERS, TRENCHING AND BACKFILL, AND PAY ALL UTILITY CO. FEES AND INCLUDE ALL REQUIREMENTS IN SCOPE OF WORK.
- 3. LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING, OR CONDUITS, ETC., AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT
- SITE PLAN GENERAL NOTES:

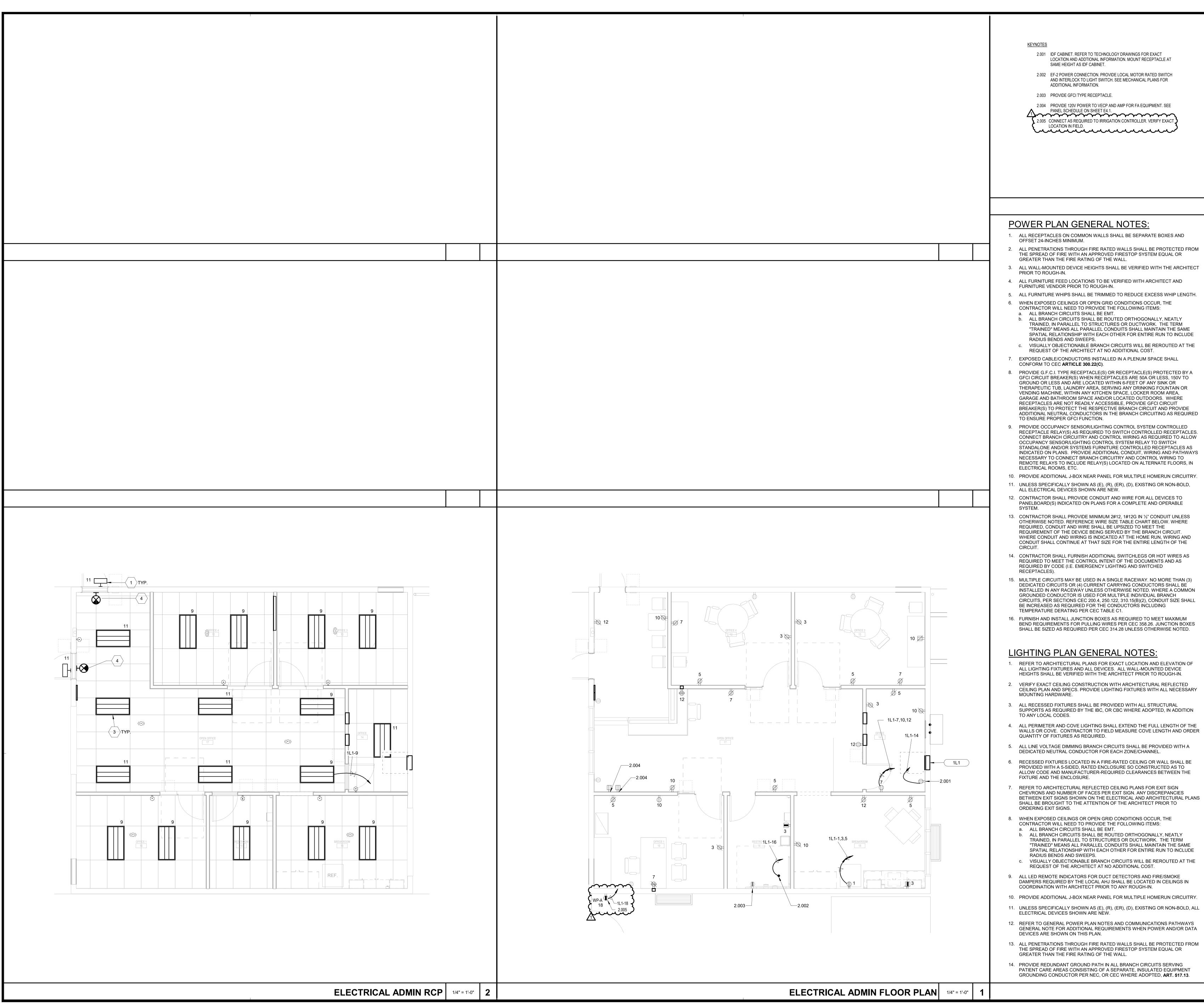
INCLUDE THE NECESSARY ELEMENTS FOR CONSTRUCTION SAFETY.

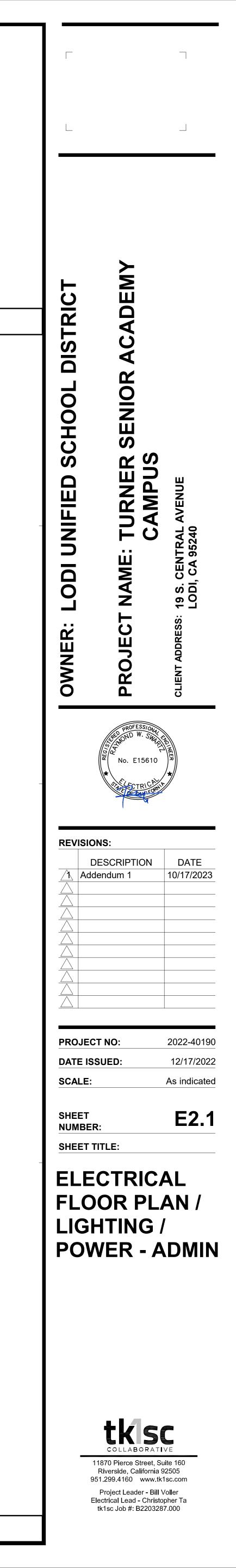
- 1. CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING OR CONDUITS, ETC., AND TO PREVENT HAZARDS TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE THE NECESSARY ELEMENTS FOR CONSTRUCTION SAFETY.
- 2. CALL UNDERGROUND SERVICE ALERT (USA) AT 1 (800) 422-4133 OR APPLICABLE STATE AND LOCAL DIG SAFE OR UNDERGROUND ALERT HOTLINES PRIOR TO CONSTRUCTION START.
- 3. MINIMUM CONDUIT SIZE SHALL BE 3/4" U.O.N.
- 4. MINIMUM CONDUCTOR SIZE SHALL BE #10 AWG. U.O.N.
- 5. ALL SITE BRANCH CIRCUITS SHALL INCLUDE AN EQUIPMENT GROUND CONDUCTOR THAT, AT MINIMUM, MATCHES THE SIZE OF THE ASSOCIATED BRANCH CIRCUIT CONDUCTOR. WHERE MULTIPLE BRANCH CIRCUITS ARE ROUTED/GROUPED TOGETHER, THE EQUIPMENT GROUNDING CONDUCTOR SHALL MATCH THE SIZE OF THE LARGEST BRANCH CIRCUIT CONDUCTOR IN THE CROUP.
- 6. ALL ELECTRICAL EQUIPMENT MOUNTED OUTDOORS SHALL BE WEATHERPROOF (NEMA #3R).
- ALL CONDUIT ONLY SHALL BE PROVIDED WITH A NYLON PULL STRING.
   SEE ARCHITECTURAL/LANDSCAPE ARCHITECTURAL PLANS FOR EXACT LOCATIONS OF FIXTURES, PULLBOXES, MANHOLES, OTHER ELECTRICAL DEVICES, ETC. COORDINATE ALL UNDERGROUND STRUCTURES AND CONDUIT ROUTING WITH LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CRITICAL LANDSCAPE PLANTING/HARDSCAPE AREAS.
- 9. UNLESS SPECIFICALLY SHOWN AS (E), (R), (ER), (D), EXISTING OR NON-BOLD, ALL ELECTRICAL DEVICES SHOWN ARE NEW.

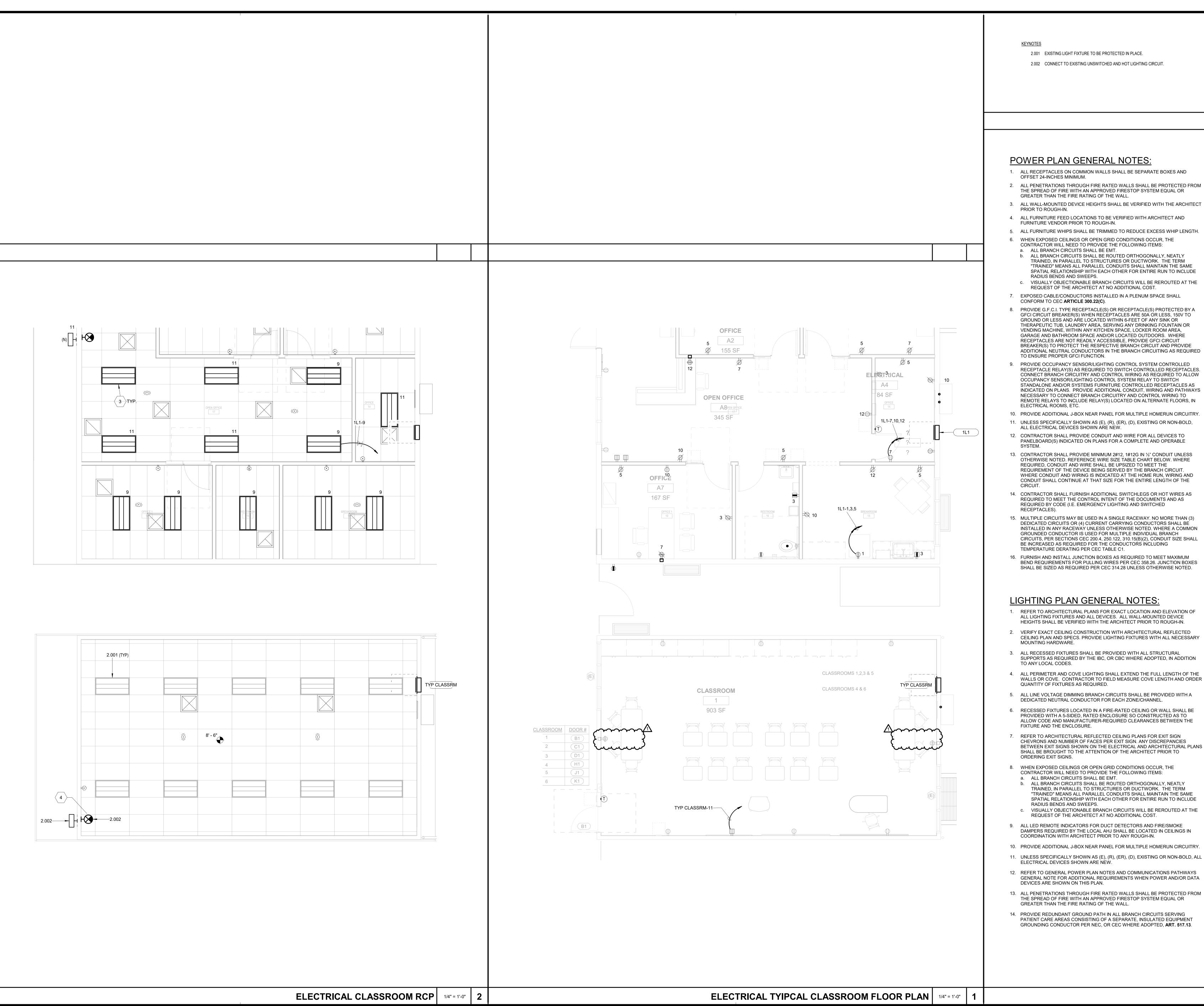
#### <u>KEYNOTES</u>

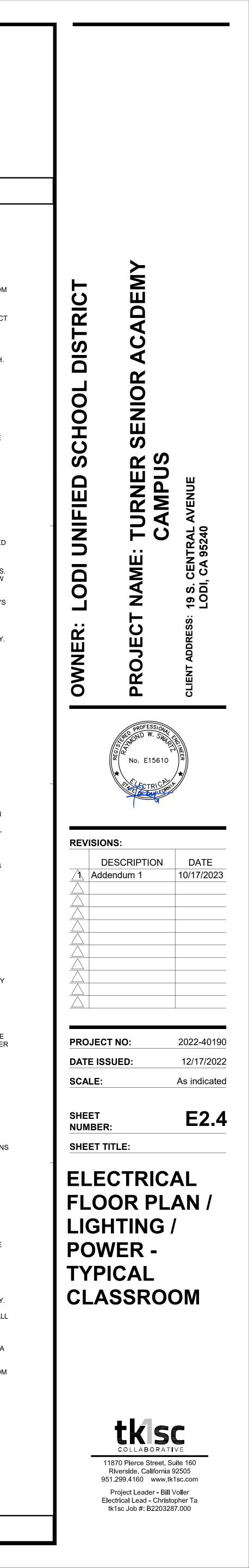
- 1.001 PROVIDE FUTURE STUB UP TO NEW BUIDLING.
- 1.002 TO UTILITY COMPANY POINT OF CONNECTION. VERIFY EXACT LOCATION AND REQUIREMENTS WITH SERVING UTILITY COMPANY.
- 1.003 CONNECT NEW TYPE 1 LIGHT FIXTURE TO RELOCTABLE HOT UNSWITCHED LIGHTING CIRCUIT.
- 1.004 PROVIDE 1"C.-4#8(HOT) + 1#10 GRD. CONTRACTOR TO INSTALL DUAL-INPUT EV CHARGER.
- 1.005 PROVIDE 1"C. POWER AND 1"C. DATA TO ADMIN BUILDING IDF FOR EACH EV CHARGER LOCATION. PROVIDE (2) 11"X17" IN-GRADE CONCRETE BOX WITH TRAFFIC RATED COVER FOR EACH CHARGER LABELED 'POWER' AND 'DATA'.
- 1.006 LIGHTING FOR SAFE DISPERSAL AREA.
- 1.007 PROVIDE (5) 2" CONDUITS [INTRUSION, FIRE, DATA, AND (2) SPARE] BETWEEN RELOCATABLE BUILDINGS.
- 1.008 PROVIDE (5) 1" CONDUITS [INTRUSION, FIRE, DATA, AND (2) SPARE] BETWEEN RELOCATABLE BUILDINGS.
- 1.009 EXISTING 8'X10' UTILITY TRANSFORMER PAD. VERIFY EXACT LOCATION AND REQUIREMENTS WITH SERVING UTILITY COMPANY.











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| MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| N<br>O<br>T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| <ul> <li>R CAFETERIA 5</li> <li>M</li> <li>SPACE</li> <li>WH-1</li> <li></li> <li>WH-3</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE LIGHTING<br>SPARE<br>SPARE<br>SPARE<br>SPARE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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VA<br>/e<br>C<br>I<br>R<br>C<br>2<br>4<br>6<br>8                                                                                                                                                          | P<br>E<br><br><br>                                                                          | O<br>L<br>E<br>1<br>1<br>1                                                                            | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE LIGHTING<br>SPARE<br>SPARE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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VA<br>/e<br>C<br>I<br>R<br>C<br>2<br>4<br>6                                                                                                                                                               | P<br>E<br><br>                                                                              | 0<br>L<br>E<br>1<br>1                                                                                 | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE 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Wy<br>A)                                                                                             | VA<br>/e<br>C<br>I<br>R<br>C<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24                                                                                                          | P<br>E<br><br><br><br><br><br><br><br><br><br><br>                                          | O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1           | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br><br><br><br>                                                                                                                                                                                                                                                                                                                                                                                                                             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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE 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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE 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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE 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23.15%                 | VOLTS<br>PHASE<br>WIRE<br>AIC<br>VA)                                                                                                | E: 3<br>E: 4<br>D: 0<br>C (V<br>0<br>0<br>                              | 3990<br>208 WVy<br>A)<br>0<br>0<br>0<br><br><br><br><br><br><br><br><br>                                         | VA<br>/e<br>/<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40                                                                   | P<br>E<br><br><br><br><br><br><br><br><br><br><br><br>                                      | O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A                                                                                                                                                                                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| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE LIGHTING<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SP | Ce DOU<br>200%      | NEUTR         I/G B         K         R         20 A         20 A | 3240<br>GS: 1<br>AL: 1<br>US: 1<br>P<br>O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1                                                                                                                                                                                                                      | VA           No           No           No           T           Y           P           E           I                                                                                                                                       - | C I R C I I 115<br>3 5 7 0 9 11 13<br>13<br>15 17 19<br>21 23<br>23<br>27 29<br>33<br>33<br>33<br>33<br>33<br>33<br>33<br>39<br>39<br>41<br>S: 11                                                                                                                                                                                                         | A (VA) 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 23.15%                 | VOLTS<br>PHASE<br>WIRE<br>AIC<br>VA)<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | E: 3<br>E: 4<br>D: 0<br>C (V<br>0<br>0<br><br><br><br><br><br><br>0.00  | 3990<br>08 Wy<br>A)<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0    | VA<br>/e<br>/e<br>/<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>24<br>26<br>28<br>30<br>32<br>24<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>32<br>34<br>36<br>32<br>34<br>36 | P<br>E<br><br><br><br><br><br><br><br><br><br><br><br>                                      | O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | LOCA<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE                                                                                                                                                                             |                       | 225 A<br>DESCR            |        |
| R = RECEPTACLE<br>W = WATER HEATER<br>MOUNTING: Surfa<br>NEMA 3R: Yes<br>FEED THRU: No<br>M.L.O.: No<br>N<br>O<br>T<br>E<br>SITE LIGHTING<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SP |                     | NEUTR         I/G B         K         R         20 A         20 A | 3240<br>GS: I<br>AL: I<br>US: I<br>P<br>O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1                                                                                                                                                                                                                      | VA           No           No           No           T           Y           P           E           I                                                                                                                                       - | C I R C I I 115<br>3 5 7 0 9 11 13<br>13<br>15 17 19<br>21 23<br>23<br>27 29<br>33<br>33<br>33<br>33<br>33<br>33<br>33<br>39<br>39<br>41<br>S: 11                                                                                                                                                                                                         | A (VA) 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 23.15%                 | VOLTS<br>PHASE<br>WIRE<br>AIC<br>VA)<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | E: 3<br>E: 4<br>C (V<br>C (V<br>0<br>0<br>0<br><br><br><br>0.00<br>0.00 | 3990<br>308 WVy<br>A)<br>(A)<br>(A)<br>(A)<br>(A)<br>(A)<br>(A)<br>(A)<br>(A)<br>(A)                             | VA<br>/e<br>/e<br>/<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>24<br>26<br>28<br>30<br>32<br>23<br>4<br>36<br>38<br>40<br>42<br>2<br>0<br>22                                  | P<br>E<br><br><br><br><br><br><br><br><br><br><br><br>                                      | O<br>L<br>E<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | B<br>K<br>R<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A<br>20 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | LOCA<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE                                                                                                                                                           |                       | 225 A<br>DESCR            |        |

|                                            |                            |                  | F                               |
|--------------------------------------------|----------------------------|------------------|---------------------------------|
| ON                                         |                            | N<br>O<br>T<br>E | N<br>O<br>T<br>E                |
|                                            |                            |                  |                                 |
|                                            |                            |                  |                                 |
|                                            |                            |                  | A,E<br>A,E                      |
|                                            |                            |                  |                                 |
|                                            |                            |                  |                                 |
|                                            |                            |                  |                                 |
|                                            |                            |                  |                                 |
|                                            |                            |                  |                                 |
|                                            |                            |                  | COI                             |
| ALS<br>AMPS<br>106.2 A<br>109.5 A<br>108 A | KV<br>2549<br>2627<br>1301 | 2 VA<br>7 VA     | L =<br>K =<br>L =<br>P =        |
|                                            |                            |                  | R =<br>W =                      |
|                                            |                            |                  | <u>ا</u>                        |
| ION                                        |                            | NOTE             | N<br>O                          |
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|                                            |                            |                  | COI<br>H =<br>K =               |
|                                            |                            |                  | COI<br>H =<br>K =<br>L =<br>M = |
|                                            |                            |                  | COI<br>H =<br>K =<br>L =<br>M = |
|                                            |                            |                  | COI<br>H =<br>K =<br>L =<br>M = |
| ALS<br>AMPS<br>3.2 A<br>4.0 A              | KV<br>1155                 | /A               | COI<br>H =<br>K =<br>L =<br>M = |

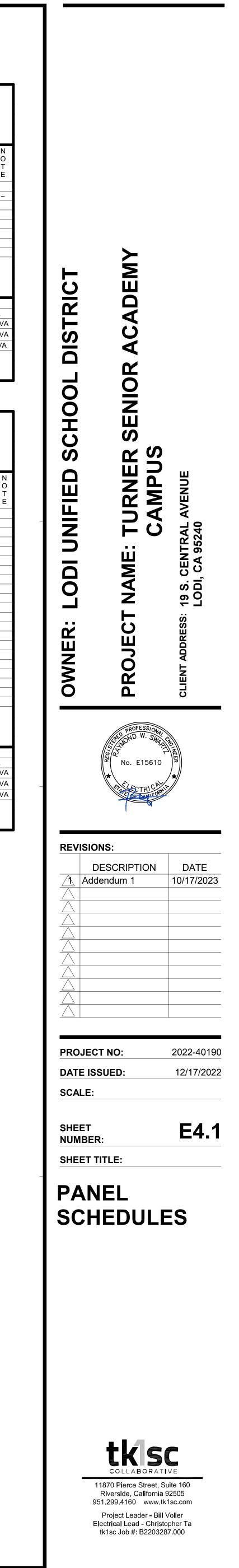
|                  |                 |                     |             |                  |             | P/               | ANE   | L: 1     | L1                   |                  |                  |                  |                       |             |                         |         |          |
|------------------|-----------------|---------------------|-------------|------------------|-------------|------------------|-------|----------|----------------------|------------------|------------------|------------------|-----------------------|-------------|-------------------------|---------|----------|
| M                | OUNTING: FLUSH  | d DOUI              | BLE-LUG     | <b>S:</b> No     | D           |                  |       |          | VOLTS                | <b>5:</b> 120/24 | 40 V             |                  |                       | S           | JPPLY FROM:             |         |          |
|                  | NEMA 3R: No     | 200%                | NEUTRA      | L: No            | D           | <b>PHASE:</b> 1  |       |          |                      |                  |                  |                  |                       |             | LOCATION: OFFICE 14     |         |          |
| FE               | ED THRU: No     |                     | I/G BU      | S: No            | C           | <b>WIRE</b> : 3  |       |          |                      |                  |                  |                  |                       |             | MCB: 200A/2P            |         |          |
|                  | M.L.O.: No      |                     |             |                  |             |                  |       |          | AIC                  | : 0              | _                | _                | _                     | _           | BUS: 225 A              |         |          |
| N<br>O<br>T<br>E | D               | ESCRIPTION          | B<br>K<br>R | P<br>O<br>L<br>E | T<br>Y<br>E | C<br>I<br>R<br>C | Α (   | VA)      | В (                  | VA)              | C<br>I<br>R<br>C | T<br>Y<br>P<br>E | P<br>O<br>L<br>E      | B<br>K<br>R |                         |         |          |
|                  | BREAK ROOM FRID | DGE                 | 20 A        | 1                | R           | 1                | 800   | 4560     |                      |                  | 2                | Р                | 2                     | 60 A        | HVAC (4-TON)            |         |          |
|                  | ADMIN BLDG RECE | ETPACLES            | 20 A        | 1                | R           | 3                |       |          | 1080                 | 4560             | 4                |                  |                       |             |                         |         |          |
|                  | ADMIN BLDG RECE | EPTACLES            | 20 A        | 1                | R           | 5                | 1080  | 3120     |                      |                  | 6                | Р                | 2                     | 30 A        | 5KW HEAT STRIP          |         |          |
|                  | ADMIN BLDG RECE | PTACLES             | 20 A        | 1                | R           | 7                |       |          | 1080                 | 3120             | 8                |                  |                       |             |                         |         |          |
|                  | ADMIN BLDG LIGH |                     | 20 A        | 1                | Other       | 9                | 671   | 1080     |                      |                  | 10               | R                | 1                     | 20 A        | ADMIN BLDG RECEPTACLES  |         |          |
|                  | ADMIN BLDG LIGH | TING                | 20 A        | 1                | Othe        | 11               |       |          | 500                  | 900              | 12               | R                | 1                     | 20 A        | ADMIN BLDG RECEPTACLES  |         |          |
| · ·              | VECP            |                     | 20 A        | 1                |             | 13               | 0     | 180      |                      |                  | 14               | R                | 1                     | 20 A        | IDF RECEPTACLE          |         |          |
| A,E              |                 |                     | 20 A        | 1                | P           | 15               |       | $\sim$   |                      | -240-            | 16               |                  |                       | 284         |                         | $\sim$  | $\sim$   |
|                  | P OFFICE 1 10   |                     | 20 A        | 1                | P           | 17               | 30    |          | س س                  |                  | 18               | R<br>R           | <b>u</b> <sup>1</sup> | 20 A        | R IRRIGATION CONTROLLER | <u></u> | <u></u>  |
|                  | P               |                     | 20 A        | 1                | P           | 19               |       | •••      | <b>~</b> 30 <b>~</b> | ••               | 20               |                  | Ť                     |             |                         |         |          |
|                  | SPACE           |                     |             | 1                |             | 21               |       |          |                      |                  | 22               |                  | 1                     |             | SPACE                   |         |          |
|                  | SPACE           |                     |             | 1                |             | 23               |       |          |                      |                  | 24               |                  | 1                     |             | SPACE                   |         |          |
|                  | SPACE           |                     |             | 1                |             | 25               |       |          |                      |                  | 26               |                  | 1                     |             | SPACE                   |         |          |
|                  | SPACE           |                     |             | 1                |             | 27               |       |          |                      |                  | 28               |                  | 1                     |             | SPACE                   |         |          |
|                  | SPACE           |                     |             | 1                |             | 29               |       |          |                      |                  | 30               |                  | 1                     |             | SPACE                   |         |          |
|                  |                 |                     |             |                  | -           | 31               |       |          |                      |                  | 32               |                  |                       |             |                         |         |          |
|                  |                 |                     |             |                  | -           | 33               |       |          |                      |                  | 34               |                  |                       |             |                         |         |          |
|                  |                 |                     |             |                  |             | 35               |       |          |                      |                  | 36               |                  |                       |             |                         |         |          |
|                  |                 |                     |             |                  |             | 37               |       |          |                      |                  | 38               |                  |                       |             |                         |         |          |
|                  |                 |                     |             |                  |             | 39<br>41         |       |          |                      |                  | 40<br>42         |                  |                       |             |                         |         |          |
|                  |                 |                     |             |                  |             |                  | 44704 | 00.1/4   | 44540                | 00.1/4           | 42               |                  |                       |             |                         |         |          |
|                  |                 |                     | Р           | HAS              | E TOT       | ALS:             | 11701 |          |                      | .00 VA           | _                |                  |                       |             |                         |         |          |
| COMI             | MENTS:          |                     |             |                  |             |                  | 97.   | 5 A      | 95.                  | 9 A              |                  |                  |                       |             |                         |         |          |
| LO               | AD TYPE KEY     | LOAD CLASSIFICATION | CONNE       | СТЕ              |             | D                | AVG.  | DEMAN    | ID                   | ESTIM            | ATEC             | D DEM            | AND                   |             | PANEL TOTA              | ALS     |          |
| H = H            | VAC EQUIP       | Other               | 1           | 037              | VA          |                  | 1     | 00.00%   |                      |                  | 1037             | ' VA             |                       |             |                         | AMPS    | KVA      |
| <                | TCHEN           | Р                   | 15          | 5420             | VA          |                  | 1     | 00.00%   |                      |                  | 15420            | ) VA             |                       | Т           | OTAL CONNECTED LOAD:    | 96.7 A  | 23211 VA |
| = LI(            | GHTING          | R                   | 6           | 380 \            | VA          |                  | 1     | 00.00%   |                      |                  | 6380             | VA               |                       |             | TOTAL DEMAND LOAD:      | 97.1 A  | 23305 VA |
| / = M            | OTOR            | L                   |             | 134 V            |             |                  |       | 25.00%   |                      |                  | 168              | VA               |                       | 1           | HIGH PHASE:             | 98 A    | 11701 VA |
|                  | OWER            | M                   |             | 240 V            |             |                  |       | 25.00%   |                      |                  | 300              |                  |                       |             |                         |         |          |
|                  | ECEPTACLE       |                     |             | v                | ••          |                  |       | _0.00 /0 |                      |                  | 000              |                  |                       | -           |                         |         |          |
|                  | ATER HEATER     |                     |             |                  |             |                  |       |          |                      |                  |                  |                  |                       | -           |                         |         |          |

|                               |                     |                     |                             | -                |                  | Ρ                | ANE  | L: T         | YP            | CLA                 | SS               | <b>RN</b>        | Λ                |             |                                                  |        |                  |
|-------------------------------|---------------------|---------------------|-----------------------------|------------------|------------------|------------------|------|--------------|---------------|---------------------|------------------|------------------|------------------|-------------|--------------------------------------------------|--------|------------------|
| MOUNTIN<br>NEMA 3<br>FEED THR | BR: No<br>RU: No    |                     | BLE-LUG<br>NEUTRA<br>I/G BU | L: No            | 0                |                  |      |              | Phase<br>Wire | : 4                 | 08 Wy            | /e               |                  | S           | UPPLY FROM:<br>LOCATION: CLASSROOM<br>MCB: 100 A | M 1    |                  |
| N<br>0<br>T<br>E              | <b>0.:</b> No<br>De | ESCRIPTION          | B<br>K<br>R                 | P<br>O<br>L<br>E | T<br>Y<br>P<br>E | C<br>I<br>R<br>C | Α (  | VA)          |               | <b>):</b> 0<br>(VA) | C<br>I<br>R<br>C | T<br>Y<br>P<br>E | P<br>O<br>L<br>E | B<br>K<br>R | BUS: 100 A                                       | N      | N<br>O<br>T<br>E |
| LIGHTIN                       |                     |                     | 20 A                        | 1                | Other            | 1                | 305  | 4560         |               |                     | 2                | Р                | 2                | 60 A        | A/C HVAC UNIT                                    |        |                  |
| LIGHTIN                       |                     |                     | 20 A                        | 1                | Other            | 3                |      |              | 305           | 4560                | 4                |                  |                  |             |                                                  |        |                  |
|                               | or light an         |                     | 20 A                        | 1                | L                | 5                | 0    |              |               |                     | 6                |                  | 1                |             | SPACE                                            |        |                  |
|                               | RECEPTAC            |                     | 20 A                        | 1                | R                | 7                | -    |              | 0             |                     | 8                |                  | 1                |             | SPACE                                            |        |                  |
|                               | RECEPTAC            |                     | 20 A                        | 1                | R                | 9                | 0    |              | -             |                     | 10               |                  | 1                |             | SPACE                                            |        |                  |
|                               | IONITOR RE          | CEPTACLE            | 20 A                        | 1                | R                | 11               |      |              | 0             |                     | 12               |                  | 1                |             | SPACE                                            |        |                  |
| SPACE                         |                     |                     |                             | 1                |                  | 13               |      |              | _             |                     | 14               |                  | 1                |             | SPACE                                            |        |                  |
| SPACE                         |                     |                     |                             | 1                |                  | 15               | 5305 |              |               |                     | 16               |                  | 1                |             | SPACE                                            |        |                  |
| COMMENTS:                     |                     |                     | P                           | ΠΑS              | ΕΤΟΤΛ            | ALS:             |      | 00 VA<br>1 A |               | .00 VA<br>.1 A      | _                |                  |                  |             |                                                  |        |                  |
| LOAD TYP                      | E KEY               | LOAD CLASSIFICATION | CONNE                       | СТЕ              | D LOA            | D                | AVG. | DEMA         | ND            | ESTIM               | ATEC             | D DEM            | IAND             |             | PANEL TOT                                        | ALS    |                  |
| H = HVAC EQ                   | UIP                 | Other               | 6                           | 510 V            | /A               |                  | 1    | 00.00%       |               |                     | 610              | VA               |                  |             |                                                  | AMPS   | KVA              |
| K = KITCHEN                   |                     | Р                   | 9                           | 120 \            | VA               |                  | 1    | 00.00%       |               |                     | 9120             | VA               |                  | Т           | OTAL CONNECTED LOAD:                             | 32.7 A | 11777 V          |
| L = LIGHTING                  | ì                   | R                   | 1                           | 980 \            | VA               |                  | 1    | 00.00%       |               |                     | 1980             | VA               |                  |             | TOTAL DEMAND LOAD:                               | 32.7 A | 11794 VA         |
| M = MOTOR                     |                     | L                   |                             | 67 V             | A                |                  | 1    | 25.00%       |               |                     | 84 \             | VA               |                  |             | HIGH PHASE:                                      | 55 A   | 5765 VA          |
| P = POWER                     |                     |                     |                             |                  |                  |                  |      |              |               |                     |                  |                  |                  |             |                                                  |        | 1                |
| R = RECEPTA                   | ACLE                |                     |                             |                  |                  |                  |      |              |               | 1                   |                  |                  |                  |             |                                                  |        |                  |
| W = WATER H                   | HEATER              |                     |                             |                  |                  |                  |      |              |               |                     |                  |                  |                  |             |                                                  |        |                  |

|                  |                                                        |                     |                            |                  |                  | P/               | ANE | L: 1           | L4            |                |                  |                  |                  |              |                                                                  |           |        |
|------------------|--------------------------------------------------------|---------------------|----------------------------|------------------|------------------|------------------|-----|----------------|---------------|----------------|------------------|------------------|------------------|--------------|------------------------------------------------------------------|-----------|--------|
|                  | IOUNTING:<br>NEMA 3R: No<br>EED THRU: No<br>M.L.O.: No |                     | LE-LUG<br>NEUTRA<br>I/G BU | L: No            | 0                |                  |     |                | PHASE<br>WIRE |                | 40 V             |                  |                  | S            | UPPLY FROM:<br>LOCATION: CONFERENC<br>MCB: 100A/2P<br>BUS: 100 A | CE ROOM 4 | 1      |
| N<br>O<br>T<br>E | D                                                      | ESCRIPTION          | B<br>K<br>R                | P<br>O<br>L<br>E | T<br>Y<br>P<br>E | C<br>I<br>R<br>C | A ( | VA)            | B(            | VA)            | C<br>I<br>R<br>C | T<br>Y<br>P<br>E | P<br>O<br>L<br>E | B<br>K<br>R  | DESCRIPTIC                                                       | DN        |        |
|                  | IDF                                                    |                     | 20 A                       | 1                | R                | 1                | 720 | 4560           |               |                | 2                | Р                | 2                | 60 A         | HEAT PUMP                                                        |           |        |
|                  | IDF                                                    |                     | 20 A                       | 1                | R                | 3                |     | 4000           | 720           | 4560           | 4                |                  |                  |              |                                                                  |           |        |
|                  | OFFICES LIGHTING                                       |                     | 20 A                       | 1                | Other            | 5                | 305 | 1080           | 671           | 1000           | 6                | R                | 1                | 20 A         | R CONFERENCE ROOM 4                                              |           |        |
| A,E              | OFFICES LIGHTING<br>FAPS-1                             | )                   | 20 A<br>20 A               | 1                | Other            | 9                | 0   | 1260           | 0/1           | 1080           | 8<br>10          | R<br>R           | 1                | 20 A<br>20 A | R CONFERENCE ROOM 4                                              |           |        |
| <br>A,⊑          | AMP-1                                                  |                     | 20 A                       | 1                | P                | 9<br>11          | 0   | 1200           | 0             |                | 10               |                  | 1                | 20 A         | SPACE                                                            |           |        |
| А, Ц             | SPACE                                                  |                     |                            | 1                |                  | 13               |     |                | 0             |                | 14               |                  | 1                |              | SPACE                                                            |           |        |
|                  | SPACE                                                  |                     |                            | 1                |                  | 15               |     |                |               |                | 16               |                  | 1                |              | SPACE                                                            |           |        |
| сом              | MENTS:                                                 |                     | P                          | HAS              | ETOT             | ALS:             |     | .00 VA<br>.0 A |               | .00 VA<br>.6 A | _                | 1                |                  |              |                                                                  |           |        |
| LC               | DAD TYPE KEY                                           | LOAD CLASSIFICATION | CONNE                      | СТЕ              | D LOA            | D                | AVG | DEMAN          | ID            | ESTIM          | IATEI            | D DEN            | IAND             |              | PANEL TOTA                                                       | LS        |        |
| H = F            | IVAC EQUIP                                             | Other               | ç                          | 976 \            | /A               |                  |     | 00.00%         |               |                | 976              | VA               |                  |              |                                                                  | AMPS      | KVA    |
| K = K            | ITCHEN                                                 | Р                   | 9                          | 120 \            | VA               |                  |     | 00.00%         |               |                | 9120             | ) VA             |                  | Т            | OTAL CONNECTED LOAD:                                             | 62.3 A    | 14956  |
| L = L            | IGHTING                                                | R                   | 4                          | 860 \            | VA               |                  |     | 00.00%         |               |                | 4860             | ) VA             |                  |              | TOTAL DEMAND LOAD:                                               | 62.3 A    | 14956  |
| M = N            | NOTOR                                                  |                     |                            |                  |                  |                  |     |                |               |                |                  |                  |                  |              | HIGH PHASE:                                                      | 66 A      | 7925 V |
| P = P            | OWER                                                   |                     |                            |                  |                  |                  |     |                |               |                |                  |                  |                  |              |                                                                  |           | 1      |
| R = F            | RECEPTACLE                                             |                     |                            |                  |                  |                  |     |                |               |                |                  |                  |                  | 1            |                                                                  |           |        |
|                  | WATER HEATER                                           |                     |                            |                  |                  |                  |     |                |               |                |                  |                  |                  | -            |                                                                  |           |        |

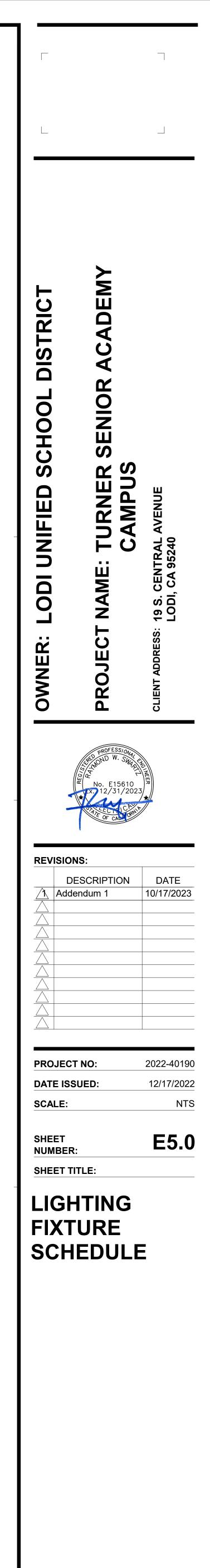
|                                                |                      |                                  |                  |                  |                  | PA    | NE     | L: E   | V           |       |                |                  |                  |                  |             |                                                       |        |                  |
|------------------------------------------------|----------------------|----------------------------------|------------------|------------------|------------------|-------|--------|--------|-------------|-------|----------------|------------------|------------------|------------------|-------------|-------------------------------------------------------|--------|------------------|
| MOUNTING:<br>NEMA 3R:<br>FEED THRU:<br>M.L.O.: | Yes<br>No            | DOUBLE-LU<br>200% NEUTF<br>I/G E | RAL              | No               |                  |       |        |        | PHAS<br>WIR |       | 208 W <u>y</u> | ye               |                  |                  | SU          | PPLY FROM:<br>LOCATION:<br>MCB: 225A/3P<br>BUS: 225 A |        |                  |
| N<br>O<br>T<br>E                               | DESCRIPTION          | B<br>K<br>R                      | P<br>O<br>L<br>E | T<br>Y<br>P<br>E | C<br>I<br>R<br>C | Α (   | VA)    | B (    | VA)         | C (   | VA)            | C<br>I<br>R<br>C | T<br>Y<br>P<br>E | P<br>O<br>L<br>E | B<br>K<br>R | DESCRIPTI                                             | ON     | N<br>O<br>T<br>E |
| EV CHARGER                                     | S (DUAL UNIT 1 OF 2) | 40 A                             | 2                | Р                | 1                | 3600  |        |        |             |       |                | 2                |                  | 1                |             | SPACE                                                 |        |                  |
|                                                |                      |                                  |                  |                  | 3                |       |        | 3600   |             |       |                | 4                |                  | 1                |             | SPACE                                                 |        |                  |
| EV CHARGER                                     | S (DUAL UNIT 2 OF 2) | 40 A                             | 2                | Р                | 5                |       |        |        |             | 3600  |                | 6                |                  | 1                |             | SPACE                                                 |        |                  |
|                                                |                      |                                  |                  |                  | 7                | 3600  |        |        |             |       |                | 8                |                  | 1                |             | SPACE                                                 |        |                  |
| EV CHARGER                                     | S (DUAL UNIT 1 OF 2) | 40 A                             | 2                | Р                | 9                |       |        | 3600   |             |       |                | 10               |                  | 1                |             | SPACE                                                 |        |                  |
|                                                |                      |                                  |                  |                  | 11               |       |        |        |             | 3600  |                | 12               |                  | 1                |             | SPACE                                                 |        |                  |
| EV CHARGER                                     | S (DUAL UNIT 2 OF 2) | 40 A                             | 2                | Р                | 13               | 3600  |        |        |             |       |                | 14               |                  | 1                |             | SPACE                                                 |        |                  |
|                                                |                      |                                  |                  |                  | 15               |       |        | 3600   |             |       |                | 16               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 17               |       |        |        |             |       |                | 18               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 19               |       |        |        |             |       |                | 20               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 21               |       |        |        |             |       |                | 22               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 23               |       |        |        |             |       |                | 24               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 25               |       |        |        |             |       |                | 26               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 27               |       |        |        |             |       |                | 28               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 29               |       |        |        |             |       |                | 30               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 31               |       |        |        |             |       |                | 32               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 33               |       |        |        |             |       |                | 34               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 35               |       |        |        |             |       |                | 36               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 37               |       |        |        |             |       |                | 38               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 39               |       |        |        |             |       |                | 40               |                  | 1                |             | SPACE                                                 |        |                  |
| SPACE                                          |                      |                                  | 1                |                  | 41               |       |        |        |             |       |                | 42               |                  | 1                |             | SPACE                                                 |        |                  |
|                                                |                      | PHA                              | SE               | τοτμ             | LS:              | 10800 | .00 VA | 10800  | .00 VA      | 7200. | 00 VA          |                  |                  |                  |             |                                                       |        |                  |
| COMMENTS:                                      |                      |                                  |                  |                  |                  | 94.   | 6 A    | 94     | .6 A        | 60.   | 0 A            |                  |                  |                  |             |                                                       |        |                  |
| LOAD TYPE K                                    | EY LOAD CLASSIFIC    | ATION CON                        | NEC              | TED              | LOA              |       | AVG.   | DEMAN  | ND          | ESTI  | MATE           | D DE             | MAN              | D                |             | PANEL TOTA                                            | LS     |                  |
| H = HVAC EQUIP                                 | Р                    |                                  | 288              | 00 V             | 4                |       | 1      | 00.00% |             |       | 2880           | 0 VA             |                  |                  |             |                                                       | AMPS   | KVA              |
| K = KITCHEN                                    |                      |                                  |                  |                  |                  |       |        |        |             | 1     |                |                  |                  |                  | тс          | TAL CONNECTED LOAD:                                   | 79.9 A | 28800 VA         |
|                                                |                      |                                  |                  |                  |                  |       |        |        |             | +     |                |                  |                  |                  | -           |                                                       | 70.0 4 | 20000 \/A        |

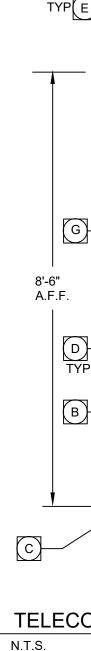
| LOAD TYPE KEY    | LOAD CLASSIFICATION | CONNECTED LOAD | AVG. DEMAND | ESTIMATED DEMAND | PANEL TOT             | ALS    |          |
|------------------|---------------------|----------------|-------------|------------------|-----------------------|--------|----------|
| H = HVAC EQUIP   | Р                   | 28800 VA       | 100.00%     | 28800 VA         |                       | AMPS   | KVA      |
| K = KITCHEN      |                     |                |             |                  | TOTAL CONNECTED LOAD: | 79.9 A | 28800 VA |
| L = LIGHTING     |                     |                |             |                  | TOTAL DEMAND LOAD:    | 79.9 A | 28800 VA |
| M = MOTOR        |                     |                |             |                  | HIGH PHASE:           | 95 A   | 10800 VA |
| P = POWER        |                     |                |             |                  |                       |        |          |
| R = RECEPTACLE   |                     |                |             |                  |                       |        |          |
| W = WATER HEATER |                     |                |             |                  |                       |        |          |

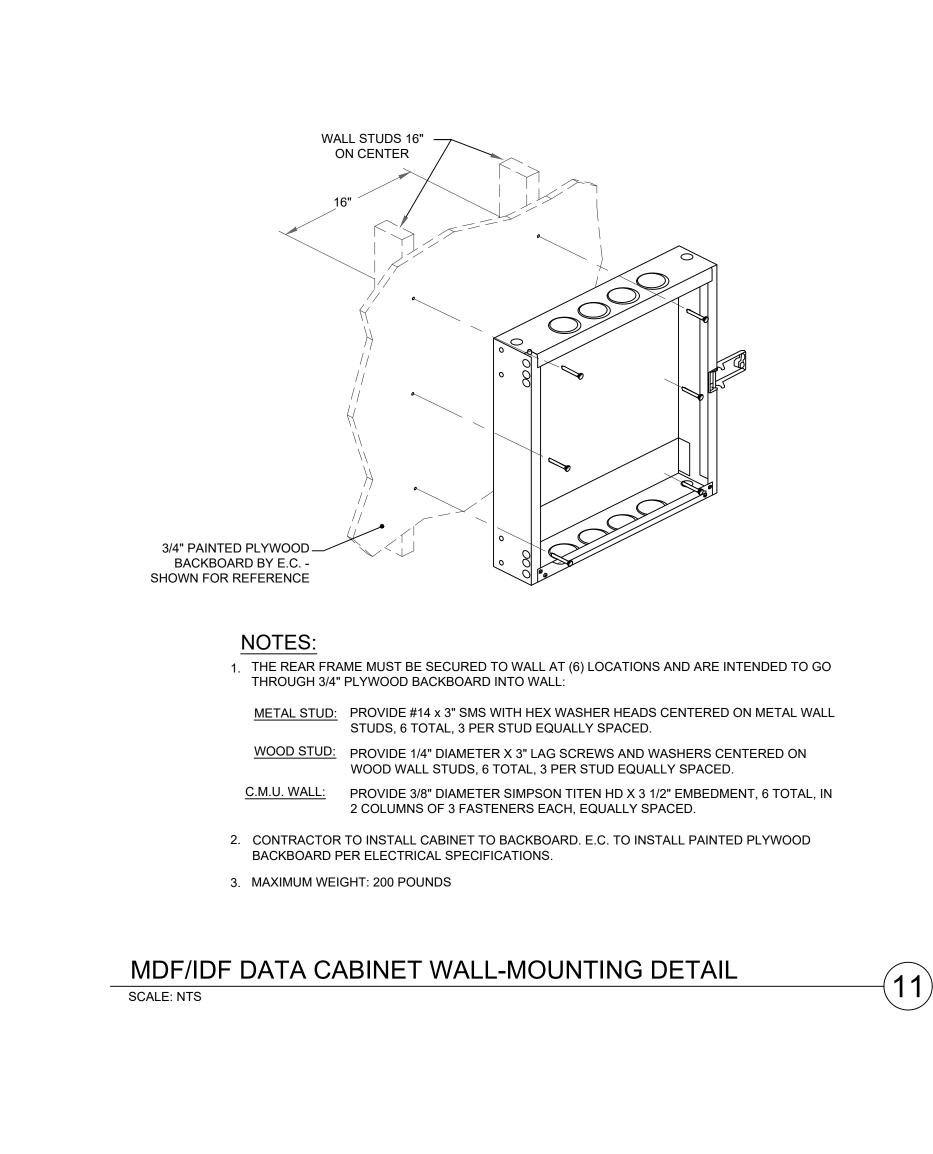


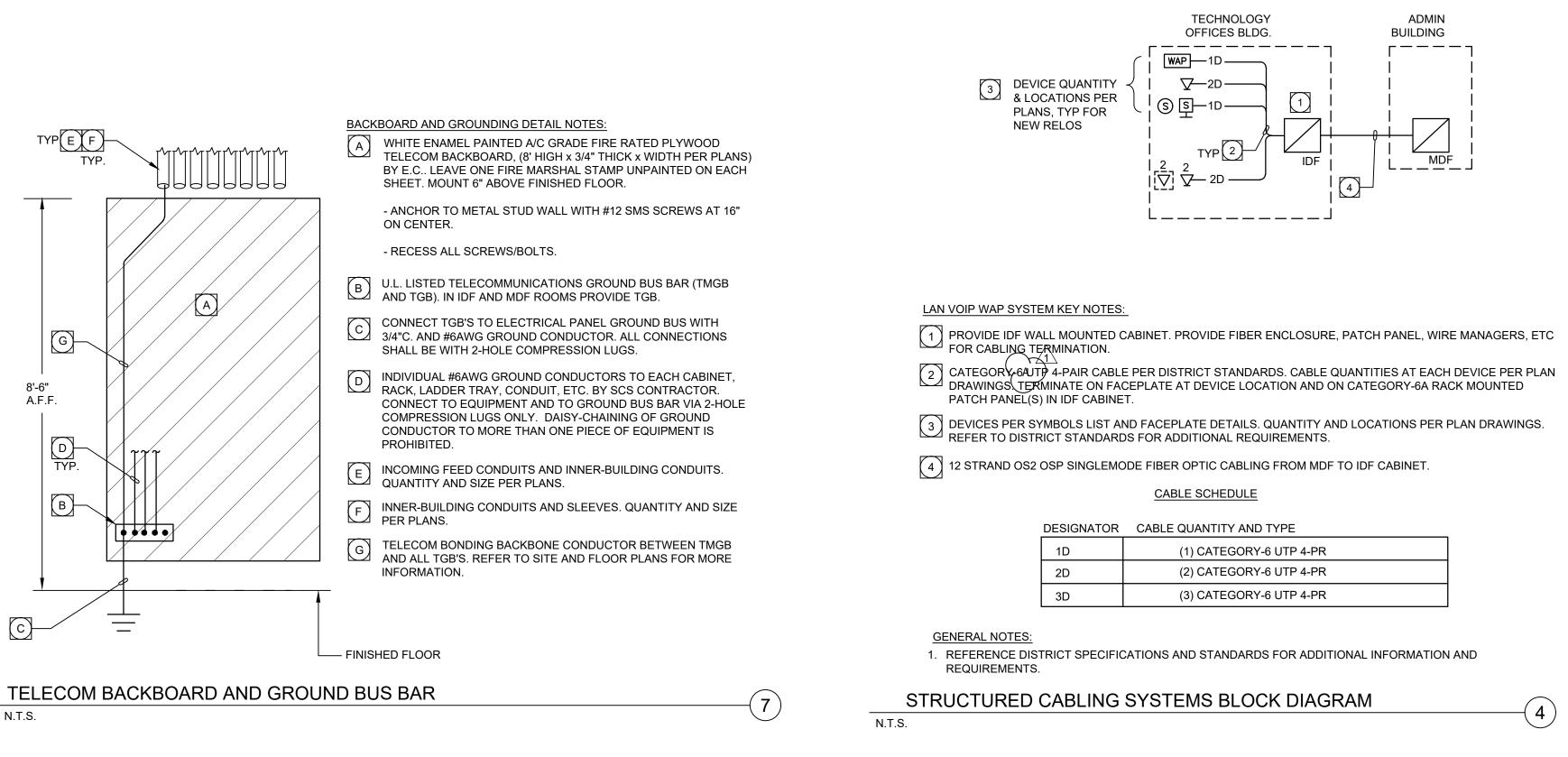
| RAL NOTES:<br>THE LIGHTING FIXTURES, LAMPS, BALLASTS, POWER SUPPLIES, DRIVERS AND TRANSFORMERS FOR THIS PROJECT HAVE BEEN<br>SPECIFIED TO ENSURE THAT SPECIFIC AESTHETIC AND PERFORMANCE REQUIREMENTS WILL BE SATISFIED. THESE PRODUCTS<br>HAVE BEEN CAREFULLY RESEARCHED AND EACH SPECIFIED ITEM HAS UNIQUE QUALITIES WHICH WERE DETERMINED TO BE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6. THE LIGHTING FIXTURE MODEL NUMBER MAY INDICATE A FIXTURE OPTION THAT THE CONTRACTOR MUST IDENTIFY PRIOR TO<br>ORDERING/PROVIDING SUBMITTALS, INCLUDING, BUT NOT LIMITED TO: VOLTAGE, MOUNTING CONDITION/HARDWARE, FINISH,<br>DIMMING REQUIREMENTS/BALLAST INFORMATION. GENERALLY, CONTRACTOR-SELECTED OPTIONS ARE DENOTED IN THE PART<br>NUMBER WITH BRACKETS EX: [VOLTS?]                                                                                                                                     |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| ESSENTIAL IN SATISFYING THE OWNER'S, ARCHITECT'S, ENGINEER'S AND LIGHTING CONSULTANT'S DESIGN CRITERIA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | a. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND PROVIDING ALL HANGERS, CLIPS AND NECESSARY HARDWARE<br>TO INSTALL THE FIXTURE IN THE ENVIRONMENT AS SHOWN ON THE ARCHITECTURAL PLANS. ALL FIXTURES SHALL BE<br>PROVIDED WITH ALL REQUIRED STRUCTURAL SUPPORTS AS REQUIRED BY THE CURRENTLY ADOPTED CODES.                                                                                                                                                                                                    |   |
| ACHIEVE A COMPLETE AND OPERATING LIGHTING SYSTEM.<br>CONTRACTOR SHALL NOTIFY THE ELECTRICAL ENGINEER AND/OR LIGHTING CONSULTANT OF ANY PROVISIONS OF THE<br>SPECIFICATION THAT IS IN CONFLICT WITH LOCALLY ENFORCED CODES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | b. VOLTAGES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING - SEE ELECTRICAL DRAWINGS FOR BRANCH<br>CIRCUIT INFORMATION. IT IS POSSIBLE THAT FIXTURES WILL BE REQUIRED IN VARIOUS VOLTAGES.                                                                                                                                                                                                                                                                                                                 |   |
| CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY REQUIRED MODIFICATIONS THAT ARE NOT SHOWN ON THE<br>DRAWINGS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul> <li>7. "NO KNOWN EQUAL" LIGHTING FIXTURE PRICING/BIDDING NOTES:</li> <li>a. EACH FIXTURE IDENTIFIED AS "NO KNOWN EQUAL" ON THIS PROJECT SHALL BE BID IN A "LINE ITEM" FORMAT. A PER UNIT</li> </ul>                                                                                                                                                                                                                                                                                                          |   |
| ALL ELECTRICAL MATERIAL SHALL BE IN NEW & UNDAMAGED CONDITION WHEN INSTALLED. ALL EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MATERIAL COST SHALL BE PROVIDED FOR EACH "NO KNOWN EQUAL" ON THIS PROJECT SHALL BE DID IN A LINE THEM FORMAT. A PER UNIT<br>MATERIAL COST SHALL BE PROVIDED FOR EACH "NO KNOWN EQUAL" FIXTURE. THIS PRICE SHALL INCLUDE LAMPS AS WELL<br>AS ALL OTHER REQUIRED MATERIALS REQUIRED FOR INSTALLATION. THE FIXTURE PRICE QUOTED WILL BE UTILIZED,<br>PRIOR TO SHOP DRAWING APPROVAL, FOR "ADDING" AND/OR "DELETING" ANY QUANTITY OF THE FIXTURE.                                                                     | • |
| ALL DIMENSIONS & MEASUREMENTS FOUND ON PLANS ARE APPROXIMATE. CONTRACTOR SHALL VALIDATE ALL DIMENSIONS<br>PRIOR TO ORDERING MATERIAL TO INCLUDE MAKING FIELD MEASUREMENTS BASED ON ACTUAL SITE CONDITIONS TO DEVELOP<br>COMPLETE ORDERS AND INSTALL SYSTEMS PER DRAWINGS AND SPECIFICATIONS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | b. A UNIT COST SHALL BE SUBMITTED FOR EACH "NO KNOWN EQUAL" FIXTURE. SUBMIT THE PRICING AS PART OF THE BID<br>FORM ON A SEPARATE 8 1/2" X 11" SHEET.                                                                                                                                                                                                                                                                                                                                                              |   |
| REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND ELEVATION OF ALL LIGHTING FIXTURES AND ASSOCIATED DEVICES AND EQUIPMENT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | c. FAILURE TO SUBMIT A LINE ITEM FOR EACH "NO KNOWN EQUAL" FIXTURE MAY RESULT IN THE REJECTION, REFUSAL, OR NON-ACCEPTANCE OF THE CONTRACTOR'S BID.                                                                                                                                                                                                                                                                                                                                                               |   |
| PRIOR TO AIMING/ADJUSTING ACTIVITIES, COMMISSIONING OR PUNCHWALK COMMENCEMENT, CONTRACTOR SHALL PROPERLY TEST AND VERIFY ALL CIRCUITRY AND CONTROL WIRING AND IMPLEMENT ALL CONTROLS PROGRAMMING.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ol> <li>FIXTURES IDENTIFIED AS "NO KNOWN EQUAL - OWNER STANDARD" OR "CAMPUS STANDARD" ARE TO BE PROVIDED AS<br/>SPECIFIED, WITH SUBSTITUTIONS STRICTLY PROHIBITED. SEE ADDITIONAL NOTES FOR "NO KNOW EQUAL" BIDDING<br/>REQUIREMENTS.</li> </ol>                                                                                                                                                                                                                                                                 | , |
| LATION:<br>LOCATIONS OF THE FIXTURES SHALL BE PER THE ARCHITECTURAL REFLECTED CEILING PLAN(S) AND SHALL BE COORDINATED<br>AT TIME OF ROUGH IN. CONFLICTS BETWEEN THE ARCHITECTURAL REFLECTED CEILING PLAN(S) AND THE ELECTRICAL/LIGHTING<br>DESIGN PLAN(S) SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING PRIOR TO ORDERING FIXTURES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul> <li>D. LIGHTING FIXTURE SPECIFICATIONS:</li> <li>1. ALL EXTERIOR LIGHTING EQUIPMENT SHALL BE RATED FOR WET LOCATION AND THE IP RATING OF ALL EQUIPMENT, INCLUDING<br/>BALLAST, POWER SUPPLY AND TRANSFORMER ENCLOSURES SHALL CONFORM TO THE CONDITIONS IN WHICH THE LIGHTING<br/>FIXTURE IS MOUNTED.</li> </ul>                                                                                                                                                                                              |   |
| LIGHTING DRAWINGS REPRESENT THE DESIGN INTENT OF THE EQUIPMENT, DEVICES, ETC. TO BE CONNECTED AND THE<br>CIRCUITS TO WHICH THEY ARE TO BE CONNECTED. CONTRACTOR SHALL INSTALL ALL CONDUIT, J-BOXES AND ADDITIONAL<br>HARDWARE AND DEVICES AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2. ALL BALLASTS, POWER SUPPLIES, DRIVERS AND/OR TRANSFORMERS THAT ARE REMOTELY LOCATED SHALL BE INSTALLED AS<br>NEAR TO THE LIGHTING FIXTURE(S) AS POSSIBLE, HIDDEN FROM PUBLIC VIEW IN AN ACCESSIBLE COMPARTMENT THAT IS WELL<br>VENTILATED. CONTRACTOR TO COORDINATE LOCATION(S) WITH ARCHITECT PRIOR TO ROUGH-IN.                                                                                                                                                                                              |   |
| ALL LIGHTING FIXTURES SHALL BE MOUNTED AND INDIVIDUALLY SUPPORTED IN ACCORDANCE WITH APPLICABLE CODES.<br>FIXTURES SHALL BE FURNISHED AND INSTALLED WITH ALL REQUIRED MOUNTING DEVICES, HARDWARE AND ACCESSORIES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3. ALL TRANSFORMERS SHALL BE FUSED ON THE SECONDARY SIDE.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| CONTRACTOR TO VERIFY LIGHTING FIXTURE MOUNTING HARDWARE IS COMPATIBLE WITH APPROVED MOUNTING CONDITIONS.<br>MOUNTING CONDITIONS MUST ALLOW FOR AIMING AND ADJUSTING OF LIGHTING FIXTURES ON SITE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ol> <li>COLOR FILTERS SHALL BE GLASS OR DICHROIC UNLESS OTHERWISE INDICATED ON DRAWINGS.</li> <li>CONTRACTOR TO PROVIDE 20% ADDITIONAL COLOR FILTERS FOR EACH COLOR AND SIZE.</li> </ol>                                                                                                                                                                                                                                                                                                                         |   |
| CONTRACTOR TO INCLUDE AIMING/ADJUSTING LABOR AFTER DARK AS REQUIRED FOR ANY ADJUSTABLE LIGHTING FIXTURE AND<br>FOR EACH INDIVIDUAL LIGHTING FIXTURE HEAD OR LAMP HOLDER IN A MULTI-FIXTURE/MULTI-LAMP ASSEMBLY. LIGHTING<br>FIXTURES TO BE AIMED/ADJUSTED PER THE DIRECTION OF OWNER. ARCHITECT AND/OR LIGHTING CONSULTANT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6. CONTRACTOR TO VERIFY THAT ALL LIGHTING FIXTURES SPECIFIED WITH A COLOR FILTER ARE SUPPLIED WITH ANY AND ALL<br>ATTACHMENT DEVICES FOR THE FILTER.                                                                                                                                                                                                                                                                                                                                                              |   |
| CONTRACTOR TO SUPPLY ADEQUATE SUPPORT INCLUDING LADDERS, LIFTS OR OTHER EQUIPMENT REQUIRED TO ACCESS<br>LIGHTING FIXTURES AT THE TIME OF FOCUS, INCLUDING EVENING OR NIGHT WORK AS MAY BE REQUIRED DUE TO SCHEDULE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7. ALL TRACK LIGHTING FIXTURES SHALL BE PROVIDED WITH THE APPROPRIATE TRACK SYSTEM WHICH SHALL INCLUDE ALL<br>MISCELLANEOUS COMPONENTS REQUIRED, AS WELL A ANY REQUIRED CIRCUIT LIMITERS FOR A COMPLETE INSTALLATION.<br>TRACK LENGTH(S) SHALL BE PER DRAWINGS.                                                                                                                                                                                                                                                   |   |
| CONFLICT OR DAYLIGHT IMPACT. AIMING/ADJUSTING LABOR SHALL BE PREPARED FOR WORK WITH COMMON HAND TOOLS TO MAKE ADJUSTMENTS AND MINOR REPAIRS DURING AIMING.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul> <li>E. DRIVERS / TRANSFORMERS:</li> <li>1. [OPTION?] IN FIXTURE MODEL NUMBER INDICATE THAT THE FIXTURE DRIVER TYPE AND QUANTITY MUST BE VERIFIED BY THE</li> </ul>                                                                                                                                                                                                                                                                                                                                           |   |
| ALL COVE MOUNTED LIGHTING FIXTURES SHALL EXTEND THE FULL LENGTH OF THE COVE. CONTRACTOR TO FIELD MEASURE<br>COVE LENGTH AND ORDER QUANTITY OF LIGHTING FIXTURES AS REQUIRED. PROVIDE COMPLETE MANUFACTURER SHOP<br>DRAWINGS OF BUILT-IN COVE OR LINEAR LIGHTING SYSTEMS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CONTRACTOR USING FIXTURE CALLOUT INFORMATION AND FIXTURE SWITCHING CONFIGURATION INFORMATION. 2. CONTINUOUS DIMMING AND CONTROLLABLE LED:                                                                                                                                                                                                                                                                                                                                                                         |   |
| CONTRACTOR TO REPLACE ALL INOPERATIVE LAMPS, LED ARRAYS OR SYSTEMS AT THE END OF THE CONSTRUCTION PHASE<br>PRIOR TO THE FOCUS AND PROGRAMMING PHASE AND AGAIN PRIOR TO OWNER OCCUPANCY OR PROJECT OPENING.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | a. PROVIDE CONTROLLABLE LED DIMMING DRIVERS (INTEGRAL OR REMOTE) WITH POWER FACTOR GREATER THAN 0.85 AND MAXIMUM THD OF 20% AT FULL LOAD.                                                                                                                                                                                                                                                                                                                                                                         |   |
| ALL POLE MOUNTED FIXTURES, POST MOUNTED FIXTURES AND BOLLARDS SHALL BE PROVIDED WITH A STRUCTURAL FOOTING<br>AS DETAILED ELSEWHERE IN THE DRAWINGS. FOOTING SIZE TO BE PROVIDED BY STRUCTURAL ENGINEER. REFERENCE FIXTURE<br>SCHEDULE AND DETAILS FOR MORE INFORMATION.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | b. PRIOR TO BID CONTRACTOR TO VERIFY DRIVER COMPATIBILITY WITH DIMMERS, DIMMING CONTROL SYSTEM(S) AND<br>DISTRIBUTED LIGHTING CONTROL SYSTEM(S) WITH RESPECTIVE LIGHTING MANUFACTURER(S) AND LIGHTING/DIMMING<br>CONTROL SYSTEM MANUFACTURERS. IF COMPATIBILITY DOCUMENTATION IS UNAVAILABLE FOR A GIVEN LED<br>FIXTURE/LIGHTING CONTROL SYSTEM COMBINATION, CONTRACTOR SHALL INCLUDE COSTS IN THE BASE BID FOR                                                                                                   |   |
| ALL EXIT SIGNS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE LOCAL FIRE PREVENTION CODE AUTHORITY. THE<br>CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY HARDWARE SUCH THAT ALL EXIT SIGNS ARE INSTALLED IN AN<br>APPROVED VISIBLE LOCATION. THE CONTRACTOR SHALL VERIFY CHEVRONS AND NUMBER OF FACES PER EXIT SIGN WITH<br>ARCHITECTURAL REFLECTED CEILING PLAN(S). ANY DISCREPANCIES BETWEEN EXIT SIGNS DEPICTED ON ARCHITECTURAL AND<br>ELECTRICAL PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO ORDERING EXIT SIGNS.                                                                                                                                                                                                                                                                                                                   | RESPECTIVE LIGHTING MANUFACTURER AND LIGHTING CONTROLS MANUFACTURER TO TEST/WARRANT COMPATIBILITY OF SAID COMBINATIONS.<br>c. CONTINUOUS LED DIMMING DRIVERS SHALL BE AT MINIMUM 4-WIRE 0-10V 10% DIMMING (HOT, NEUTRAL, DIM+, DIM-).<br>F. EMERGENCY FIXTURES / BATTERY PACKS:                                                                                                                                                                                                                                   |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul> <li>F. EMERGENCY FIXTURES / BATTERY PACKS:</li> <li>1. LIGHT FIXTURES INDICATED AS EMERGENCY SHALL BE IDENTIFIED / PROVIDED AS FOLLOWS:</li> </ul>                                                                                                                                                                                                                                                                                                                                                           |   |
| CONTRACTOR TO SUBMIT FOR APPROVAL ON THE PRODUCTS THEY INTEND TO FURNISH WITHIN TEN (10) DAYS OF AWARD OF<br>CONTRACT. FAILURE TO SUBMIT WITHIN DEADLINE CONSTITUTES A GUARANTEE THAT ONLY THE BASE SPECIFIED PRODUCTS<br>WILL BE SUPPLIED AND THAT NO OTHER PRODUCTS, WHETHER LISTED AS ALTERNATES OR NOT, WILL BE CONSIDERED.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | a. INTEGRAL BATTERY PACK (EB):<br>3a/3EB - FIXTURE CONNECTED TO CIRCUIT "3", CONTROL SWITCHLEG "a" - WITH THE BATTERY CHARGING LEAD                                                                                                                                                                                                                                                                                                                                                                               |   |
| CONTRACTOR TO PROVIDE A SUBMITTAL/SHOP DRAWING SUBMITTAL FOR EACH LIGHTING FIXTURE TYPE INCLUDING<br>ACCESSORIES, BALLAST(S), POWER SUPPLIES, DRIVER(S) TRANSFORMER(S), AND INTEGRAL EMERGENCY BATTERIES AND TEST<br>SWITCHES. ANY LIGHTING FIXTURE SUBMITTAL PROVIDED WITHOUT SPECIFIC LIGHTING FIXTURE'S ACCESSORIES, BALLAST,<br>POWER SUPPLY, DRIVER, TRANSFORMER OR BATTERY INFORMATION SHALL BE REJECTED AS INCOMPLETE.                                                                                                                                                                                                                                                                                                                                                                                                                                            | CONNECTED TO A CONSTANT HOT CIRCUIT "3".<br>3NL/3EB - FIXTURE CONNECTED TO A CONSTANT HOT CIRCUIT "#3". BATTERY CHARGING LEAD CONNECTED TO A<br>CONSTANT HOT CIRCUIT "3".                                                                                                                                                                                                                                                                                                                                         |   |
| SUBSTITUTIONS OF THE SPECIFIED PRODUCTS ARE STRICTLY PROHIBITED - UNLESS APPROVED AS STATED HEREIN. LIGHTING<br>FIXTURE SUBSTITUTIONS SHALL BE FORMALLY PRESENTED TO THE ELECTRICAL ENGINEER AND/OR LIGHTING CONSULTANT, BY<br>APPOINTMENT ONLY, AT LEAST TEN (10) WORKING DAYS PRIOR TO BID TIME. THE SUBMITTAL MATERIAL SHALL INCLUDE THE<br>FOLLOWING ITEMS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul> <li>b. REMOTE BACK-UP SOURCE (EM):</li> <li>3a/3EM - ROUTED THROUGH A U.L. LISTED TRANSFER RELAY (LC &amp; D #GR-2001E/S) FOR SWITCHED CONTROLS OR A<br/>U.L. LISTED TRANSFER SWITCH (BODINE #GTD SERIES DEVICE) FOR DIMMING CONTROLS. CONNECTED TO<br/>A CONSTANT HOT EMERGENCY CIRCUIT "3". SEE DISTRIBUTED LIGHTING CONTROL SPECIFICATIONS FOR<br/>DEVICE REQUIREMENTS WHEN CONTROLLED BY OCCUPANCY SENSORS.</li> </ul>                                                                                   |   |
| <ul> <li>A COMPLETE AND OPERATING SAMPLE, WIRED FOR 120V OPERATION, WITH LAMP, CORD AND PLUG</li> <li>A COMPLETE PHOTOMETRIC REPORT, FOR THE PROPOSED SUBSTITUTE PRODUCT, USING THE SPECIFIED LAMP OR LED<br/>TYPE AND WATTAGE, INCLUDING TABULATED CANDLEPOWER VALUES, COEFFICIENT OF UTILIZATION, AND AN</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3NL/3EM - FIXTURE CONNECTED TO A CONSTANT HOT EMERGENCY CIRCUIT "3".                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
| ISO-FOOT-CANDLE DIAGRAM. PRORATED DATA WILL NOT BE ACCEPTABLE. THE PHOTOMETRIC REPORT MUST BE DONE IN ACCORDANCE WITH PUBLISHED I.E.S. TESTING PROCEDURES AND CERTIFIED BY A REGISTERED ELECTRICAL ENGINEER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul> <li>c. REMOTE BACK-UP SOURCE (EM) NOTES:</li> <li>ALL REMOTE BACK UP SOURCE (EM) FIXTURES SHALL BE PROVIDED WITH AN IN LINE FUSE. PROVIDE<br/>ADDITIONAL LABELING TO INDICATE FIXTURE IS PROTECTED BY A FUSE.</li> </ul>                                                                                                                                                                                                                                                                                     |   |
| C. A CURRENT ORIGINAL CATALOG DATA SHEET WITH LIGHTING FIXTURE CATALOG NUMBERS. MODIFIED DATA SHEETS WILL<br>NOT BE ACCEPTABLE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
| d. A SIGNED COPY OF THE "SUBSTITUTION COMPLIANCE FORM", LOCATED IN THE DIVISION 1 SPECIFICATION, STATING THAT IF<br>THE PROPOSED SUBSTITUTION IS ACCEPTED, THE PROJECT SCHEDULE WILL NOT BE NEGATIVELY AFFECTED. IF THE<br>COMPLETION OF THE PROJECT IS DELAYED BECAUSE OF THE APPROVED SUBSTITUTION, THE CONTRACTOR WILL BE<br>RESPONSIBLE FOR PAYMENT OF ANY ESTABLISHED LIQUIDATED DAMAGES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul> <li>a. PROVIDE INTEGRAL TEST SWITCH / CHARGE LIGHT OPTION FOR ALL EMERGENCY BATTERY PACKS INSTALLED IN LIGHT<br/>FIXTURES.</li> <li>b. ALL RECESSED DOWNLIGHTS SUPPLIED WITH A BATTERY PACK SHALL BE PROVIDED WITH AN INTEGRAL COMBINATION TEST</li> </ul>                                                                                                                                                                                                                                                   |   |
| e. FOR SPECIFIC INTERIOR FIXTURE SUBSTITUTIONS, WHEN DIRECTED BY THE ELECTRICAL ENGINEER AND/OR LIGHTING<br>CONSULTANT, A POINT-BY-POINT SCALED COMPUTER PRINTOUT SHALL BE PROVIDED VERIFYING THE ILLUMINATION LEVELS<br>FOR THE SPECIFIC INTERIOR AREA. IF THE SUBSTITUTED FIXTURE IS AN EMERGENCY FIXTURE, THE REPORT SHALL BE RUN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SWITCH / CHARGING INDICATOR LIGHT- MOUNTED INSIDE THE REFLECTOR. REMOTE TEST SWITCH / CHARGING LIGHTS ARE NOT<br>ALLOWED. THE TEST SWITCH / CHARGING INDICATOR LIGHT SHALL BE SECURELY ATTACHED TO THE REFLECTOR WITH 18" OF<br>SLACK LEADS, FOR EASY REMOVAL OF THE REFLECTOR ASSEMBLY.                                                                                                                                                                                                                          |   |
| IN BOTH NORMAL AND EMERGENCY MODES. THIS REPORT SHALL BE CONFIGURED WITH SPECIFIC CONSTRAINTS, AS<br>DIRECTED BY THE ENGINEER OF RECORD. THE REPORT MUST SHOW THAT THE SUBSTITUTED FIXTURE PROVIDES<br>PERFORMANCE EQUAL TO OR BETTER THAN THE LIGHTING LEVELS OF THE SPECIFIED PRODUCT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul> <li>ALL BATTERY PACKS AND ALL COMBINATION LED BATTERY PACK/EMERGENCY DRIVERS SHALL BE UL924 LISTED.</li> <li>PRIOR TO BID, CONTRACTOR SHALL VERIFY WITH FIXTURE MANUFACTURER(S) THAT EMERGENCY BATTERY PACKS ARE<br/>MANUFACTURED TO BE INTEGRAL TO FIXTURE HOUSINGS.</li> </ul>                                                                                                                                                                                                                             |   |
| f. FOR ALL EXTERIOR FIXTURE SUBSTITUTIONS, A POINT-BY-POINT SCALED COMPUTER PRINTOUT SHALL BE PROVIDED<br>VERIFYING THE ILLUMINATION LEVELS FOR THE ENTIRE SITE PLAN BASED ON USING THE PROPOSED ALTERNATIVE<br>FIXTURES. THE REPORT MUST SHOW THAT THE SUBSTITUTED FIXTURE PROVIDES PERFORMANCE EQUAL TO, OR BETTER<br>THAN THE LIGHTING LEVELS AND UNIFORMITY RATIOS (MAX:MIN AND AVG:MIN) OF THE SPECIFIED PRODUCT. THIS REPORT<br>SHALL BE CONFIGURED WITH THE FOLLOWING CONSTRAINTS.                                                                                                                                                                                                                                                                                                                                                                                | <ul> <li>e. SHOULD THE SPECIFIED LED EMERGENCY BATTERY PACK(S) NOT FIT WITHIN A GIVEN FIXTURE(S) OR SHOULD THE FIXTURE NOT<br/>BE MANUFACTURED TO ACCOMMODATE A BATTERY PACK, CONTRACTOR SHALL INCLUDE ALL COSTS IN BASE BID TO<br/>LOCATE/CONNECT SELF-TESTING MINI INVERTER(S) (IOTA #ILS SERIES OF BODINE#ELI-S-[WATT?]) REMOTELY FROM THE<br/>FIXTURE(S) IN THE NEAREST ELECTRICAL ROOM OR TO LOCATE EMERGENCY BATTERY PACK(S) REMOTELY FROM THE FIXTURE<br/>ABOVE THE NEAREST ACCESSIBLE CEILING.</li> </ul> |   |
| i. THE SPACING INCREMENT OR POINTS ON THE VERIFICATION REPORT SHALL NOT EXCEED TEN (10) FEET IN EITHER DIRECTION.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | f. LED BATTERY PACKS SHALL PROVIDE A MINIMUM OF 90 MINUTES OF EMERGENCY ILLUMINATION, AND SHALL BE RATED AT A<br>MINIMUM OF 10 WATTS, OR AS SPECIFIED. WHERE A FIXTURE TYPE IS UNAVAILABLE WITH A 10W BATTERY PACK OR WHERE THE<br>WATTAGE IS NOT SPECIFIED ON THE PLANS. INCLUDE AND COST IN BASE BID TO PROVIDE THE HIGHEST WATTAGE AVAILABLE ON                                                                                                                                                                |   |
| ii. THE PHOTOMETRIC CALCULATION SHALL BE BASED ON PROVIDING MAINTAINED FOOT-CANDLE LEVELS USING MEAN LAMP LUMENS AND A LIGHT LOSS FACTOR, AS DIRECTED BY THE ENGINEER OF RECORD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | WATTAGE IS NOT SPECIFIED ON THE PLANS, INCLUDE ALL COST IN BASE BID TO PROVIDE THE HIGHEST WATTAGE AVAILABLE ON<br>THE FIXTURE CUTSHEET. ANY LISTED EQUAL FIXTURE OR ANY SUBSTITUTION OFFERED BY THE CONTRACTOR MUST ALSO HAVE<br>BATTERY PACKS CAPABLE OF PRODUCING THE SAME OR MORE LUMENS WHEN ON BATTERY AS OUTLINED ABOVE. ACCEPTABLE<br>MANUFACTURES: BODINE OR IOTA.                                                                                                                                       |   |
| iii. THE PHOTOMETRIC CALCULATION SHALL SHOW ANY ADDITIONAL ENERGY AND/OR ENERGY COSTS, FOR A TEN YEAR<br>PERIOD, AS COMPARED TO THE ORIGINALLY SPECIFIED ITEM. THE TOTAL COSTS FOR THESE EXPENSES WILL BE<br>DEDUCTED FROM THE CONTRACT COST.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | g. TO MAINTAIN UL LISTING OF LED FIXTURE, FIXTURE MANUFACTURER(S) SHALL INSTALL LED EMERGENCY BATTERY PACKS AT<br>THE FACTORY AND OBTAIN A UL LISTING FOR THE FIXTURE WITH EMERGENCY BATTERY PACK. FIELD-INSTALLATION OF LED<br>EMERGENCY BATTERY PACK(S) IS PROHIBITED.                                                                                                                                                                                                                                          |   |
| DURING THE BIDDING PROCESS, THE CONTRACTOR SHALL REFER TO THE LIGHTING FIXTURE SCHEDULES ON THE<br>ARCHITECTURAL PLANS (IF PROVIDED ON PROJECT), LIGHTING DESIGN PLANS/SPECIFICATIONS (IF PROVIDED ON PROJECT), AND<br>THE ELECTRICAL PLANS. ANY DISCREPANCIES BETWEEN THEM INCLUDING, BUT NOT LIMITED TO, PART NUMBERS AND FIXTURE<br>DESCRIPTIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT, ELECTRICAL ENGINEER, AND LIGHTING DESIGNER<br>WITH PRE-BID RFI(S). WHERE DISCREPANCIES ARE DISCOVERED WHEN THERE IS INSUFFICIENT TIME TO ISSUE PRE-BID RFI(S),<br>THE BASE BID SHALL INCORPORATE THE MOST COSTLY VERSION OF THE DISCREPANCY AND SHALL BE MEMORIALIZED IN AN RFI<br>OR AS A BID CLARIFICATION. PROVIDING A VOLUNTARY DEDUCTIVE ALTERNATE BID CLARIFYING FIXTURE SCHEDULE<br>DISCREPANCIES IS ALSO AN ACCEPTABLE EORM OF DISCREPANCY DOCUMENTATION | h. PROVIDE DAMP LOCATION VERSION IN ALL DAMP LABEL INSTALLATIONS.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| DISCREPANCIES IS ALSO AN ACCEPTABLE FORM OF DISCREPANCY DOCUMENTATION.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
| ALL FIXTURE FINISHES AND COLORS, UNLESS NOTED AS PREMIUM OR CUSTOM, SHALL BE SELECTED FROM THE<br>MANUFACTURERS STANDARD COLOR OPTIONS AS LISTED ON THE FIXTURE SPECIFICATION SHEET. STANDARD FINISH<br>SHALL BE SELECTED BY THE ARCHITECT, INTERIOR DESIGNER OR OWNER. THIS DIRECTION WILL BE PROVIDED IN THE<br>SHOP DRAWING REVIEW PROCESS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
| b. ALL FIXTURES INDICATED WITH A PREMIUM OR CUSTOM COLOR SHALL BE ASSIGNED A CUSTOM COLOR REFERENCE<br>NUMBER (SUCH AS RAL#) OR PROVIDE FIVE (5) PAINT CHIPS FOR MANUFACTURER TO USE TO MATCH COLOR. PREMIUM OR<br>CUSTOM FINISH SHALL BE SELECTED BY THE ARCHITECT, INTERIOR DESIGNER OR OWNER. THIS DIRECTION WILL BE<br>PROVIDED IN THE SHOP DRAWING REVIEW PROCESS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |

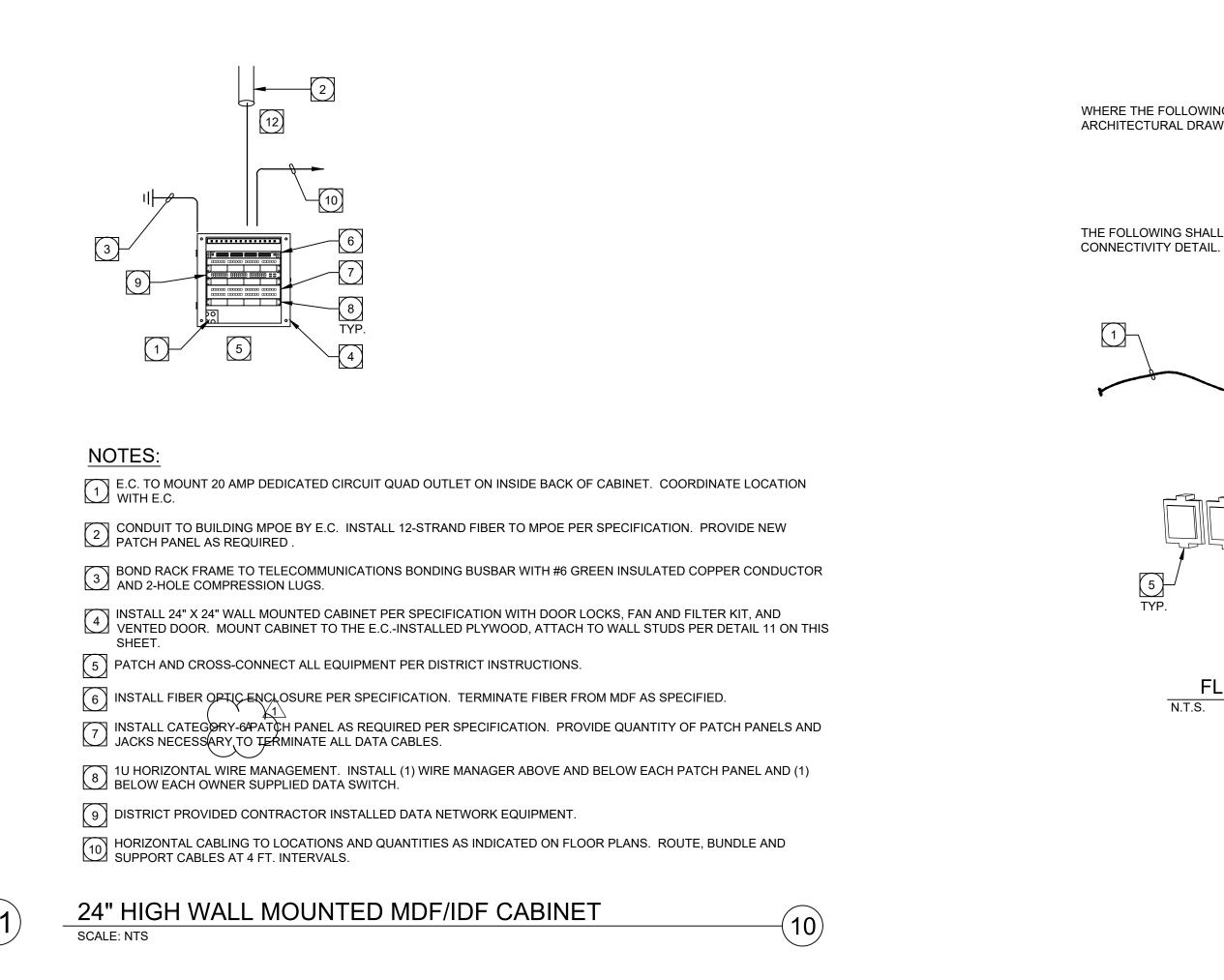
| - | TYPE        | MANUFACTURER AND MODEL NUMBER                                                                                                                  | FIXTURE<br>VA/<br>WATTS | LAMP/<br>LAMP<br>OPTION | GENERAL DESCRIPTION                                                                                                                                                                                                                                                                                                                                                               |    |
|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|   |             | INVUE<br>ENV-SA1-F-740-U-SL3-EBP-TR<br>-<br>EQUAL BY:<br>PHILIPS GARDCO, KIM LIGHTING                                                          | 66.1W                   | LED/4000°K              | EXTERIOR HALF-ROUND WALL PACK FOR USE WITH 66W, 4462 LUMEN LED MODULE. TEMPERED<br>FROSTED GLASS LENS. TYPE III DISTRIBUTION WITH BACKLIGHT CONTROL. TAMPER RESISTANT<br>HARDWARE. PROVIDE BATTERY PACK WITH BACKBOX. FINISH TO BE DETERMINED BY<br>ARCHITECT. CONTROLS SHALL BE RUN THRU DISTRICT STANDARD PELICAN SYSTEM.<br>(EXTERIOR WALL PACK)                               | -  |
|   | 2           | MC GRAW EDISON TOP TIER SERIES<br>TT-D9-740-U-T4-PM-[FINISH]-F-MS/DIM-L20-OA/RA1014<br>WITH RSS SERIES 20' POLE<br>EQUAL BY:<br>PHILIPS GARDCO | 178.0W                  | LED/4000°K              | LED PARKING LOT LUMINAIRE WITH 20,000 LUMEN OUTPUT, TYPE 4 DISTRIBUTION, DIE-CAST<br>ALUMINUM HOUSING, DIMMING OCCUPANCY SENSOR, WITH PHOTO CONTROL, 20' STRAIGHT<br>ROUND STEEL POLE, SINGLE OR DOUBLE HEAD CONFIGURATIONS AS SHOWN ON PLANS. FINISH<br>AS SELECTED BY ARCHITECT. SEE DETAIL 3 & 4, SHEET E-6.0. CONTROLS SHALL BE RUN THRU<br>DISTRICT STANDARD PELICAN SYSTEM. |    |
|   | 3           | FOCAL POINT<br>FLUL-24-PS-5500L-40K-1C-UNV-LD1-G-(EM)-WH<br>-<br>EQUAL BY:                                                                     | 61.0W                   | LED/4000°K              | RECESSED BASKET STYLE FIXTURE FOR USE WITH 43W, 5500 LUMEN LED MODULE. 2 FOOT BY 4 FOOT, 5.03-INCH DEEP. 0-10V DIMMING. HIGH REFLECTANCE MATTE WHITE PAINT. PROVIDE 90 MINUTE EMERGENCY BATTERY PACK WHERE SHOWN ON PLANS.                                                                                                                                                        |    |
| Ŋ | YYY         | COLUMBIA, PHILIPS DAY-BRITE, LITHOMA                                                                                                           | YYYY                    | YYYY                    | THERMOPLASTIC EXIT SIGN FOR USE WITH LED LAMPS. EMERGENCY BATTERY PACK.                                                                                                                                                                                                                                                                                                           | ♪  |
| ) | 4           | LPX-7-SINGLE-SD-VS1<br>EQUAL BY:                                                                                                               | 2/2                     | LED/GREEN               | REFER TO ARCHITECTURAL PLANS FOR NUMBER OF FACES AND CHEVRONS.                                                                                                                                                                                                                                                                                                                    |    |
|   |             | PHILIPS CHLORIDE<br>-                                                                                                                          |                         |                         | -                                                                                                                                                                                                                                                                                                                                                                                 | -  |
| ト | $_{5}$      |                                                                                                                                                | $\dots$                 | $\dots$                 |                                                                                                                                                                                                                                                                                                                                                                                   | لل |
|   |             | EQUAL BY:                                                                                                                                      |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | 6           | -<br>-<br>EQUAL BY:<br>-                                                                                                                       |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | 7           | -<br>-<br>EQUAL BY:                                                                                                                            |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | 8           | -<br>-<br>EQUAL BY:                                                                                                                            |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | 9           | -<br>-<br>EQUAL BY:<br>-                                                                                                                       |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | (13)        | -<br>-<br>EQUAL BY:                                                                                                                            |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
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|   | <b>14</b>   | -<br>-<br>EQUAL BY:                                                                                                                            |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
|   |             | -                                                                                                                                              |                         |                         | -                                                                                                                                                                                                                                                                                                                                                                                 | _  |
|   |             | -                                                                                                                                              |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
|   | < <u>15</u> | -<br>EQUAL BY:                                                                                                                                 |                         |                         |                                                                                                                                                                                                                                                                                                                                                                                   |    |
|   |             | -                                                                                                                                              |                         |                         | -                                                                                                                                                                                                                                                                                                                                                                                 |    |





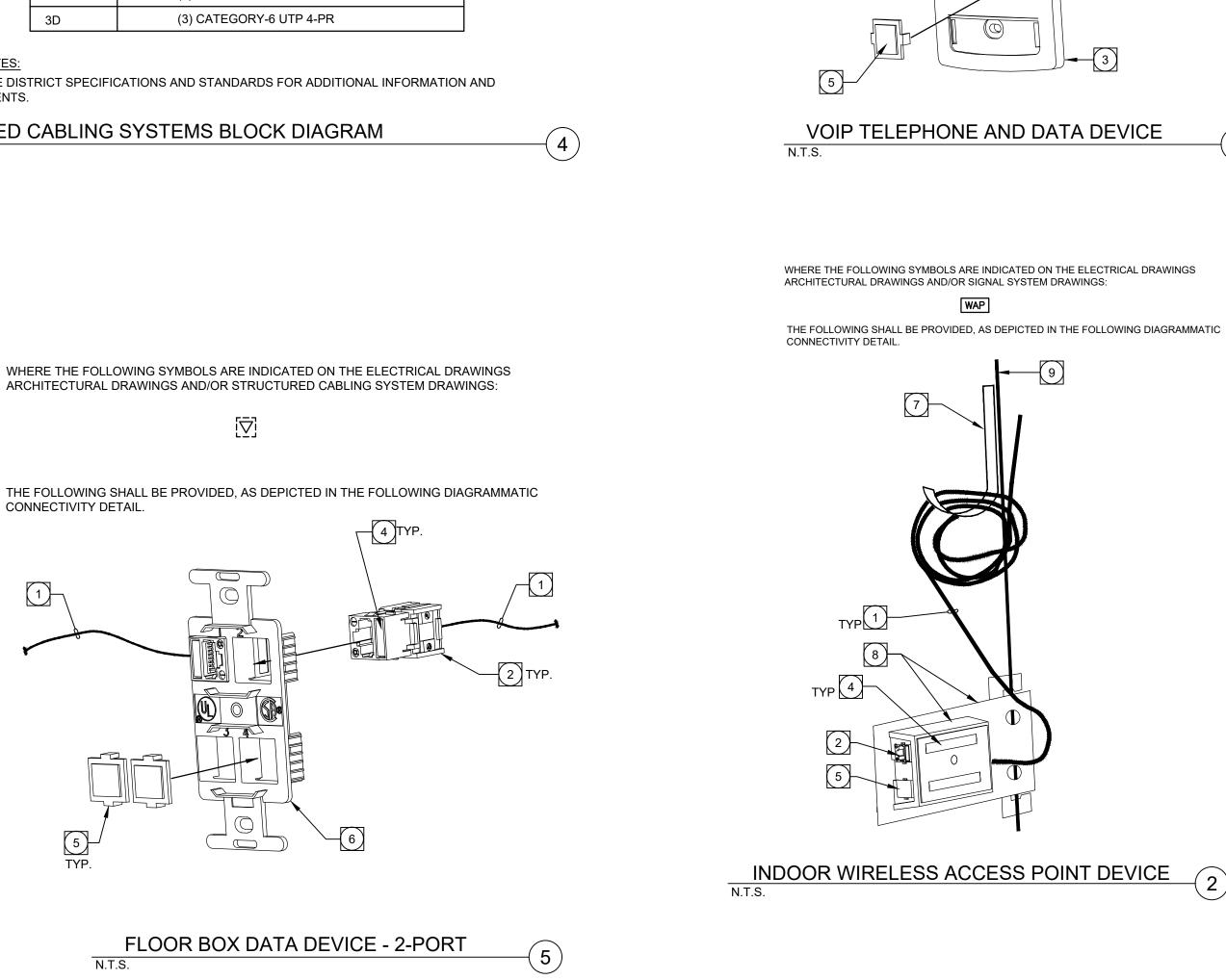


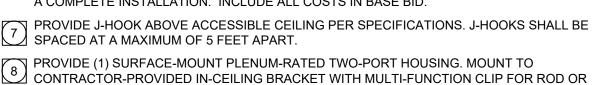




N.T.S.

 $\overline{\mathbb{V}}$ 





HANGER WIRE MOUNTING. PROVIDE 15FT SLACK LOOP ON J-HOOK MOUNTED ABOVE

INSTALL DEDICATED SUSPENDED CEILING WIRE/HANGER OR SUPPORT ROD/ROD HANGER DIRECTLY TO STRUCTURAL CEILING ABOVE TO SUPPORT WAP SURFACE MOUNT HOUSING.

WHERE THE FOLLOWING SYMBOLS ARE INDICATED ON THE ELECTRICAL DRAWINGS

THE FOLLOWING SHALL BE PROVIDED, AS DEPICTED IN THE FOLLOWING DIAGRAMMATIC

WHERE THE FOLLOWING SYMBOLS ARE INDICATED ON THE ELECTRICAL DRAWINGS

THE FOLLOWING SHALL BE PROVIDED, AS DEPICTED IN THE FOLLOWING DIAGRAMMATIC

-<u>(</u>4) TYP.

-3

 $\nabla \dot{\nabla}$ 

ARCHITECTURAL DRAWINGS AND/OR SIGNAL SYSTEM DRAWINGS:

CONNECTIVITY DETAIL.

DATA DEVICE - 2-PORT

N.T.S.

 $\mathbf{V}$   $\mathbf{V}$ 

ARCHITECTURAL DRAWINGS AND/OR SIGNAL SYSTEM DRAWINGS:

CONNECTIVITY DETAIL.

HOUSINGS. MOUNT HOUSING 10 TO 12 INCHES ABOVE ACCESSIBLE CEILING TILE.

PROVIDE J-HOOK ABOVE ACCESSIBLE CEILING PER SPECIFICATIONS. J-HOOKS SHALL BE SPACED AT A MAXIMUM OF 5 FEET APART.

- PROVIDE (1) SURFACE-MOUNT PLENUM-RATED TWO-PORT HOUSING. MOUNT TO

- A COMPLETE INSTALLATION. INCLUDE ALL COSTS IN BASE BID.

- 6 PROVIDE COVERPLATE PER SPECIFICATIONS. COVERPLATE MATERIAL AND FINISH SHALL MATCH ADJACENT/NEARBY POWER COVERPLATES. PROVIDE FLOOR BOX AS REQUIRED FOR

3 PROVIDE FACEPLATE. FACEPLATE MATERIAL AND FINISH SHALL MATCH ADJACENT/NEARBY POWER FACEPLATES UNLESS OTHERWISE NOTED.

- BLANK INSERT. ALL UNUSED FACEPLATE OPENINGS SHALL BE COVERED WITH A BLANK

- 5 INSERT MATCHING THE COLOR OF THE FACEPLATE.

4 PROVIDE FACEPLATE LABELING PER DISTRICT STANDARDS.

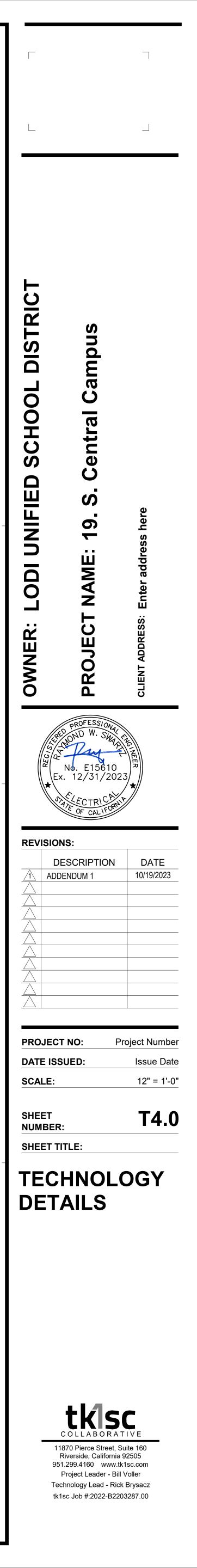
FACEPLATE AND DETAIL NOTES:

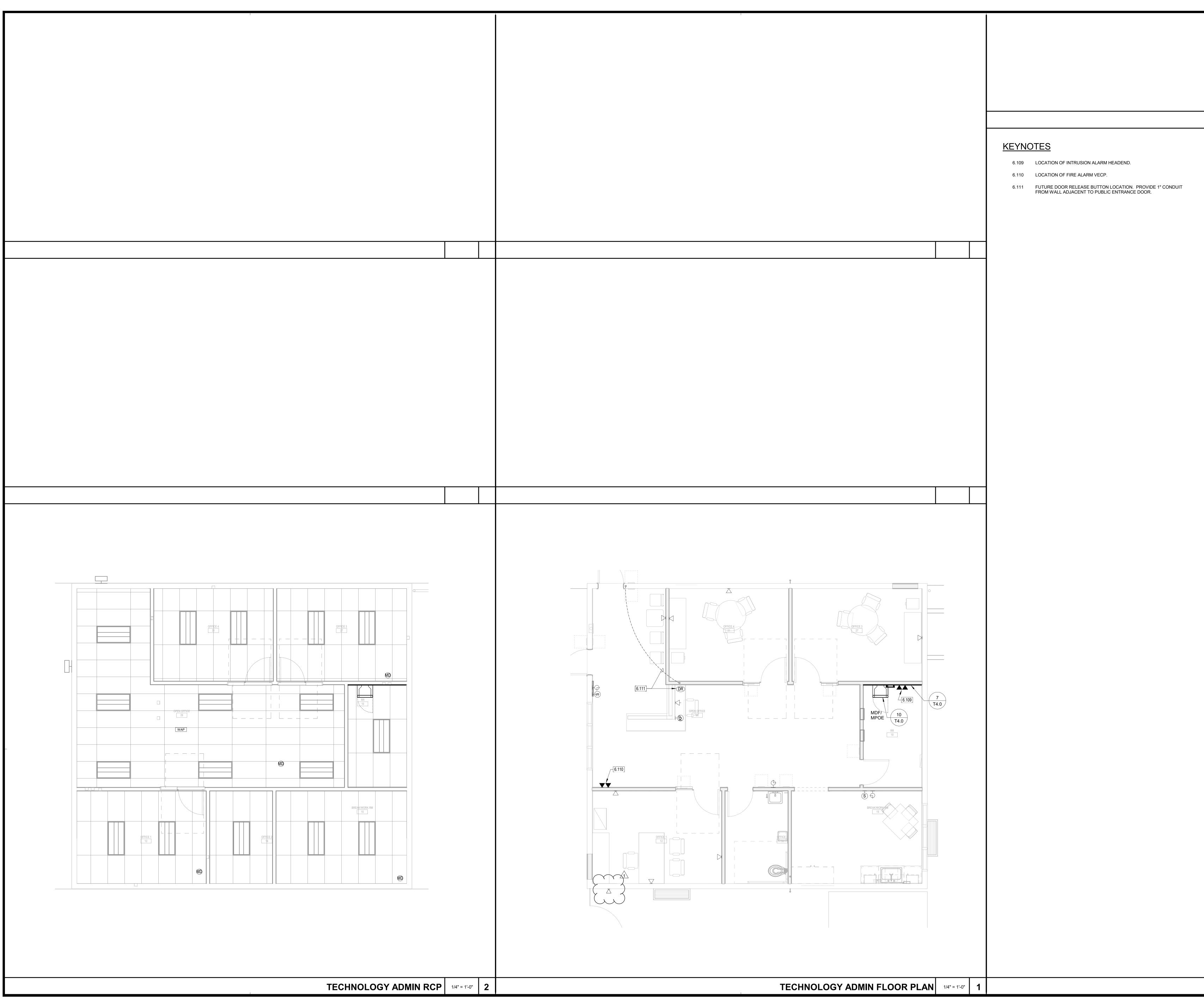
SPECIFICATIONS.

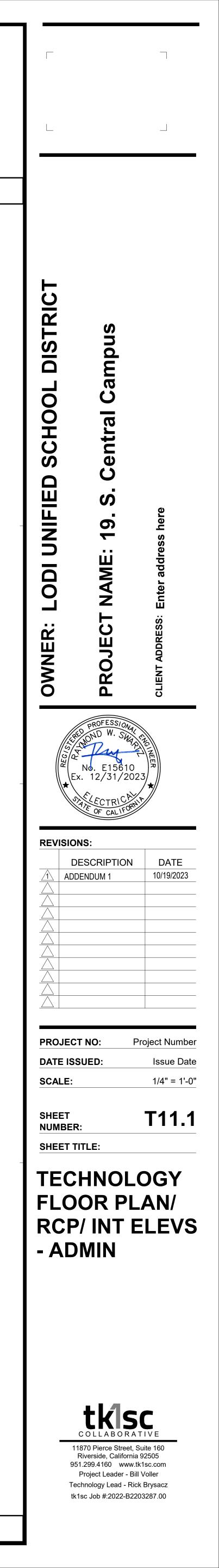
PROVIDE (1) CATEGORY-6A, 4-PAIR, UTP CABLE(S) TO IDF ROOM RACK. COLOR PER SPECIFICATIONS. TERMINATE STATION END(S) IN STATION CONNECTOR(S) PER DETAILS.

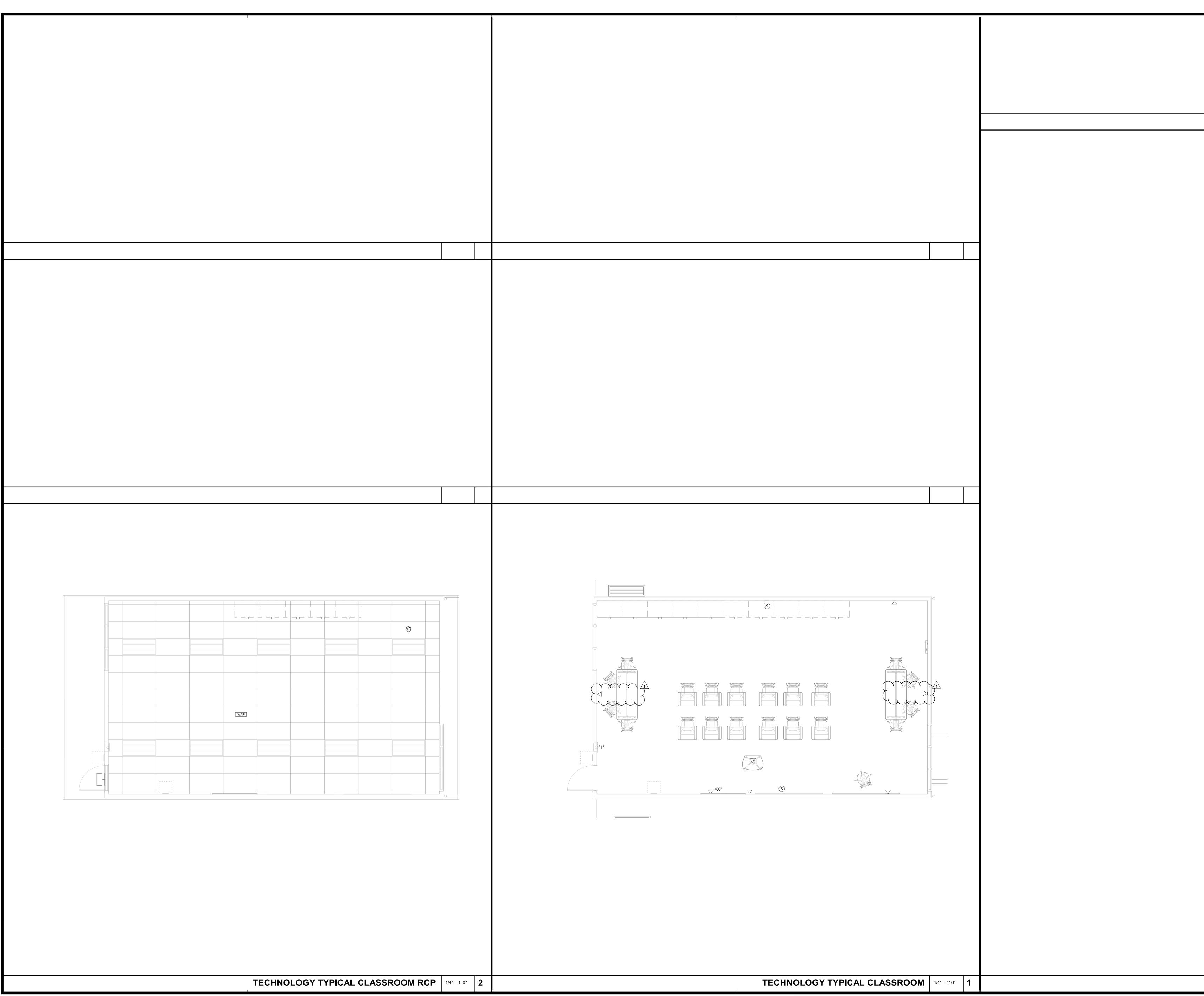
TERMINATE IDF RACK/CABINET END(S) ON CATEGORY-6A PATCH PANEL(S).

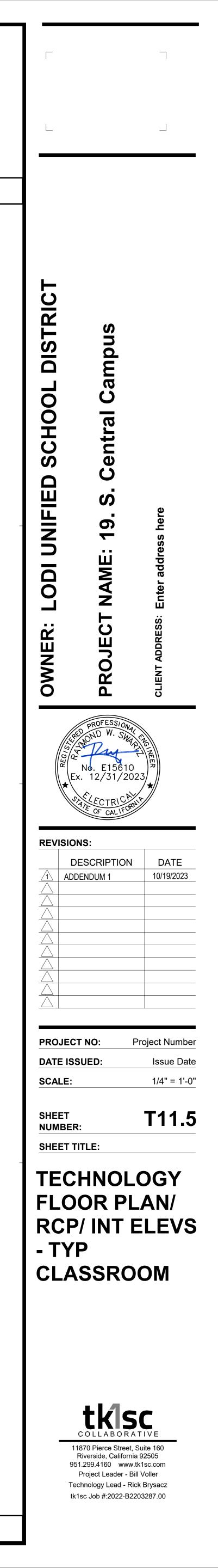
PROVIDE CATEGORY-6A STATION CONNECTOR. COLOR OF CONNECTOR PER













| Project:   | LODI UNIFIED SCHOOL DISTRICT<br>TURNER SENIOR ACADEMY CAMPUS           |            |
|------------|------------------------------------------------------------------------|------------|
| Owner:     | LODI UNIFIED SCHOOL DISTRICT<br>19 S. CENTRAL AVENUE<br>LODI, CA 95240 |            |
| Architect: | SVA Architects, Inc.<br>1450 Drew Ave., Davis, CA 95618                | ADDENDUM 1 |

10/20/2023

Note: The following revisions and clarifications to the Contract Documents (plans and specifications) shall become a part of the Contract Documents. All bidders are required to incorporate all necessary changes, additions, or deductions into their proposals.

# A. REVISIONS:

# 1. GENERAL

A. Add the attached *Revised Geotechnical Report* and *Lodi Demo Former Serna Charter School - Stormwater Inspection Report* to the project documents. Contractor shall incorporate all recommendations and requirements applicable to their work.

# 2. CIVIL

- A. C3.0, C3.1, C4.0 and C5.0: The topo was updated to the post-demolition survey.
- B. C3.0: Keynote 18 was added calling for the removal of an existing tree that conflicts with the drop-off drive aisle.
- C. C3.0: Additional existing grades callouts were added along the north-eastern property line based on the new survey.
- D. C6.0: The dimensions on details 7 and 8 were adjusted slightly for clarity.

# 3. LANDSCAPE:

A. L3.1: Controller revised. Irrigation boxes revised.

# 4. ARCHITECTURAL

- A. A1.0: Topo updated; areas of fence to be demolished and replaced with new revised; sign and bench demolished in previous phase removed
- B. A1.2: Topo updated; areas of fence to be demolished and replaced with new revised; Keynote 19 revised to specify bike locker
- C. A11.1: Corrected window schedule sheet reference (A52.1 instead of A53.1)
- D. A11.2: Corrected window schedule sheet reference (A52.1 instead of A53.1)
- E. A11.3: Corrected window schedule sheet reference (A52.1 instead of A53.1)
- F. A11.4: Corrected window schedule sheet reference (A52.1 instead of A53.1)
- G. A11.5: Corrected window schedule sheet reference (A52.1 instead of A53.1)
- H. A52.1: Added note at window schedule to provide new shades at all windows



I. A61.1: Detail 7 revised to include note for condition of building at soil.

#### 5. STRUCTURAL

A. S4.01: Detail 8 added to show beam penetration condition (e.g., for Mechanical ducts at Administration Building)

## 6. MECHANICAL

- A. M11.1: Mechanical Floor Plan- Admin
  - a. Revised duct layout to accommodate existing structural openings.
- B. M11.2 Mechanical Floor Plan- Student Support Services
  - a. Added Pelican wireless controls.

# 7. ELECTRICAL

- A. E1.0: Electrical Site Plan
  - a. Revised feeder callout to MSB1-10.
  - b. Added feeder stub MSA1-13.
- B. E2.1: Electrical Floor Plan / Lighting / Power Admin
  - a. Added plan note #2.005.
  - b. Added power for irrigation controller in detail #1.
- C. E2.4: Electrical Floor Plan / Lighting / Power Typical Classroom
  - a. Added plan note #2.005.
  - b. Removed floor outlets.
- D. E4.1: Panel Schedules
  - a. Revised panel schedule 1L1.
- E. E5.0 Lighting Fixture Schedule
  - a. Added fixture type 4.

# 8. TECHNOLOGY

- A. T4.0: Technology Details
  - a. Change (2) instances of Cat6 to Cat6A.Added feeder stub MSA1-13.
- B. T11.1: Technology Floor Plan / RCP / Int Elevs Admin
- a. Add data drop to southwest corner of building for sprinkler controller.
- C. T11.6- Technology Floor Plan / RCP / Int Elevs Typ Classrooms a. Removed floor boxes.

#### 9. SPECIFICATIONS

- A. 23 09 00 Building Automation System added
- B. 27 10 00: replace instances of Cat 6 with Cat 6A. Revise fiber to 12-strand SM. Add note to adhere to District Specs.
- C. 32 84 00: Controller revised. Irrigation boxes revised.



**Turner Senior Academy** Addendum 1 Page 3 of 7 — 10/20/2023

# D. BIDDERS' REQUESTS FOR CLARIFICATION

- Q: During the jobwalk, it was noted that there are miscellaneous loose items in all of the portable buildings. Will these items be removed by the district, prior to them being relocated by the GC?

   A: The miscellaneous loose items in all the portable buildings will be removed by the District prior to start of work.
- Q: Spec section 00 31 19, existing Conditions notes that are reports that have not been included in the project documents that are necessary for bidding purposes. Please provide electronic copies these documents: Survey of site; Geotechnical report; Hazardous Material Report A: Geotechnical Report attached. A Hazardous Material inspection has not been conducted.
- Q: Has the District applied for the state mandated SWPPP-WDID#? Please provide the Risk level
   A: See attached for SWPP Inspection Report showing risk level and WDID number. Please note that the Contractor will be responsible for SWPPP after the job is awarded.
- 4. Q: On Plan Sheet C6.1, Detail 6 (Utility Trench) calls out a concrete cap for trenches with less than 18" of cover from top of pipe to subgrade. The lower limit of the cap is defined as the centerline of pipe. What is the upper limit of the concrete cap? Is it 6" above the pipe, or is it at bottom of subgrade? A: The upper limit of the concrete cap is 6" above the pipe.
- 5. Q: Relating to the same Utility Trench Detail, the detail says that the concrete cap is needed in paved areas only. Is this all paved areas, or only paved areas with vehicular traffic?

A: The concrete cap is needed in all paved areas with insufficient depth of cover.

- 6. Q: Relating to the same Utility Trench Detail, please proved a concrete specification for the concrete cap (strength requirement, cement content, etc.)
- A: Concrete for the cap should generally conform to the specifications supplied as part of the contract documents such as the specifications for Trenching and Backfilling, Concrete for Exterior Improvements and the utility specifications.
- 7. Q: Is there a geotechnical report available for this project? A: See answer to Question 2 above.
- 8. Q: There are several areas of hardscape (asphalt and concrete), fencing, and several trees that are still on the property. (see attached photos) There is not a demolition sheet showing that any of these get removed, however, they are located in the area of new



**Turner Senior Academy** Addendum 1 Page 4 of 7 — 10/20/2023

> construction. Please advise if these areas are to be cleaned up and all remaining items that are in the area of construction are to be removed by the district or by the GC. A: It is the contractor's responsibility to remove all above ground features remaining including but not limited to, concrete pavement, brick pavers, AC pavement, and excluding utility poles electrical transformers not noted to be removed. Where new fence is being installed contractor will need to remove the existing fence.

- Q: The site grade is very uneven at this time and the plans do not indicate this. Has a site survey or an import/export survey been completed? Please provide further information
   A: Yes, a Site Survey has been conducted. Contractor to consult Addendum 1 plan sheet C3.0.
- 10. Q: Spec section 00 31 19, existing Conditions notes that are reports that have not been included in the project documents that are necessary for bidding purposes. Please provide electronic copies these documents: Survey of site; Geotechnical report; Hazardous Material Report
   A: See ensure to questione 2 and 2 above

A: See answers to questions 2 and 3 above.

- 11. Q: Please provide a specification for the Acoustic Tile scope of workA: For purposes of bidding, assume Armstrong Radar Acoustic Ceiling Tiles; include an allowance for repairing and replacing damaged tiles.
- 12. Q: Please provide a specification for the Bike LockersA: Huntco Single Bike Locker or equal, 14 gauge steel, powder coated, color selected by Architect, padlock handle.
- 13. Q: Please provide specification for Tack board A: Include an allowance for repairing tack board
- 14. Q: Please provide specification and details for the closure strip between to unit pieces for the walls, flooring, and roof.A: See PC drawings.
- 15. Q: Please confirm there is no other roof work to be performed other than the closure strip between two unitsA: Confirmed
- 16. Q: What joint/expansion material is required at the metal floor joists where it meets concrete and/or soil
  A: See Specification section 32 05 23, section 2.05 for joint/expansion material. Where soil abuts the building, provide subgrade drainage and protection board, TREMDrain or equal, to 6" below flashing in lieu of expansion board. (see attached revised Detail 7 / sheet A61.1)



**Turner Senior Academy** Addendum 1 Page 5 of 7 — 10/20/2023

- 17. Per pages A11.1 through A11.5 under the keynotes section there is the symbol for the windows, and it states (number indicates window per schedule, refer to sheet A53.1) I cannot locate sheet A53.1. do we disregard this.A: The window tag description in the Floor Plan Legend should reference A52.1, not A53.1
- 18. Q: Will they be requiring shades on the windows indicated as letter E, possible storefront. An example would be page A11.4 in the conference room. Can you please let us know how to proceed. Please give us a call if you have any questions about my questions.

A: Provide new manual chain operated window shades per Specification section 12 24 00 at all new and existing windows.

- 19. Q: E2.3 calls for a type 4 lighting fixture. A type 4 fixture is not referenced on the fixture schedule. Please provide an updated fixture schedule.A: See addendum #1 drawings, sheet E5.0.
- 20. Q: Under note 1.001 of E1.0, a future stub is needed to a new building. Please provide conduit quantity and size.A: See addendum #1 drawings, sheet E1.0. Conduit was added to the plan drawing.
- 21. Q: Please provide pull box schedule stated in E6.0 detail 5.A: Disregard the note referencing the pull box schedule. Provide pull boxes sized per NEC requirements as per Pull Box Note #6.
- 22. Q: Please confirm that data cables will be free aired and supported thru J-hooks inside each modular building.A: Cables may be supported on J-hooks. See spec section.
- 23. Q: Please provide details and specs for required floor boxes in 'classrooms' on E2.4 and T11.5.
  - A: Floor boxes have been removed from typical classrooms
- 24. Q: Please confirm if cable is Cat6 or Cat6A.A: Category 6A. See updated spec and drawings Addendum 1
- 25. Q: How many cables does a fully blackened triangle get that does not say W for wall phone? A. One (1) Category 6A cable.
- 26. Q: Do clocks and speakers get a Cat6 or Cat6A cable? A: Category 6A



#### **Turner Senior Academy** Addendum 1 Page 6 of 7 — 10/20/2023

- 27. Q: Spec section 27 10 00, 2.6 Fiber Optic Cabling says that the fiber optic cable will be provided by owner and owner will provide all fiber connector housings, connectors, terminations, patch cords and testing. Please confirm that this is correct and what is required of the contractor. Is fiber and copper backbone being provided by the carriers?
  A: 12-strand SM fiber optic cable will be provided and installed by contractor. See updated addendum 1 specification.
- 28. Q: Is there any copper backbone required for this project? Please provide (1) 25-pair Category 5E cable from MDFs to IDF.A: See updated specification section addendum 1.
- 29. Q: Please confirm if WAP's only get (1) cable and if cable is to be Cat6A or Cat6? A: WAPs will get a single data cable (Category 6A)
- 30. Q: Where is the MDF located in the Admin building?A: See sheet T11.1

## Attachments:

Revised Geotechnical Report Lodi Demo Former Serna Charter School - Stormwater Inspection Report Sheet C3.0 Sheet C3.1 Sheet C4.0 Sheet C5.0 Sheet C6.0 Sheet L3.1 Sheet A1.0 Sheet A1.2 Sheet A11.1 Sheet A11.2 Sheet A11.3 Sheet A11.4 Sheet A11.5 Sheet A52.1 Sheet A61.1 Sheet S4.01 Sheet M11.1 Sheet E1.0 Sheet E2.1 Sheet E2.4 Sheet E4.1 Sheet E5.0 Sheet T 4.0 Sheet T11.1



# Turner Senior Academy Addendum 1

Page 7 of 7 — 10/20/2023

Sheet T11.5 Specification section 23 09 00 Building Automation System Specification section 27 10 00 Structured Cabling System Specification section 32 84 00 Planting Irrigation

**Reason**: Revision & Clarification of Bid Documents

# **Distribution**:

Bidders Owner Inspector

#### SECTION 23 09 00

#### BUILDING AUTOMATION SYSTEM (WIRELESS)

#### PART 1 - GENERAL

- 1.01 WORK INCLUDED
  - A. Furnish a wireless Building Automation System (BAS) by Pelican Wireless Systems, according to the District standards.
  - B. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.
  - C. Implement the detailed design for all analog and binary objects, system databases, graphic displays, logs, and management reports based on control descriptions, logic drawings, configuration data, and bid documents.
  - D. Design, provide, and install all equipment cabinets, panels, conduit as required, data communication network cables needed, and all associated hardware.
  - E. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.
  - F. Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.
  - G. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.
  - H. Provide a comprehensive operator and technician training program as described herein.
  - I. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.
  - J. Provide new sensors, dampers, valves, and install only new components. No used components shall be used as any part or piece of installed system.

#### 1.02 SYSTEM DESCRIPTION

A. The 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,

23 09 00 - 1 BUILDING AUTOMATION SYSTEMS (WIRELESS)

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.
- 1.03 APPROVED MANUFACTURERS AND INSTALLERS
  - A. Pelican Wireless Systems installed by local Pelican authorized installer.
- 1.04 QUALITY ASSURANCE
  - A. The BAS shall be designed, installed, commissioned, and serviced by authorize Pelican installer. System provider shall have an in-place support facility within 2 hours response time of the site with technical staff, spare parts inventory, and necessary test and diagnostic equipment.
    - The Bidder shall be regularly engaged in the design, installation and maintenance of BAS systems and shall have demonstrated technical expertise and experience in the design, installation and maintenance of Pelican Wireless Systems of similar in size and complexity to this project. Bidders shall provide a list of at least 5 projects, similar in size and scope to this project completed within the past 3 years.
  - B. Materials and equipment shall be manufacturer's latest standard design that complies with the specification requirements.
  - C. All BAS peer-to-peer network controllers, central system controllers and local user displays shall be UL Listed under Standard UL 916, category PAZX.

- D. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Governing Radio Frequency Electromagnetic Interference, and be so labeled.
- E. Control system shall be engineered, programmed and supported completely by representative's local office that must be within 100 miles of project site.

#### 1.05 REFERENCE STANDARDS

- A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof, shall govern design and selection of equipment and material supplied:
  - 1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
  - 2. Uniform Building Code (UBC), including local amendments.
  - 3. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.
  - 4. National Electrical Code (NEC).
  - 5. FCC Part 15, Subpart J, Class A.
  - 6. EMC Directive 89/336/EEC (European CE Mark).
  - 7. Title 24, Part 6: 2022 California Building Energy Efficiency Standards.
- B. City, county, state, and federal regulations and codes in effect as of contract date.
- C. Except as otherwise indicated, the system supplier shall secure and pay for all permits, inspections, and certifications required for his work, and arrange for necessary approvals by the governing authorities.

#### 1.06 SUBMITTALS

- A. Drawings
  - 1. The system supplier shall provide a fully complete submittal including point to point engineered drawings, control sequences of operations, bill of materials, and cut sheets for all control devices for approval. Incomplete submittals will be rejected. Partial submittals are not acceptable.
  - 2. Drawings provided in PDF format are acceptable.
- B. System Documentation
  - 1. Include the following in submittal package:
    - a. Site Plan Drawings indicating the exact location of all gateways and repeaters to ensure wireless connectivity between all buildings on the site.
    - b. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
    - c. Complete bill of materials, gateways, repeaters, combination drybulb thermostat and CO2 sensors, economizer controllers, power supplies, cabling, and all other devices required for a fully functional system.
    - d. Cut sheets of all control devices.

#### 1.07 WARRANTY

- A. The BAS contractor shall warrant the system for 12 months after system acceptance and beneficial use by the owner. During the warranty period, the BAS contractor shall be responsible for all necessary revisions as required to provide a complete and workable system consistent with the letter and intent of the Sequence of Operation section of the specification. BAS equipment shall include a limited-warranty by the manufacturer for a period of five (5) years from the time of system acceptance.
- B. Limited-warranty by manufacturer is limited to replacement of defective products.
- 1.08 RELATED WORK IN OTHER SECTIONS
  - A. Refer to Division 0 and Division 1 for related contractual requirements.
  - B. 230593 Testing, Adjusting, and Balancing for HVAC
  - C. 120800 Commissioning of HVAC
  - D. 237413 Packaged Outdoor AC Units
  - E. 26 00 00 General Electrical Provisions.
  - F. 260519 Low Voltage Electrical Power Conductors and Cables
  - G. 260523 Control Voltage Electrical Power Cables
  - H. 260529 Hangers and Supports for Electrical Systems
  - I. 260533 Raceways and Boxes for Electrical Systems
- 1.09 PRODUCTS INTEGRATED TO BUT NOT FURNISHED OR INSTALLED UNDER THIS SECTION
  - A. None.

PART 2 - PRODUCTS

- 2.01 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:

23 09 00 - 4 BUILDING AUTOMATION SYSTEMS (WIRELESS)

- 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.
  - 3. 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.
  - 4. 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
  - 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.
  - Each space temperature a.
  - Each temperature set point(s) b.
  - Each current call: heat, cool, number of stages, fan, economizer, etc. C.
  - d. Each damper position
  - Each valve position e.
  - f. Each CO<sup>2</sup> change
  - Each CO<sup>2</sup> setting g.
  - Each current call for ventilation due to high CO<sup>2</sup> h.
  - i. Each Humidity change
  - Each Humidity set point j.
  - Each current call for dehumidification or humidification. k.
  - Each Fan speed adjustment Ι.
  - Supply duct static pressure m.
  - Supply, Return, Outside air temperatures n.
  - Other points as requested by the mechanical engineer of record and/or the ο. Commissioning Agent.
- 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.

#### 2.02 APPLICATION SPECIFIC CONTROLLERS

- Application Specific Controllers shall not require custom programming and shall control Α. 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.
- Gateways are devices which connected to an Ethernet port and act as a bridge between Β. the BAS cloud servers and the wireless mesh network.
  - Shall be capable of providing Internet connection to up to 2,000 devices. 1.
  - Shall be capable of automatically addressing routing tables to all devices part of 2. wireless mesh network and shall not require manual programming or addressing.
  - Shall communicate to cloud servers over a TCP/IP outbound-only connection. 3.
  - Shall not require a Public IP address, custom VPNs, or any on-site servers. 4.
  - 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<sup>2</sup>, and temperature and CO<sup>2</sup>. 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.
- 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 2016 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.

23 09 00 - 7

BUILDING AUTOMATION SYSTEMS (WIRELESS)

- 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 cooling 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<sup>2</sup> 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

23 09 00 - 8

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 thirdparty 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

23 09 00 - 9

12/16/2022

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<sup>2</sup> 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 shortterm 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<sup>2</sup> 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.

23 09 00 - 10

BUILDING AUTOMATION SYSTEMS (WIRELESS)

- 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. 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 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. Configuration of Devices and System
  - 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 standalone operation. BAS devices shall not require web connection or communication to the BAS to run under normal operations.

23 09 00 - 11 BUILDING AUTOMATION SYSTEMS (WIRELESS)

#### 2.03 CONTROL ENCLOSURES

- A. All controllers, power supplies and relays shall be mounted in enclosures.
- B. Enclosures may be NEMA 1 when located in a clean, dry, indoor environment. Indoor enclosures shall be NEMA 12 when installed in other than a clean environment.
- C. Enclosures shall be NEMA 4 when located in an outdoor environment.
- D. Enclosures shall have hinged, locking doors.
- E. Provide laminated plastic nameplates for all enclosures in any mechanical room or electrical room. Include location and unit served on nameplate. Laminated plastic shall be 0.125 inches thick and appropriately sized to make label easy to read.

#### PART 3 - EXECUTION

#### 3.01 Installation

- A. 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.
- 3.02 Examination
  - A. Thoroughly examine project plans for control device and equipment locations. Report discrepancies, conflicts, or omissions to Architect or Engineer for resolution before starting rough-in work.
  - B. Inspect site to verify that equipment can be installed as shown. Report discrepancies, conflicts, or omissions to Engineer for resolution before starting rough-in work.
  - C. Examine drawings and specifications for work of others. Report inadequate headroom or space conditions or other discrepancies to Engineer and obtain written instructions for changes necessary to accommodate Section 230900 work with work of others. BAS Contractor shall perform at his expense necessary changes in specified work caused by failure or neglect to report discrepancies.
- 3.03 Protection
  - A. BAS Contractor shall protect against and be liable for damage to work and to material caused by BAS Contractor's work or employees.

- B. BAS Contractor shall be responsible for work and equipment until inspected, tested, and accepted. Protect material not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.
- 3.04 Coordination
  - A. Site:
    - 1. Assist in coordinating space conditions to accommodate the work of each trade where work will be installed near or will interfere with work of other trades. If installation without coordination causes interference with work of other trades, BAS Contractor shall correct conditions without extra charge.
    - 2. Coordinate and schedule work with other work in the same area and with work dependent upon other work to facilitate mutual progress.
  - B. Test and Balance:
    - 1. Provide Test and Balance Contractor a single set of necessary tools (if needed) to interface to control system for testing and balancing.
    - 2. Train Test and Balance Contractor to use control system interface tools.
    - 3. Provide a qualified technician to assist with testing and balancing the first 20 terminal units.
    - 4. Test and Balance Contractor shall return tools undamaged and in working condition at completion of testing and balancing.
  - C. Coordination with Other Controls: Integrate with and coordinate controls and control devices furnished or installed by others as follows.
    - 1. Each supplier of a controls product shall configure, program, start up, and test that product to meet the sequences of operation.
    - 2. Coordinate and resolve incompatibility issues that arise between control products provided under this section and those provided under other sections or divisions of this specification.
    - 3. BAS Contractor shall be responsible for integration of control products provided by multiple suppliers regardless of where integration is described within the contract documents.
- 3.05 General Workmanship
  - A. Install equipment, piping, and wiring or raceway horizontally, vertically, and parallel to walls wherever possible.
  - B. Provide sufficient slack and flexible connections to allow for piping and equipment vibration isolation.
  - C. Install equipment in accessible locations as defined by National Electrical Code (NEC) Chapter 1 Article 100 Part A.
  - D. Verify wiring integrity to ensure continuity and freedom from shorts and ground faults.

23 09 00 - 13 BUILDING AUTOMATION SYSTEMS (WIRELESS)

- E. Equipment, installation, and wiring shall comply with industry specifications and standards and local codes for performance, reliability, and compatibility.
- 3.06 Field Quality Control
  - A. Work, materials, and equipment shall comply with rules and regulations of applicable local, state, and federal codes and ordinances as identified in Section 230900 Article 1.5 (Reference Standards).
  - B. Continually monitor field installation for code compliance and workmanship quality.
  - C. BAS Contractor shall arrange for work inspection by local or state authorities having jurisdiction over the work.
- 3.07 Wiring
  - A. Low voltage (Class 2) wiring in concealed accessible spaces may be plenum rated and is not required to be enclosed in conduit.
  - B. Control and interlock wiring and installation shall comply with national and local electrical codes, Division 26, and manufacturer's recommendations. Where the requirements of Section 230900 differ from Division 26, Section 230900 shall take precedence.
  - C. NEC Class 1 (line voltage) wiring shall be UL listed in approved raceway as specified by NEC and Division 26.
  - D. Low-voltage wiring shall meet NEC Class 2 requirements. Subfuse low-voltage power circuits as required to meet Class 2 current limit.
  - E. NEC Class 2 (low voltage current-limited) wires not in raceway but in concealed and accessible locations such as return air plenums shall be UL listed for the intended application.
  - F. Conduit: All conduit shall comply with the minimum requirements of the local authority having jurisdiction.
    - 1. Install wiring in conduit where subject to mechanical damage and at levels below 10ft in mechanical, electrical, or service rooms.
    - 2. Install wiring in conduit for wall sensors and extend the conduit 6" above the ceiling. Install a bushing on the end of the conduit.
    - 3. Install wiring in conduit above inaccessible ceilings.
    - 4. Secure conduit with conduit clamps fastened to structure and spaced according to code requirements. Conduit and pull boxes shall not be hung on or attached to ductwork, electrical raceways, piping, or ceiling suspension systems.
    - 5. Size conduit and select wire size and type in accordance with manufacturer's recommendations and NEC requirements.
    - 6. Include one pull string in each conduit 1 in. or larger.
    - 7. Install Class 1 and Class 2 wiring in separate conduits. Boxes and panels containing high-voltage wiring and equipment shall not be used for low-voltage

23 09 00 - 14

wiring except for the purpose of interfacing the two through relays and transformers.

- 8. Do not install wiring in conduit containing tubing.
- 9. Conceal conduit except within mechanical, electrical, or service rooms. Maintain minimum clearance of 6 in. between raceway and high-temperature equipment such as steam pipes or flues.
- 10. Adhere to requirements in Division 26 where conduit crosses building expansion joints.
- 11. Flexible metal conduit and liquid-tight flexible metal conduit shall not exceed 3 ft. in length and shall be supported at each end. Do not use flexible metal conduit less than 1/2 inch electrical trade size. Use liquid-tight flexible metal conduits in areas exposed to moisture including chiller and boiler rooms.
- 12. Install conduits rigidly, support adequately, ream at both ends, and leave clean and free of obstructions. Join conduit sections with couplings and according to code. Make terminations in boxes with fittings. Make terminations outside of boxes with bushings.
- G. Locate control transmitters, high/low limit switches, status relays, etc., in control panels only. Do not install control and status relays in packaged equipment control panel enclosures containing Class 1 starters.
- H. Field wiring of all safety switches shall be brought back individually to discrete terminals in the control panel. Serial wiring of safeties is not permitted. Where safeties (e.g. freeze-stat) must be mounted in a plenum, the locations shall be clearly described in documents, and clearly field-labelled on access doors as per the diagram designation.
- I. All terminal box controls (controller, power supply, actuators, sensors, pressure ports) shall be field-mounted to permit calibration and service from a single ladder location, coordinated wherever feasible with the furniture layout. Components shall not be installed in a manner that obstructs the factory-provided performance curve data.
- J. Terminate control and interlock wiring related to the work of this section. Maintain at the job site updated (as-built) wiring diagrams that identify terminations.
- K. BAS Contractor shall provide stepdown transformers.
- 3.08 Communication Wiring
  - A. BAS Contractor shall comply with all wiring requirements previously listed.
  - B. Communication wiring shall be low-voltage (class 2) wiring and shall comply with Article 3.6 (Wiring) for plenum rated installations.
  - C. Install communication wiring in separate conduit and enclosures from other Class 2 wiring.

- D. During installation do not exceed maximum cable pulling, tension, or bend radius specified by the cable manufacturer.
- E. Verify entire network's integrity following cable installation using appropriate tests for each cable.
- F. Each run of communication wiring shall be a continuous length without splices when that length is commercially available. Runs longer than commercially available lengths shall have as few splices as possible using commercially available lengths.
- G. Label communication wiring to indicate origination and destination.
- H. Ground coaxial cable according to NEC regulations article on "Communications Circuits, Cable, and Protector Grounding."
- I. All Ethernet cabling, routers, hubs, and switches for connecting 230900 furnished and installed control panels, servers and clients to the building owner's Ethernet network are the responsibility of the BAS contractor.
- 3.09 Installation of Sensors
  - A. Install sensors according to manufacturer's recommendations.
  - B. Mount sensors rigidly and adequately for operating environment.
  - C. Install room temperature sensors on concealed junction boxes properly supported by wall framing. For room sensors located exterior walls, furnish and install a ¼" thick, adhesive backed, foam insulating pad made by BAPI. Do not place room sensors in direct sunlight.
  - D. Air seal wires attached to sensors in their conduits in the wall to prevent sensor readings from being affected by air transmitted from other areas.
  - E. Use averaging sensors in mixing plenums and hot and cold decks. Install averaging sensors in a serpentine manner vertically across duct. Support each bend with a capillary clip.
  - F. Install mixing plenum low-limit sensors in a serpentine manner horizontally across duct. Support each bend with a capillary clip. Provide 1 ft. of sensing element for each 1 ft 2) of coil area.
  - G. Install pipe-mounted temperature sensors in wells. Install liquid temperature sensors with heat-conducting fluid in thermal wells.
  - H. Install outdoor air temperature sensors on north wall at designated location with sun shield.
  - I. Differential Air Static Pressure:

23 09 00 - 16 BUILDING AUTOMATION SYSTEMS (WIRELESS)

- 1. Supply Duct Static Pressure: Pipe high-pressure tap to duct using a pitot tube. Make pressure tap connections according to manufacturer's recommendations.
- 2. Return Duct Static Pressure: Pipe high-pressure tap to duct using a pitot tube. Make pressure tap connections according to manufacturer's recommendations.
- 3. Building Static Pressure: Pipe pressure sensor's low-pressure port to the static pressure port located on the outside of the building through a high-volume accumulator. Pipe high-pressure port to a location behind a thermostat cover.
- 4. Piping to pressure transducer pressure ports shall contain a capped test port adjacent to transducer.
- 5. Pressure transducers, except those controlling VAV boxes, shall be located in control panels, not on monitored equipment or on ductwork. Mount transducers in a vibration-free location accessible for service without use of ladders or special equipment.
- 6. Mount gauge tees adjacent to air and water differential pressure taps. Install shutoff valves before tee for water gauges.
- J. Smoke detectors, freeze stats, high-pressure cut-offs, and other safety switches shall be hard-wired to de-energize equipment as described in the sequence of operation. Switches shall require manual reset. Provide contacts that allow BAS software to monitor safety switch status.

## 3.10 SYSTEM CONFIGURATION

- A. General. The installing contractor shall provide all labor necessary to install, initialize, start-up and troubleshoot all system hardware and configurations described in this section. This includes any requirements necessary to access the web application on third-party devices.
- B. Installing contractor shall work with owner's representative to determine configuration parameters including but not limited to hours of operation, set points, system variables, naming of devices, and site naming. Naming of devices and the site shall be performed by the installing contractor. Naming convention of space thermostats shall be space served. Naming convention of zone controllers shall be the equipment serial number. All naming shall be provided by or agreed upon with the owner.

#### 3.11 SYSTEM COMMISSIONING AND SYSTEM STARTUP

- A. 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.
- B. 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.

- 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 demonstrate that they are a direct supporting resource. Contact information for Technical Support from Pelican Wireless Systems is to be provided.
- 3.12 Control System Checkout and Testing
  - A. Startup Testing: Complete startup testing to verify operational control system before notifying Owner of system demonstration. Provide Owner with schedule for startup testing. Owner may have representative present during any or all startup testing.
    - 1. Calibrate and prepare for service each instrument, control, and accessory equipment furnished under Division 23.
    - 2. Verify that control wiring is properly connected and free of shorts and ground faults. Verify that terminations are tight.
    - 3. Enable control systems and verify each input device's calibration. Calibrate each device according to manufacturer's recommendations.
    - 4. Verify that binary output devices such as relays, solenoid valves, two-position actuators and control valves, and magnetic starters, operate properly and that normal positions are correct.
    - 5. Verify that analog output devices such as I/Ps and actuators are functional, that start and span are correct, and that direction and normal positions are correct. Check control valves and automatic dampers to ensure proper action and closure. Make necessary adjustments to valve stem and damper blade travel.
    - 6. Prepare a log documenting startup testing of each input and output device, with technician's initials certifying each device has been tested and calibrated.
    - 7. Verify that system operates according to sequences of operation. Simulate and observe each operational mode by overriding and varying inputs and schedules. Tune PID loops and each control routine that requires tuning.
    - 8. Alarms and Interlocks:
      - a. Check each alarm with an appropriate signal at a value that will trip the alarm.
      - b. Trip interlocks using field contacts to check logic and to ensure that actuators fail in the proper direction.
      - c. Test interlock actions by simulating alarm conditions to check initiating value of variable and interlock action.

#### 3.13 Control System Demonstration and Acceptance

- A. Demonstration: Prior to acceptance, perform the following performance tests to demonstrate system operation and compliance with specification after and in addition to tests specified in Section 3.9 (Control System Checkout and Testing). Furnish log documenting completion of startup tests.
  - 1. Demonstration shall follow process submitted and approved under Submittals section of this specification. Complete approved checklists and forms for each system as part of system demonstration.
  - 2. Demonstrate actual field operation of each sequence of operation. Provide at least two persons equipped with two-way communication. Demonstrate calibration and response of any input and output points requested by Owner's representative. Provide and operate test equipment required to prove proper system operation.
  - 3. Demonstrate compliance with System Performance section of this specification.
  - 4. Demonstrate compliance with sequences of operation through each operational mode.
  - 5. Demonstrate complete operation of operator interface.
  - 6. Demonstrate each of the following:
    - a. Furnish trend logs for each system: Trend data shall indicate setpoints, operating points, valve positions, and other data as specified in the points list provided with each sequence of operation in. Each log shall cover three 7-day periods and shall have a sample frequency not more than 5 minutes. Logs shall be accessible through system's operator interface.
  - 7. Tests that fail to demonstrate proper system operation shall be repeated after BAS Contractor makes necessary repairs or revisions to hardware or software to successfully complete each test.
- 3.14 Cleaning
  - A. Each day clean up debris resulting from work. Remove packaging material as soon as its contents have been removed. Collect waste and place in designated location.
  - B. On completion of work in each area, clean work debris and equipment. Keep areas free from dust, dirt, and debris.
  - C. On completion of work, check equipment furnished under this section for paint damage. Repair damaged factory-finished paint to match adjacent areas. Replace deformed cabinets and enclosures with new material and repaint to match adjacent areas.

#### 3.15 AS-BUILT DOCUMENTATION

- A. Project Record Documents. Submit three copies of record (as-built) documents upon completion of installation for approval prior to final completion. Submittal shall consist of:
  - 1. Project Record Drawings of as-built versions of submittal Shop Drawings provided in electronic PDF format. As-built floor plans indicating the routing of mstp communication wiring shall be included.

- 2. Testing and commissioning reports and checklists of completed final versions of reports, checklists, and trend logs.
- 3. As-built versions of submittal Product Data.
- 4. Names, addresses, e-mail addresses and 24-hour telephone numbers of Installer and service representatives for DDC system and products.
- 5. Operator's manual with procedures for operating control systems including logging on and off, handling alarms, producing point reports, trending data, overriding computer control and changing set points and variables.
- 6. Programming manuals with description of programming language and syntax, of statements for algorithms and calculations used, of point database creation and modification, of program creation and modification, and of editor use.
- 7. Engineering, installation, and maintenance manuals that explain how to:
- 8. Design and install new points, panels, and other hardware.
- 9. Perform preventive maintenance and calibration.
- 10. Debug hardware problems.
- 11. Repair or replace hardware.
- 12. Documentation of all programs created using custom programming language including set points, tuning parameters, and object database.
- 13. Backup copy of graphic files, programs, and database on electronic media such as DVDs.
- 14. List of recommended spare parts with part numbers and suppliers.
- 15. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
- 16. Complete original-issue copies of furnished software, including operating systems, custom programming language, BAS software, and graphics software.
- 17. Licenses, guarantees, and warranty documents.
- 18. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
- 19. Owner training materials.
- 3.16 Training
  - A. Provide 32 hours of training for a designated staff of Owner's representatives. Training shall be provided via self-paced training, web-based or computer-based training, classroom training, or a combination of training methods.
  - B. Training shall enable students to accomplish the following objectives:
    - 1. Proficiently operate system
    - 2. Understand control system architecture and configuration
    - 3. Understand DDC system components
    - 4. Understand system operation, including DDC system control and optimizing routines (algorithms)
    - 5. Operate workstation and peripherals
    - 6. Log on and off system
    - 7. Access graphics, point reports, and logs
    - 8. Adjust and change system setpoints, time schedules, and holiday schedules

- 9. Recognize common HVAC system malfunctions by observing system graphics, trend graphs, and other system tools
- 10. Understand system drawings and Operation and Maintenance manual
- 11. Understand job layout and location of control components
- 12. Access data from DDC controllers
- 13. Operate portable operator's terminals
- 14. Create and change system graphics
- C. Provide course outline and materials according to Section 230900 (Submittals). Provide one copy of training material per student.
- D. Instructors shall be factory-trained and experienced in presenting this material and shall present according to a pre-written curriculum.
- E. Perform classroom training using a network of working controllers, representative of installed hardware.
- F. Record training sessions on digital video for future use by the Owner.

END OF SECTION

# SECTION 27 10 00

#### STRUCTURED CABLING SYSTEM

#### PART 1 – GENERAL

#### 1.1 SCOPE OF WORK

- A. The information in this specification is presented to convey performance requirements for the components shown on the drawings. Contractor shall follow LUSD standard data specification requirements for all materials provided.
- B. The work under this section includes all final design, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Structured Cabling System (SCS) as indicated on the drawings and as specified herein. These systems shall be defined as all cables, equipment, products, etc, as indicated on the drawings, and mentioned in these specifications.
- C. It is the intent of the Drawings and Specifications, which are presented in a "designbuild" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.
- D. All miscellaneous system components including, but not limited to, cables, cable supports, termination equipment, punch blocks, patch panels, patch cords, device outlets, ladder runway, backboards, equipment racks, equipment cabinets, enclosures, terminal cabinets, equipment grounding, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.
- E. Schedule is paramount to the project's success. With this, the SCS Contractor will have to be a team player, continually working with the team to facilitate expeditious design, procurement, and construction processes.
- F. This project will be performed in a phased construction format. Each phase of construction will be completely installed, labeled and tested, to the greatest extent physically possible, before moving to the next phase.
- G. It is a mandatory requirement that a single Contractor perform the work described in the following specification sections:
  - 1. Section 27 10 00 Structured Cabling System

#### 1.2 RELATED WORK, STANDARDS, DOCUMENTS AND PUBLICATIONS

- A. Each agency's relative codes, standards, and recommended practices apply to the voice/data cabling systems and their components as specified herein:
  - 1. American National Standards Institute (ANSI)

- a. ANSI T1.404 Network and customer installation interfaces DS3 and metallic interface specification
- 2. Building Industry Consulting Service International (BICSI)
  - a. Telecommunications Distribution Methods Manual (TDMM) latest edition.
  - b. Customer-Owned Outside Plant Design Manual (CO-OSP) latest edition.
- 3. Federal Communications Commission (FCC)
  - a. FCC Part 68 Rule
- 4. American Society for Testing and Materials (ASTM)
  - a. E814-02 Standard Test Method for Fire Tests of Through-Penetration Fire Stops
- 5. International Electrotechnical Commission (IEC)
  - a. IEC 61935-01 Generic Cabling Systems Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 1: Installed Cabling
  - b. IEC 61935-02 Generic Cabling Systems Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 2: Patch Cords and Work Area Cords
- 6. Institute of Electrical and Electronics Engineers (IEEE)
  - a. IEEE 802 Specification for Local Area Networks, latest edition.
  - b. IEEE 802.3an Specification for 10GBASE-T Ethernet, latest edition.
  - c. ANSI/IEEE C62.41 Guide on the Surge Environment in Low-Voltage (1000V or less) AC Power Circuits, latest edition.
- 7. International Organization for Standardization (ISO)
  - a. ISO/IEC 11801 Information Technology Generic Cabling for Customer Premises, latest edition.
  - b. ISO TR 24750 Technical Report
- 8. National Fire Protection Association (NFPA)
  - a. ANSI/NFPA-70 National Electric Code Current version as adopted by AHJ(NEC)
  - b. ANSI/NFPA-75 Standard for the protection of information technology equipment

- 9. National Electrical Manufacturers Association (NEMA)
- 10. Occupational Safety and Health Administration (OSHA)
- 11. Telecommunications Industry Association (TIA)
  - a. Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber.
  - b. TIA-526-7 Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
  - c. TIA-526-14-B Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 Edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.
  - d. TIA-568-C.0 Telecommunications Cabling for Customer Premises, latest edition.
  - e. TIA-568-C.1 Commercial Building Telecommunications Cabling Standard
  - f. TIA-568-C.2 Twisted-Pair Telecommunications Cabling and Components Standard, latest edition.
  - g. TIA-568-C.3 Optical Fiber Cabling Components Standard, latest edition.
  - h. TIA-568-C.4 Broadband Coaxial Cabling and Components Standard
  - i. TIA-569-C Telecommunications Pathways and Spaces, latest edition.
  - j. TIA-598-C Optical Fiber Cable Color Coding.
  - k. TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure, latest edition.
  - I. TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, latest edition.
  - m. TIA-758-B Customer-Owned Outside Plant Telecommunications Infrastructure Standard, latest edition.
  - n. TIA-862-A Building Automation Systems Cabling Standard, latest edition.
  - o. TIA-942-A Telecommunications Infrastructure Standard for Data Centers
  - p. TIA-1152 Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling, latest edition.
- 12. Underwriters Laboratories Standards (UL)
  - a. UL 5 Surface Metal Raceways and Fittings, latest edition.
  - b. UL 5A Nonmetallic Surface Raceways and Fittings, latest edition.

- c. UL 5B Strut-Type Channel Raceways and Fittings, latest edition.
- d. UL 5C Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits, latest edition.
- e. UL 514A Metallic Outlet Boxes, latest edition.
- f. UL 514B Conduit, Tubing, and Cable Fittings, latest edition.
- g. UL 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, Covers, latest edition.
- h. UL 514D Cover Plates for Flush-Mounted Wiring Devices, latest edition.
- i. UL 1685 Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables, latest edition.
- j. UL 1863 Communications-Circuit Accessories, latest edition.
- 13. Intetek Testing Services ETL SEMKO (ETL)
- 14. Perris Union High School District, Master Standards for Data Cabling Infrastructure, latest edition.
- B. The Contractor shall be responsible for obtaining and utilizing the latest Structured Cabling, Architectural, Security and Electrical plans.

### 1.3 GENERAL REQUIREMENTS

- A. Manufacturer: The term "manufacturer" shall be defined as the company, or group of companies, that actually produces the products meeting the requirements of Section 2 of this document. The manufacturer shall have a minimum of seven (7) year's experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer, with the exception of:
  - 1. Data racks and other hardware that is not defined as part of the copper cable channel test configuration by TIA-568-C.
  - 2. Fiber Optic Cable and Outside plant (OSP) fiber optic cable.
  - 3. Channel solutions consisting of cabling and connectivity hardware independently tested as by UL or ETL and that are listed Section 2 of this document.
  - 4. Cables manufactured by another manufacturer specifically called out on the drawings.
- B. Contractor: The term "Contractor" shall be defined as the company, or group of companies, that actually provides the products per Section 2 and installs the products per Section 3 of this document. The Contractor selected to provide the installation of

this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein.

- The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least ten (10) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least the past five (5) consecutive years, and capable of being bonded to assure the Owner's Project Manager of performance and satisfactory service during the guarantee period.
- 2. The Contractor shall have a minimum of one (1) Registered Communications Distribution Designer (BICSI RCDD) and a minimum of two (2) BICSI Technician level installers on staff as full time employees.
- 3. All work shall be performed under the supervision of a company accredited and trained by the manufacturer and such accreditation must be presented with the bid submittal. Contractor must be accredited a minimum of 180 days prior to bid submittal date.
- 4. The Contractor shall be a manufacturer's Authorized Installer and Warranty Station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
- 5. All personnel performing work on this project must have successfully completed the manufacturer's training course prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer. All personnel engaged in the testing of fiber optic and category-6 metallic premise horizontal and distribution systems must have successfully completed the test equipment manufacturer's training. Certification of such training must be presented with the bid submittal.
- 6. The Contractor selected for this Project shall adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
- 7. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic cable, and Category 6 metallic premise horizontal and distribution systems, and have personnel who are manufacturer trained in the use of such testing tools and equipment.
- 8. The Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction (AHJ) over the work.
- 9. The Contractor shall maintain and provide appropriate liability and worker's compensation insurance coverage.
- 10. For additional Contractor requirements, see Section 1.06.A.1 (b) of this document in its entirety.
- 1.4 QUALITY ASSURANCE

- A. It is the intent of these specifications to establish an installation standard of quality for labor and materials. For any proposed product substitution, or when the Contractor intends to include an "or equal" product in the bid pricing, the Contractor shall provide a "Substitution/Or-Equal Request" submittal to the Owner's Project Manager for review no later than fifteen (15) calendar days prior to Bid submittal. This report shall include *all* of the following items:
  - 1. Description of how the proposed product(s) will impact meeting the project completion date, indicate all item(s) with lead times and expected delivery date(s).
  - 2. Itemized cost comparisons between the proposed product(s) and the listed product(s).
  - 3. Detailed technical analysis of the electrical and mechanical specification differences between the proposed product(s) and the listed product(s).
  - 4. ETL "Verified" or UL "Verified" test lab documentation for the proposed product(s) and assemblies proposed.
  - 5. Proposed product identification, manufacturer literature (specifications and cut sheets).
  - 6. Name, address and contact information of several similar projects where the substituted product(s) have been used.
  - 7. Name, address and contact information of the proposed product(s) manufacturer's local representative.
  - 8. Sample proposed product(s) manufacturer's lifetime component and application warranty. Detailed warranty requirements are described in Section 1.10 General System Product Warranty of this document.
- B. Failure to provide *all* items listed in Section 1.4.A.1 through 8 for review by the Owner's Design Team shall result in rejection of the substitution/or-equal request.
- C. The Owner's Design Team/Project Manager must approve any proposed product(s) substitution/or-equal item in writing. The Owner's Design Team/Project Manager reserves the right to require a complete sample of any proposed product(s) and may request a sample tested by an independent testing consultant to prove equality. The decision of the Owner's Design Team/Project Manager regarding equality of proposed product(s) items will be final.
- D. If a proposed product(s) is given final acceptance by the Owner's Project Manager, the Contractor shall reimburse the Owner's Design Team/Project Manager for the costs to review the proposed product(s) substitution(s), and for any additional engineering charges, and shall pay all charges of other trades resulting from this products use, at no cost to the Owner.

## 1.5 GENERAL SUBMITTAL REQUIREMENT

- A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this bid package.
- B. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a <u>bold arrow or circle</u> shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number. Contractor submittal shall include a materials list. Cut sheets shall be numbered by and match page numbers of each item included on the material list.

## 1.6 PRE INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within fifteen (15) calendar days after the date of award of the Contract, the Contractor shall submit the following:
  - Submittal Binder: Submit one (1) hard copy and one (1) electronic copy of the complete Submittal Binder to the Project Engineer for review. The binder shall consist of five (5) major sections with each section separated by Index Tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the Index.
    - a. The FIRST section shall include the following items:
      - 1) The TITLE SHEET which shall include the Submittal Date, Project Title and Address, Contractor's Name and contact information, and name of the Owner.
      - 2) The INDEX sheet which shall list each item included in the binder along with the page number where it may be found.
    - b. The SECOND section shall include the following items:
      - 1) CONTRACTOR'S LICENSE: A copy of the low voltage Contractor's valid State of California C-7 Low-Voltage license.
      - 2) PROOF OF EXPERIENCE: Proof (written documentation) that the low voltage Contractor has been regularly engaged in the business of low voltage contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of communication systems of the type specified herein for at least the past five (5) consecutive years.
      - 3) PENDING LITIGATION: Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst-case scenario. Non-disclosure of this item, if later discovered, may result, at the Owner's discretion, in the Contractor bearing all costs and any cost related to the associated delays in the progress of the work.

- 4) INSURANCE CERTIFICATES: Copy of low voltage Contractor's current liability insurance, workers compensation, and state industrial insurance certificates in conformance with the contract documents.
- 5) PROJECT LIST: A List containing at least ten (10) California installations completed within the last five (5) years by the low voltage Contractor that are comparable in scope and nature to that specified in the contract document. Provide up to date contact information for each project listed including contact name, title, email address and phone number.
- 6) SERVICE CAPABILITY: Documentation indicating in detail that the low voltage Contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 75 air miles of the job site. Do not submit a sales brochure as documentation.
- 7) AUTHORIZATION LETTERS: Letters from the low voltage equipment manufacturer stating that the low voltage bidding Contractor is a Factory Authorized Distributor/Installer, and is trained and certified for the equipment he proposes to use on this project, and is licensed to purchase and install software required to provide the specified functions.
- 8) CERTIFICATION: Copy of the following current BICSI certifications. Provide proof that the certificate holders are full time employees of the low voltage Contractor's local facility servicing this project and will be actively involved on site for the duration of this project.
- a) BICSI RCDD, minimum of (1). Mandatory requirement: Shall be on site a minimum of one (1) day per workweek.
- b) BICSI TECHNICIAN, minimum of (1). Mandatory requirement: Shall be on site a minimum of five (5) full 8-hour days per workweek.
- 9) PROOF OF TRAINED PERSONNEL: Documentation that the Contractor has full time on-staff personnel, manufacturer trained and BICSI certified, for the equipment proposed for this project, and on-staff manufacturer trained and certified by the Test Equipment manufacturer in the proper use of the test equipment required on this project. Provide copies of all manufacturers' training/certification documentation, and Test Equipment manufacturer's training/certification documentation. Provide a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.
- 10) DOJ FINGERPRINTING: A fingerprint check must be provided for all personnel working on school sites, performed by the Department of Justice, pursuant to California Education Code Section 45125.1. Fingerprinting shall be performed prior to start of project. All costs associated with DOJ fingerprinting/background checks shall be the full responsibility of the Contractor.

## TURNER SENIOR ACADEMY CAMPUS LODI UNIFIED SCHOOL DISTRICT LODI, CALIFORNIA

c. The THIRD section shall contain a detailed bill of materials including the quantity, product Manufacturer, product part number, product description, and corresponding specification section number or drawing sheet number where that product is referenced. Also listed in the Contractor's bill of materials shall be each item of test equipment to be used to test the optical fiber, copper and coax components. Include all patch cords and other specialized components. See example format below:

| Description               | Part #            | Quantity     | UoM        | Spec | Test Equip.        |
|---------------------------|-------------------|--------------|------------|------|--------------------|
| CAT6A<br>Station<br>cable | Panduit<br>#12345 | 100<br>boxes | 1000ft/box | 2.03 | Fluke DTX-<br>1800 |

This information may be used by the Owner to evaluate the Contractor's general understanding of the project scope during the bid evaluation. Errors or omissions from this bill of material do not relieve the Contractor from providing all material, components, labor, etc., as outlined in this specification and on the drawings to provide a complete and useable structured cabling system.

- d. The FOURTH section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the bill of materials. On each cut-sheet, provide an indicating arrow next to each part number of proposed material.
- e. The FIFTH section shall contain a designation schedule for each system component location and complete full size 30" x 48" (unless otherwise specified) bond drawings (shop drawings), showing system wiring plans. The professionally drafted drawings shall be generated on AutoDesk AutoCAD 2010 (or later) computer design software. These drawings shall also include:
  - 1) MDF and IDF Diagrams Including:
    - a) Cable routing
    - b) Position of all devices, components and apparatus
    - c) Detailed elevation layout of the wallfield(s)
    - d) Labeling plan (see District labeling requirements)
  - 2) Site Plan Including:
    - a) Conduit routing of all site conduits including size and quantity
    - b) Building designations

- c) MDF and IDF locations
- d) Campus cabling and conduit between MDF and IDF racks including cable type and quantity
- 3) Work Area Floor Plans Including:
  - a) Detailed cable routes including cable type and quantity
  - b) Device locations and quantities with labeling
  - c) Work area labeling plan (see District labeling requirements)
- 4) Cross Connect Documentation Including:
  - a) Cross-connect records for all voice and data devices
  - b) Cross-connect records may be in either Excel or Word format
- 5) Riser Distribution Plan
- 6) Rack elevations of all MDF and IDF equipment
- 7) <sup>1</sup>/<sub>4</sub>-inch scale floor plans of all data rooms (MDF, IDF, MPOE, etc.)
  - a) Identify all equipment racks, cabinets, terminals, cross connect locations, ground bus bar, and all other components in room(s).
- 8) Cable Tray, Conduit, and Raceway Plans (if applicable)
  - a) Provide <sup>1</sup>/<sub>4</sub>-inch scale ladder runway plan for all data rooms.
  - b) Provide scaled plans for all in-building conduit and raceway.
- B. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

## 1.7 PROJECT DIRECTION

- A. Single Point of Contact: Contractor shall provide an English-proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and shall provide the following functions:
  - 1. Initiate and coordinate tasks with Owner's Project Manager, and others as specified by Owner's Project Manager.
  - 2. Provide day-to-day direction and on-site supervision of Contractor personnel.
  - 3. Shall be readily available to the Owner/Owner's Project Manager 24 hours a day / 7 days a week throughout the duration of the Project.

- 4. Shall have full time cellular phone capability, and the ability to send/receive email correspondence, accessible by the Owner's Project Manager.
- 5. Ensure conformance with all Contract provisions.
- 6. Participate in weekly site project meetings and construction meetings.
- 7. Provide detailed and written weekly status reports to Owner's Project Manager. The content shall be substantive enough to bring about a full understanding of all situations current and situations future. Weekly reports shall include but are not limited to detailed progress report, RFI status log (Request for Information), Change Order Log (pending and approved), Project Addendum log, and a twoweek look ahead work calendar. Each of the above must show assigned responsibilities and event history. Weekly reports shall include milestone information, resource updates (staff and materials), and any conditions or incidents that may impact the Project Schedule.
- 8. This individual shall remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the Owner's Project Manager's written approval.

## 1.8 PLANNING

A. Planning meetings and schedule: Within fifteen (15) calendar days after the date of award of the Contract, an initial planning meeting will be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that will transpire during the implementation of the project. Within seven (7) calendar days of this initial meeting, the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project. Contractor's project schedule shall conform to the overall Project Construction Schedule issued by the Construction Management Company or the Owner. Contractor is required to attend all planning and other construction meetings as requested by the Owner, Architect, or Engineer.

## 1.9 POST INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:
  - 1. Record Documentation:
    - a. Final Test Results Test results for each cable indicating tests performed, results obtained and values measured. Test results shall be provided in electronic format with the associated application (if required) for viewing. Contractor shall provide individual test results for each cable tested, and a summary sheet listing all cables, test summary, lengths, and the total cable count. Provide test reports for all copper cables and fiber optic cables.

Testing shall be conducted in accordance with Section 3.06 of this document.

- b. As-Built records Contractor shall create and provide all backgrounds and floor plans in AutoCAD or Revit file format. Sheet boarders shall be either provided by, or approved by, the Architect. Contractor's as-built records shall include all of the items described and listed in section 1.6.A.1.e of this document.
- B. After as-built submittal is approved by Owner, the Contractor shall provide two (2) sets of CDs containing all post-installation submittals and close out documentation in AutoCAD (or Revit) format; and in PDF, Word, or Excel formats as required elsewhere in this document.
- C. As-Built Documentation Display in Each MDF and IDF: Within fifteen (15) days after the completion of work, the Contractor shall install a complete Contractor-provided, professionally drafted as-built floor plan in color in each MDF and IDF mounting frame. Each floor plan, generated on AutoDesk AutoCAD 2010 (or later) computer design software and printed in color, shall depict all jack locations in each modular furniture cubicle and all other areas. Also depicted shall be speaker, clock, wireless access point, terminal cabinets, MDF, IDF, pull boxes, vaults, CCTV cameras, television jack locations, or any other communications outlet cables by the SCS Contractor. All jack locations shall be color coordinated with the Owner's labeling scheme as described elsewhere in this specification. Contractor's device symbols shall match the device symbols utilized on the bid documents. The Contractor will provide to Owner two (2) sets of CDs containing all as-built records in AutoCAD (.dwg) or Revit (.rvt) format, and full size PDF format.
- D. Warranty Documentation:
  - 1. Contractor shall apply for all Manufacturers' Extended Warranties on behalf of the Owner. Contractor shall present to Owner all product Warranty documents per General System Product Warranty Section of this document. Warranty shall commence after final acceptance of System and Project Close Out by the Owner.

### 1.10 GENERAL SYSTEM PRODUCT WARRANTY

- A. The horizontal communications cabling system installed shall be eligible for coverage by a 20-year (minimum) Warranty to the District.
  - 1. Horizontal channels shall be completed with Panduit Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Panduit Warranty with Channel Performance guarantees.
  - 2. Approved product shall be listed on the most recent version of the applicable Panduit data sheets for each Panduit product solution.
- B. Installer shall provide labor, materials, and documentation in accordance with Panduit requirements necessary to ensure that the Owner will be furnished with a 20-Year (minimum) Warranty.

## TURNER SENIOR ACADEMY CAMPUS LODI UNIFIED SCHOOL DISTRICT LODI, CALIFORNIA

- C. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Category 5e, Category 6, and/or Category 6A cabling systems or ISO 11801 requirements for Class D, Class E, and/or Class Ea. Standards-compliant channel performance tests shall be performed in the field with a Panduit approved certification tester in the appropriate channel test configuration. See 1.10. A.1 above for channel requirements.
- D. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 10 days) following 100 percent testing of cables. Contractor shall submit test results to Panduit, in the certification test analyzer's original software files. Installer shall ensure that the warranty registration is properly submitted, with all required documentation within ten (10) days of project completion. Installer must adhere to the terms and conditions of the respective manufacturer's warranty programs.
- E. Installer shall ensure that the Owner receives the manufacturer issued project warranty certificate within sixty (60) calendar days of warranty registration.
- F. The first usage date shall be agreed to be in writing by the District and Contractor within five (5) working days of first usage. During this time, the entire system must be kept in proper operating condition at no additional cost to the District.
- G. Cable Manufacturer "site certifications" are prohibited.

## 1.11 GENERAL ENGINEERING AND DESIGN GUIDELINES

- A. Cabling System Installation Practices
  - 1. Plastic cable tie (tie wrap) devices shall *not* be utilized at any time. Only Velcrotype hook-and-loop strap devices are permitted. In the MDF and IDF rooms, all vertically run cables and conductors shall be secured with Velcro at a maximum interval of eighteen (18) inches, and all horizontally run cables and conductors shall be secured with Velcro at a maximum interval of eighteen (18) inches.
  - 2. In the MDF and IDF rooms, all vertically run innerduct shall be secured with Velcro at a maximum interval of eighteen (18) inch intervals. Innerduct installed on ladder runway shall be supported horizontally and vertically at a maximum of eighteen (18) inch intervals.
  - 3. All horizontally run innerduct shall be secured with Velcro at a maximum interval of forty-eight (48) inches when installed horizontal above accessible ceiling spaces or open ceiling spaces.
  - 4. All cables installed above accessible ceiling spaces shall be independently supported
  - 5. All pull ropes are to be installed and/or replaced in all pathways for future use.

- 6. All intra-building cabling shall be routed either parallel or at right angles to the building structure and/or walls.
- 7. No cabling is to be pulled through electrical Condulet bodies (L-bend) devices. If Condulet devices are pre- existing and it is determined, at the review of the Owner's representative, that sufficient space in the conduit is available and the Owner provides written approval to utilize the Condulet, the Contractor shall remove the Condulet cap, pull the cable to and beyond the cap then carefully reinstall the cap.
- 8. Communications cabling shall never be tied or attached to the exterior of electrical conduits, power cables or devices, lighting systems, or co-exist inside any pathway with power cabling.
- 9. Any visible damage to a cable such as kinks or bends in violation of the minimum bend radius shall render the cable segment defective and shall be removed and replaced by the Contractor at no additional cost to the Owner.
- 10. All materials shall be new, unused, and delivered to job site in original manufacturer or distributor cartons or packages. No previously installed material shall be used at any time.
- 11. Reference Part 3 of this document for additional installation guidelines and requirements.

## 1.12 SPECIFIC SYSTEM REQUIREMENTS

- A. Backbone Infrastructure Cabling
  - 1. Backbone Fiber Optic Cabling
    - a. Contractor shall provide (1) 12-strand single mode OS2 fiber optic cable for backbone connectivity between the Main Distribution Frame (MDF) location and each Intermediate Distribution Frame (IDF) location, where indicated on the plan drawings. Cable may be composite (MM/SM) type utilizing one overall sheath.
    - b. At the MDF, provide a 20-foot slack loop neatly coiled and secured. At each IDF, provide a 10-foot slack loop neatly coiled and secured.
    - c. Splicing of fiber optic cable shall not be permitted unless specifically called out on the bid documents and authorized in writing by the District's engineer.
    - d. All exposed fiber optic cable shall be enclosed in innerduct. Innerduct is not required within inter-building conduits.
    - e. Provide 2-meter LC to LC duplex fiber optic patch cords at each MDF and IDF. A minimum of two (2) per 6-strands of fiber optic cable installed.
    - f. Refer to Part 2 of this document for fiber optic cable specifications.

- 2. Backbone Multipair Copper Cabling
  - a. Contractor shall provide (1) 25-pair category-5E multipair cable for backbone connectivity between MDF and each IDF on campus, where indicated on the plan drawings.
  - b. Provide a 10-foot slack loop neatly coiled and secured at both ends of the cable.
  - c. Splicing of multipair copper backbone cable shall not be permitted unless specifically called out on the bid documents.
  - d. The multipair backbone cable shall be outdoor-rated and installed in conduit.
  - e. Provide building entrance protectors at both ends of the backbone multipair cable. Terminate all pairs on the protectors and properly bond the protectors to ground. Refer to section 2.12 PROTECTORS in this document for additional requirements.
  - f. Contractor shall label backbone cable sheath with a machine generated weatherproof label identifying the cable number, total pair count, and origination/destination locations. Refer to Labeling Requirements section of this document for additional labeling requirements.
  - g. Refer to Part 2 of this document for multipair copper cable specifications.
- 3. MDF/IDF UTP Termination Equipment
  - a. The horizontal cross-connect for data circuits shall consist of Category-6A patch cords from the horizontal Category-6A termination panels to the network equipment within the same or adjacent racks.
  - b. The MDF and IDF horizontal data cross-connects shall be contained in 19"x 7' rack(s) or wall mounted lockable cabinet(s) as described in Part 2 of this document, and as detailed on the bid documents/plan drawings.
  - c. Category 6A patch cords shall be provided by the Contractor. See Part 2 of this document for additional patch cord requirements.
  - d. See Part 2 of this document for category 6A copper cable specifications.

## PART 2 – PRODUCTS

## 2.1 STRUCTURED CABLING SYSTEM

- A. Acceptable Manufacturers all equipment listed herein will be by:
  - 1. SCS components: Per District specification

- B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- C. The functions and features specified are vital to the operation of this facility; therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the Contractor from strict compliance with the requirements of this specification.

## 2.2 OUTLETS

- A. Telecommunications outlets (TO) shall consist of one- or two-gang utility outlet boxes equipped with 8-pin modular (RJ-45) jacks utilizing the T568B wiring scheme and a faceplate. All outlet cabling shall terminate on patch panels at their associated Main Distribution Frame (MDF) room, Intermediate Distribution Frame (IDF) Rooms, or as otherwise indicated on the drawings.
- B. Faceplates
  - 1. All Faceplates shall be available in duplex, quad, or six-plex configuration in a single-gang form.
  - 2. Surface mount boxes shall be available in dual, quad, and six-plex configuration.
  - 3. Modular furniture faceplates shall be available in dual and quad configuration for the Owner's modular existing and/or new modular furniture. Faceplates shall be flush-mounted in the modular furniture. Surface mounted boxes/faceplates are unacceptable. The Contractor is responsible for coordinating with the Owner's modular furniture Contractor to determine faceplate requirements. The Contractor shall provide and install all parts/fittings necessary to meet the requirements of this section.
  - 4. Wall mounted phone jack faceplates shall be single gang configuration, constructed of stainless steel and have two standard phone mounting posts located above and below the jack opening. Wall mounted phone faceplates will consist of 8p8c modular (RJ-45) jacks.
  - 5. Faceplates shall have two (2) designation windows, one located at top and one located at bottom. Designation windows shall be equipped with clear plastic covers.
  - 6. Color of faceplates shall match adjacent electrical faceplate color, unless otherwise noted.
  - 7. Provide blank faceplate inserts for all unused outlet locations within the faceplate.
  - 8. Product specification: Panduit #CFPE2???, CFPE4???
- C. Category 6A 10-Gigabit jacks

- 1. All category 6A jacks shall be 8-position/8-conductor (8p8c) modular RJ-45 jacks incorporating 110-style rear termination lugs for termination of Category 6A cable, T568B wiring type, with a connector body made of high-impact fire-retardant plastic.
- 2. Category-6A jacks shall be channel-rated.
- 3. All Category 6A jacks shall meet or exceed TIA-568-C.2 component Cat 6A requirements for connecting hardware from 1MHz to 500MHz, 10Gb/s.
- 4. Cable entry can be 90-degree or 180-degree orientation.
- 5. Category 6A jacks shall include an integrated pair divider to facilitate required conductor separation.
- 6. Contractor shall verify color with Owner prior to start of work.
- 7. Category 6A jacks shall only be terminated on Category 6A cables.
- 8. Product Specification: Panduit mini-com #CJ6X88TG??

## 2.3 STATION CABLE

- A. Station cables shall extend between the station location (TO) and its associated MDF/IDF.
- B. Category 6A station cable:
- 1. The Category 6A augmented (6A) cable shall consist of 4-pair, 23-AWG bare copper twisted pairs with a UTP design.
- 2. The cable jacket shall be rated for the environment in which it is installed. Install CMP cable in plenum-rated spaces, CMR cable in riser-rated spaces, and OSP cable in outdoor and underground conduit spaces. In the Administration building, install cable in conduit.
- 3. Category 6A cable shall be ETL verified to TIA-568-C.2-10 Category 6A, and support 10GBASE-T IEEE 802.3an standard of 10Gb/s.
- 4. Contractor shall verify color with Owner prior to start of work.
- 5. Category 6A cable shall only be terminated on Category 6A-rated jacks and patch panels.
- 6. Category 6A cable shall have a maximum outside diameter of 0.30".
- 7. Product Specification: Panduit #PUR6A04-??
- 2.4 MODULAR PATCH PANEL SYSTEM

- A. The termination block shall support the appropriate emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2.4 Gbps ATM, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, and Internet-Intranet Communications/ Commerce, as well as all 77 channels (550 MHz) of analog broad band video, including 1000 Mbps Ethernet and potentially 1.2 Gbps ATM, and facilitate cross connection and inter connection using modular patch cords.
- B. All Modular jack panels shall be wired to ANSI/TIA/EIA 568-C using T568B wiring scheme.
- C. The wiring block shall be able to accommodate 23 AWG cable conductors and be rated for category 6A performance.
- D. The patch panel shall be available in 24-port and 48-port sizes.
- E. Contractor shall provide Category 6A modular jack panels in sufficient quantities to terminate all category 6A cables.
- F. All patch panels shall have two (2) cable strain relief/management bars (Leviton #49005-CMB or equal) installed at the rear of the panel to support the terminated horizontal cabling.
- G. Contractor shall mount patch panel in Owner-provided IDF cabinet. If no IDF cabinet is provided, Contractor shall provide a wall mount bracket to mount patch panel(s) to wall.
- H. Product Specification: Panduit #CP246X88BL.

## 2.5 PATCH/STATION CORDS

- A. Provide Category 6A Modular Patch/Station cords for each assigned port on the patch panel and for each outlet in the station locations. Cords shall be equipped with an 8-pin 8-conductor modular connector on each end and shall conform to the length(s) specified. All cords shall be wired to T568B wiring scheme. All cords shall be factory-built by the cable manufacturer. Fabrication of cords in the field is prohibited.
- B. All category 6A patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category 6/Class E specifications. Category 6A patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category 6A specifications.
- C. At the MDF and each IDF, provide one (1) 3-foot cat-6A patch cord for each cat-6A cable terminated in the patch panels, and provide one (1) 3-foot cat-6A patch cord for each cat-6A cable terminated in the patch panels. At the workstations, provide one (1) 10-foot cat-6A patch cord for each cat-6A cable terminated at a cat-6A outlet. At wireless access point locations, provide one (1) 3-foot cat-6A patch cord. In instances were longer cords are required, the Contractor shall clarify the requirement with the Owner before installing any longer cords. Where the specifications and the plan drawings conflict, the more stringent requirement will apply.

- D. Contractor shall verify required patch cord color with Owner prior to ordering materials. Include all costs in base bid.
- E. All patch cords shall be channel-rated and include a snagless boot.
- F. Category 6A patch cords shall be provided at all Category 6A patch panels and outlets.
- G. Product Specification: Panduit #UTP28X???

### 2.6 FIBER OPTIC CABLING

A. Fiber optic cable on this project is Contractor provided. Contractor's work shall be to pull this cable from MDF to IDF cabinet locations. Contractor shall provide all cable supports in the ceiling space. Owner will provide all fiber connector housings, connectors, terminations, patch cords, and testing.

## 2.7 FIBER OPTIC PATCH CORDS

A. Fiber patch Cords shall be provided and installed by the Owner.

## 2.8 FIBER DISTRIBUTION CENTER (FDC)/FIBER PATCH PANEL

A. Fiber Patch Panels/Enclosures shall be provided and installed by the Owner.

### 2.9 FIBER OPTIC CONNECTORS

A. Fiber Optic Connectors shall be provided and installed by the Owner.

### 2.10 COPPER CABLING

- A. Outside Plant Multipair Copper Cables
  - 1. All outside plant multipair copper cables shall support analog voice circuits (fire alarm, intrusion alarm, elevator phone, etc.) and building energy management systems.
  - 2. All copper cable placed in the outside environment shall be 24 AWG, solid annealed copper, twisted pair, and multi-conductor. Refer to section 1.12.A.2 of this document for additional requirements.
  - 3. The outside plant cable shall be resistant to mechanical damage, lightning or damage from wildlife.
  - 4. The outside plant cable shall have an aluminum shield, conductors surrounded by FLEXGEL III filling compound (or other water-blocking compound), and have a black polyethylene jacket.

- 5. All outside plant cable shall be installed in conduit. Direct-bury cable is prohibited.
- 6. Multi-pair voice grade copper cables installed in underground conduit shall be minimum category-5E rated.
- 7. Product Specification: Superior Essex (PE-89), or equal.

### 2.11 INDOOR MULTIPAIR RISER CABLE TERMINATIONS

- A. The multipair riser cable wiring block shall be 110-type (unless otherwise noted) and support analog voice circuits (fire alarm, intrusion alarm, elevator phone, etc.) and building energy management circuits, be Category 5E or 6A rated, and facilitate cross connection and interconnection using either cross connect wire or the appropriate category patch cords.
- B. MPOE/MDF/IDF Rooms, or as otherwise indicated on drawings, shall be equipped with 110 termination blocks for termination of analog station cables. Termination blocks shall consist of a minimum 25-pair. All blocks shall be securely fastened to the room backboards or equipment racks using 89B stand-off brackets. Provide all required D-rings or other approved cable guides as required to provide a neat installation. All cables shall terminate in numerical sequence.

### 2.12 PROTECTORS

- A. All outside plant underground backbone multipair copper cables shall be provided with protection between each building with an entrance cable protector panel(s). All building-to-building multipair copper cables shall be routed through this protector(s). The protector(s) shall be connected with a #6 AWG copper bonding conductor between the protector's ground lug and the MDF/IDF telecommunications ground busbar (TMGB/TBG).
- B. Plug in Surge Protection Modules shall be provided for each pair terminated on the protector chassis. Protector module shall be solid-state type unless otherwise noted.
  - 240VDC/300VDC solid-state protector modules shall provide transient and power fault protection for standard telephone line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Black in color.
  - 2. 30VDC/75VDC solid-state protector modules shall provide transient and power fault protection for digital and data line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Red in color.
  - 3. In the event that protector modules are not called out in the drawings, SCS Contractor shall include all costs in base bid to provide the 75v solid-state modules w/sneak current protection. Confirm module color with Owner's

Engineer prior to ordering. In all cases, SCS Contractor is responsible to coordinate appropriate module with District prior to ordering material.

C. Product Specification: Circa, Emerson or Marconi.

## 2.13 GROUNDING SYSTEM AND CONDUCTORS

- A. The SCS Contractor shall utilize a Telecommunications Bonding Backbone (TBB) as provided by the Electrical Contractor. The SCS Contractor shall terminate TBB cable(s) on SCS Contractor provided ground bus bars located at each MDF/IDF Room, or as otherwise indicated on the drawings. Ground bus bars shall be ANSI-J-STD-607-A compliant and UL Listed. MDF telecom main ground bus bar (TMGB) shall be Chatsworth #40153-020. IDF telecom ground bus bars (TGB) shall be Chatsworth #40153-012, or as noted on the drawings. Wall mounted cabinets require a horizontal rack bus bar (Chatsworth #10610-XXX) (equal by Harger). All communication system bonding and grounding shall be in accordance with the ANSI-J-STD-607-A (current edition), the NEC/CEC, and NFPA.
- B. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices.
- C. Horizontal equipment including cross connect frames, patch panels, cable trays, equipment racks, ladder trays, conduits, active telecommunication equipment, test apparatus and equipment shall be bonded to the ground bus bars utilizing a #6-AWG solid copper green insulated conductor and 2-hole crimp type grounding lugs. All connections shall be bare metal to bare metal using appropriate antioxidant compound. Burndy mechanical-type grounding lugs and terminals are prohibited. Minimize the length and number of bends of the grounding conductors to the busbar. Attachment to every rack and cabinet shall be made by one of the following methods:
  - 1. Wall mounted IDF cabinets- Attach ground conductor's 2-hole compression lug to the rear rail's top holes of the rack, or front rail's top hole of the cabinet, using 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 the connection point and use an approved anti-oxidant prior to attaching the ground conductor.
  - Floor Mounted Cabinet/Racks Install a dedicated copper horizontal ground busbar strip at the top of the rear rail of each rack and cabinet. Attach ground conductor's 2-hole compression lug to this ground strip using either 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.
- D. The SCS Contractor shall be responsible for providing an approved ground at all newly installed distribution frames, and/or insuring proper bonding to any existing facilities. The SCS Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, cable sheaths, circuit protectors, closures, cabinets, service boxes, and framework.

E. SCS Contractor shall label both ends of each grounding conductor as close as practical to the point of termination in a readable position. Ground tag must indicate the location of both ends of the ground conductor (e.g. Rack#1 to TMGB) and tag must include the warning "If this connector or cable is loose or must be removed, please call the Owner's Telecommunications Manager".

## 2.14 EQUIPMENT RACKS

A. Equipment racks are not required on this project.

#### 2.15 EQUIPMENT CABINETS

A. Contractor shall provide bonding conductor from telecommunications ground bus bar to cabinet. Refer to section 2.13 of this document for grounding requirements.

#### 2.16 BACKBOARDS

A. Where indicated on plan drawings, provide new plywood terminal backboards. Use Douglas Fir plywood, A/C grade, finished A-side facing out, with prime coat painted on all surfaces (front, back and sides), and a finish coat of fire retardant white enamel paint. On each plywood sheet leave one (1) Fire Marshal Stamp unpainted for inspection. Unless otherwise indicated, use 8'-0" high x 3/4" thick plywood x length as shown on the plan drawings.

#### 2.17 UNSPECIFIED EQUIPMENT AND MATERIAL

A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional SCS installation shall be provided in a level of quality consistent with other specified items.

#### 2.18 FIRE RATED PATHWAY

- A. The firewall through-penetration shall be a manufactured, UL Classified, firestop 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.
- B. The firestopping device shall be capable of installation in new construction or retrofit in existing structures.
- C. The device shall be UL Tested and Classified in accordance with ASTM E814 (UL 1479) and with ratings up to and including 2 hours.
- D. Manufacturer: Specified Technologies Inc., EZ-Path (#EZDP33FW) or equal by Wiremold.

## PART 3 – EXECUTION

## 3.1 GENERAL INSTALLATION REQUIREMENTS

- A. 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 District's Project Manager before making any changes. It shall be the responsibility of the manufacturer-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be numbered for identification using machine generated labels wrapped around the cable jacket within 6 inches of termination point. Refer to Labeling Requirements section of this document for additional requirements. Handwritten labels are prohibited.
- D. Splicing of any cable is not acceptable.
- E. The labor employed by the Contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the District's Project Manager to engage in the installation and service of this system.
- F. The system must meet all local and other prevailing codes.
- G. All cabling installations shall be performed by qualified and manufacturer-trained technicians.
- H. Cable lubricants (i.e. Polywater) shall be used to reduce the cable pull tension stated by the cable manufacturer during cable installation in conduits and innerduct. Contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant. Lubricants that harden after installation are not allowed. Submit all proposed lubricants for approval PRIOR to use on low voltage, A/V, coax, fiber, and data cable installation. Cable lubricants shall be allowed to dry a minimum of 15 days before performing cable certification tests.
- Cables may be run exposed above accessible ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The Contractor shall include all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction. The cables shall not be laid directly on the ceiling panels.
- J. The cable jacket composition must meet local and all other prevailing fire and safety codes.
- K. All firewalls penetrated by structured cabling shall be sealed by use of a nonpermanent fire blanket or other method in compliance with the current edition of NFPA and the NEC or other prevailing code and must be a system listed by UL. 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.

- L. All equipment racks and cabinets shall be bolted to the structural floor by the SCS Contractor in the location shown on drawings. Wall mounted relay rack and wall mounted cabinet kits shall be fastened to structural studs, not drywall or backboard only.
- M. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor before final acceptance at no cost to the Owner.
- N. The cable manufacturer's minimum bend radius and maximum pulling tension shall not be exceeded.
- O. Cable raceways, when required, shall not be filled greater than the NEC maximum fill for the particular raceway type. Innerduct fill shall not exceed 40 percent.
- P. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

## 3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 (or related CEC Articles), and the appropriate local codes. All copper 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 SCS Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.
- B. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the Contractor for placement of new or removal of old cable into or through shall be the responsibility of the Contractor. Sealing material (Approved UL listed system) and application of this material 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's work. Any openings created by or for the Contractor and left unused shall also be sealed as part of this work.
  - 1. Fire stopping work shall be performed by a single Contractor to maintain consistency and accountability on the project.
  - 2. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.

- 3. The Contractor's installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
- 4. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized Contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.
  - a. Sample Label:

MANUFACTURER'S NAME: <u>ATTENTION</u> <u>Fire Rated Assembly</u> <u>For Any Changes To This System, Please Refer To UL System Listed</u> <u>Below</u> PRODUCT: HOUR RATING: UL SYSTEM: INSTALLATION DATE: INSTALLED BY: (Contractor's Company name) CONTRACTOR LICENSE NUMBER: BUSINESS PHONE: EMAIL ADDRESS:

- C. The Contractor shall be responsible for damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary.
- D. Cable bundles within the MDF/IDF shall be dressed into bundles of no more than twenty-four (24) cables. Maintain each bundle with half inch-wide hook and loop strips spaced every twelve (12) inches maximum.
- E. The Contractor shall install all patch cords per direction of the District's project manager in a neat and systematic fashion. Prior to installing all patch cords, the Contractor shall install patch cords in a single rack to demonstrate work practices to the District's project manager. Only after any corrections/modification to the installation as directed by the District's project manager, may the Contractor continue installing the patch cords in the remaining racks.
- F. All installation shall be done in conformance with TIA/EIA 568-C standards, BICSI TDMM guidelines and manufacturer's installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends 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 District's Project Manager. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

- 1. Power Separation: The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus. Maintain a minimum of 12 inch separation from light fixtures.
- 2. Miscellaneous Equipment: The Contractor shall provide any necessary screws, anchors, clamps, hook & loop ties, distribution rings, wire molding (MDF & IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.
- 3. Special Equipment and Tools: 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.
- 4. Labeling: The Contractor shall be responsible for printed labels for all pull boxes, conduits, cables, protectors, racks, cabinets, patch panels, connector panels, cords, distribution frames, and outlet locations, according to the specifications. Hand written labels are prohibited. See LABELING REQUIREMENTS Section 3.9 of this document for more information.
- 5. Cable Storage: The Contractor shall not roll or store cable reels without an appropriate underlay and the prior written approval of Owner's Project Manager.
- 6. Cable Records: The Contractor shall maintain conductor polarity (tip and ring) identification at the main equipment room (switch room), risers, and station connecting blocks in accordance with industry practices, but only in locations authorized by the Owner's Project Manager. Contractor to provide spread sheet for all outdoor backbone and indoor riser backbone cables tested.

## 3.3 STRUCTURED CABLING GENERAL INSTALLATION DESCRIPTION

- A. The structured cabling system shall consist of any or all of the following subsystems:
  - 1. Work Area Subsystem
  - 2. Horizontal Subsystem
  - 3. Administration Subsystem
  - 4. Backbone Subsystem
  - 5. Equipment Subsystem
- B. Work Area Subsystem: The Work Area Subsystem provides the connection between the telecommunications outlet (TO) and the station equipment in the work area. It consists of cords, adapters, and other transmission electronics.

- 1. Contractor shall supply the wiring or cords that connect terminal devices to telecommunications outlets. This includes mounting cords and connectors, as well as extension cords.
- C. Horizontal Subsystem: The Horizontal Subsystem provides connections from the horizontal cross connect to the telecommunications outlets in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media and outlets in the work area. Each floor of a building is served by its own Horizontal Subsystem(s).
  - 1. Horizontal Cabling
    - a. Contractor shall supply horizontal cables to connect each telecommunications outlet to the backbone subsystem as shown on the drawings.
    - b. Unless otherwise noted on the floor plans or within this document, the type of horizontal cables used for each work location shall be 4-pair unshielded twisted pair (UTP).
    - c. The 4-pair UTP cables shall be run using a star topology format from the administration subsystem to every individual telecommunications outlet. All cable routes, other than those dictated on the drawings, are to be approved by District's Project Manager prior to installation.
    - d. The length of each individual run of horizontal cable from the administration subsystem to the telecommunications outlet shall not exceed 295-ft (90 m).
    - e. Contractor shall observe the bending radius and pulling strength requirements of the 4-pair UTP cable during handling and installation.
    - f. Each run of cable between the termination block and the telecommunications outlet shall be continuous without any joints or splices.
    - g. All station cable shall be placed in the interior of walls unless otherwise noted in the bid documents/plan drawings.
    - h. In the event Contractor is required to remove ceiling tiles, such Work shall not break or disturb the ceiling grid. Removal of the ceiling grid must be coordinated with the Owner's Project Manager. All insulation shall be replaced in its original location. Contractor shall be responsible to replace any ceiling tiles that they damage during the course of their work, at no additional cost to the District.
    - i. Avoid electromagnetic interference (EMI) by maintaining adequate physical separation between telecommunications cabling and possible sources such as, but not limited to, electric motors, electric erasers, electric pencil sharpeners, transformers, fluorescent lighting 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. Minimum separation shall be six (6) inches.

- j. Contractor shall provide District's Project Manager with detailed cable run diagrams for cable runs within raised floors (if shown on plans) detailing exact locations of cable for review and written approval by Owner's Project Manager.
- k. Conduit runs installed above grade by the Contractor should not exceed 100 feet or contain more than two 90 degree bends without utilizing appropriately sized pull box. Pull boxes are not to be used in lieu of a bend.
- I. Station cables and riser cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits.
- m. Each station cable shall have 1 meter of service slack configured in an "S" shape via J-hooks at rack or wall field end and 1 foot of service loop at station outlet end. Service slack shall be located within 15' of the MDF/IDF as required to maintain a neat and "workmanship like" installation.
- D. Administration Subsystem: The Administration Subsystem links all of the subsystems together. It consists of labeling hardware for providing circuit identification and patch cords or jumper wire used for creating circuit connections at the cross connects. All wallfield layouts must be approved by Owner's Project Manager prior to rough-in and installation.
  - 1. Separate termination fields shall be created for voice/data, wireless access points, paging, surveillance cameras, clocks, and building energy management system applications.
  - 2. Termination blocks that require rotation after connection of horizontal/vertical wiring will not be allowed.
  - 3. Contractor shall supply cross-connect wire, patch cords and fiber patch cords for cross-connection and inter-connection of termination blocks and lightguide interconnection units.
- E. Backbone Subsystem:
  - The main cable route between two or more buildings is called the Backbone Subsystem. It links the main distribution frame (MDF) in the equipment room to each intermediate distribution frame (IDF). It consists of the backbone transmission media between these locations and the associated connecting hardware terminating this media. It is normally installed in a star topology, with first-level backbone cables beginning at the main cross connect. If needed, second-level backbone cables begin at intermediate cross connects.
  - 2. The backbone subsystem shall include vertical runs (riser) of in-building cable between floors of a multi-story building, if applicable.
  - 3. All backbone fiber optic cable(s) will be run in innerduct and terminated in the MDF/IDF Rooms, or as otherwise indicated on the plan drawings, with connectors, type as specified elsewhere, in rack mounted or wall mounted fiber patch panels equipped with sufficient panels, couplers and jumper storage

shelves to terminate and secure all fibers. All innerduct (Carlon or equal) shall be corrugated and a minimum of 3/4" in diameter unless otherwise indicated on plans. Innerduct shall be plenum, riser or general rated as required by the environment in which it is to be installed. Innerduct capacity shall not exceed 40 percent fill.

- 4. All backbone multipair copper cable(s) will be terminated in the MDF/MPOE/IDF rooms, or as otherwise indicated on the plan drawings. Backbone multipair cable shall be terminated on building entrance fused protectors as specified elsewhere in this document. The minimum pair count for multipair copper cable between buildings shall be 25-pairs. Refer to bid documents/plan drawings for any additional required pairs.
- 5. In multi-story buildings, Contractor shall supply multi-pair copper cables and optical cables as the riser cables between floors. Reference this document and plan drawings for quantities. Contractor shall observe the bending radius and pulling strength requirements of all backbone cables during handling and installation.
- F. Equipment Room Subsystem: The Equipment Subsystem consists of shared (common) electronic communications equipment in the equipment room or telecommunications closet and the transmission media required to terminate this equipment on distribution hardware.

### 3.4 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees or sub-Contractors; including but not limited to:
  - 1. Damage to any portion of the building caused by the movement of tools, materials or equipment.
  - 2. Damage to any component of the construction of spaces.
  - 3. Damage to the electrical distribution system.
  - 4. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
  - 5. Damage to the materials, tools and/or equipment of the Owner, its consultants, agents and tenants.

#### 3.5 PENETRATIONS OF WALLS FLOORS AND CEILINGS

A. Unless specifically shown on the drawings, the Contractor shall make no penetration of floors, walls or ceiling without the prior written approval of the Owner's Project Manager.

- B. Any penetrations through acoustical walls or other walls for cable pathways/cables shall be sealed by the Contractor in compliance with applicable code requirements and as directed by Owner's Project Manager.
- C. Any penetrations through fire-rated walls for cable pathways/cables shall be sealed by the Contractor as required by code and as directed by Owner's Project Manager. The Contractor shall be required to work together with the General Contractor and the Electrical Contractor to coordinate and develop all fire stopping methods prior to any cable installation. The Contractor shall also, prior to the commencement of on-site activities, submit to Owner's Project Manager, details of any special systems to be used.
- D. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

## 3.6 TESTING/WARRANTY

- A. Structured Cabling System
  - 1. The Contractor shall provide competent, test equipment manufacturer-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
  - The Contractor shall test and certify the cabling system to minimum standards as set forth in the TIA/EIA-568-C specifications for Category 6A cable, token ring, and 1000baseT signals.
  - 3. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the Contractor before system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, splices, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
  - 4. Each cable shall be tested for continuity on all pairs and/or conductors. Twistedpair voice cables shall be tested for length, continuity, pair reversals, opens, shorts, transpositions, presence of AC and DC voltages and opens. Twisted-pair horizontal cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. Category-6A cables shall be tested using a TIA-568-C.2-1 Category 6A Level III/IEC 61935 Level III or better, ETL certified cable tester/analyzer.
  - 5. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests.
  - 6. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested before final acceptance.

- 7. Each installed cable shall be tested for installed length using a Time Domain Reflectometer (TDR) type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the TIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
- 8. Multi-pair cables, record the following tests on every cable pair in each multipair cable using a TDR type device: record the shortest pair length, continuity, pair reversals, shorts, opens, transpositions, presence of AC and DC voltage.
- 9. Enhanced Category 6A data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:
  - a. Attenuation (Insertion Loss).
  - b. Return Loss (RL).
  - c. Near End Crosstalk (NEXT) measured at both ends of each cable pair.
  - d. Attenuation to Crosstalk Ratio (ACR).
  - e. Power Sum Near End Crosstalk (PSNEXT).
  - f. Power Sum Attenuation to Crosstalk Ratio (PSACR).
  - g. Far End Crosstalk (FEXT).
  - h. Equal Level Far End Crosstalk (ELFEXT).
  - i. Power Sum Equal Level Far End Crosstalk (PSELFEXT).
- 10. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the ANSI/TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result, and the actual test result achieved.
- 11. Optical Fiber Cable Testing: All fiber testing shall be performed on all fibers in the completed end to end system by test equipment manufacturer-trained engineers and/or technicians. There shall be no splices unless clearly defined in Section 3 of this specification or on the plan drawings. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 455-61 & ANSI/TIA/EIA 526 and a bi-directional end to end power meter test performed per ANSI/TIA/EIA 455-53A. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.

- a. Pre-installation cable testing: The Contractor shall test all fiber optic cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
- Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km) x (km of fiber in link) + (.4dB) x (number of connectors) = maximum allowable loss.
- c. Any link not meeting the requirements of the standard shall be brought into compliance by the Contractor, at no additional charge to District.
- 12. The Contractor shall provide test documentation to the District's Project manager in a three ring binder(s) and in CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. A paper copy of the test results shall be provided that lists all the links that have been tested, and include link name, overall pass/fall evaluation, date and time of test, cable type and NVP value. Detailed test results shall be provided for each link tested and shall include length, propagation delay, delay skew, insertion loss, return loss, NEXT, ELFEXT, ACR, PSNEXT, PSELFEXT, and PSACR. Detailed test results for each link will also include customer site name, name of standard selected to execute the tests, date and time test results were saved in memory of test unit, brand name model and serial number of tester and revision of the tester software and test standards database in the tester. Individual test data within each section shall be presented in the sequence listed in the test summary records. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation.
- 13. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.
- 14. The entire SCS system shall be warranted free of mechanical or electrical defects by the Contractor for a period of one year after final acceptance of the installation.
- 15. Any equipment that is not installed per the manufacturer's recommendation shall be replaced promptly and at no cost to the District.
- 16. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the District.
- 17. Provide all labor and material warranties for each system, as described elsewhere in this document.
- 18. At the District's direction, the Contractor shall perform additional random testing which shall consist of a random sample of up to 10% of each installation distribution system. The Contractor shall assume responsibility for providing the

proper test equipment and staff to conduct tests. The District's representative shall witness the tests.

- 19. Should the initial 10% test not be 100% successful (all drops testing over CAT6A up to 500MHz), the Contractor shall assume responsibility to repair/replace non-passing links, at the direction of the District, and the links to re-verify and resubmitted. A 20% random sample shall then be conducted to ensure proper performance of the system.
- 20. Should there be failure in this re-test, the Contractor shall be responsible to repeat the re-test procedure until such time as all cabling is verified.

## 3.7 COMPLETION OF WORK:

A. At the completion of the Systems, the Contractor shall restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above will be by the Contractor and at no cost to Owner. If the Contractor fails in its duties under this paragraph, Owner may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.

### 3.8 INSPECTION

A. On-going inspections shall be performed during construction by the District's representative. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly. Any work that does not meet the District's representative's approval shall be removed and reinstalled by the Contractor at no additional cost to the District.

### 3.9 LABELING REQUIREMENTS

- A. Numbers must be assigned to each outlet location using a logical designation convention. Blueprints with the outlet placement and configuration information have been furnished to the Contractor. Contractor will provide the equipment as necessary to generate Panduit PAN-CODE (or Equal) laser printer generated self-laminating labels using the numbering convention shown below and as specified herein. Before any permanent labels are installed on blocks, face plates or cables, Contractor shall submit a sample label of each various type listed below to District's Project Manager for written approval to ensure compliance with the labeling scheme, legibility, etc. Contractor is responsible to provide the labeling scheme as described herein.
- B. Station Faceplate (Telecommunications Outlet) Labeling. Contractor shall consult with Owner on preferred labeling scheme. Contractor shall provide sample labels to Owner for review and approval before final labels are printed and installed.

- C. Patch Panel Labeling. All copper category 6A rack mounted patch panels shall be sequentially numbered, beginning with the uppermost panel in the rack. Patch panel number shall be printed and attached to both left and right edges and centered. Numbers shall be minimum 1/2" high and printed white on a black background. Contractor shall consult with Owner on preferred labeling scheme. Contractor shall provide sample labels to Owner for review and approval before final labels are printed and installed.
- D. Station Cable Jacket Labeling. All Category 6A cables shall be labeled within six inches of each termination end (e.g., at both ends, outlet end and MDF/IDF end) using machine-generated, "P-Touch" type, self-laminating cable markers.
  - 1. Example: IDF2-4/9
  - 2. IDF location where cable originates (i.e., IDF room "#2").
  - 3. Patch panel and port numbers where cable terminates (i.e., patch panel #4, port #9)
- E. Backbone and Riser Multipair Cable Labeling. All backbone and riser cables (copper, fiber, coax, etc) will be labeled to reflect the origin and destination abbreviation for the cable and pair counts on large font (16 pitch) self-laminating labels, which shall be located within 18 inches of each end of the cable. Labels shall be placed on the cable to be visible without relocating surrounding cables.
  - 1. Example #1: IDF2/IDF3/CP100/01
  - 2. IDF2: Cable Origination
  - 3. <u>IDF3</u>: Cable Destination
  - 4. <u>CP100</u>: Cable Type & Pair or Strand Count (ex. 100 pair Copper Cable. Other possibilities include CX for coax, HB for hybrid fiber cable, MM for multimode cable, and SM for singlemode cable.)
  - 5. <u>01:</u> Cable identification number (ex. cable 01). There may be more than one backbone or riser cable with the same origin, destination and pair count.
- F. Multipair Cable Termination Block Labels. All multipair cables will be labeled using appropriate terminal-block label strip with label holders. Termination blocks shall be labeled in such a manner to indicate Termination Block number (ex: W1, W2, etc) and type of cables (ex. Fire Alarm-FA, Security Alarm-SE, Paging-PA, FAX machine, etc.).
  - 1. Termination Block Label:
  - 2. Example: W1 Alarm Cables 1st Floor
  - 3. <u>W1</u>: Wall Field 100-pair 110-block #1
  - 4. Individual cable numbers on label strip:

- 5. Example: 001
- 6. Station #1
- G. Multipair Cable Termination Block Labels. All multipair riser blocks shall be labeled using appropriate terminal-block label strip with label holders and shall follow the labeling scheme outlined above. Building interconnect cable termination block labels shall be per ANSI/TIA/EIA-606-B. Final label scheme shall be determined by the District's decision.
- H. Fiber Enclosure Labels. All fiber enclosures and panels will be labeled using selflaminating laser label markers. Fiber labels shall include all information as specified by the District. Contractor is responsible to provide a labeling scheme that meets with the District's satisfaction. At a minimum, the fiber enclosure label card shall indicate destination of connected cables, slash (/), origination of connected cables, slash (/), and the fiber enclosure number and port number.
  - 1. Example: <u>MDF</u>/IDF2/1-1
  - 2. <u>MDF</u>: Destination Patch Panel Location Designation
  - 3. <u>IDF2</u>: Origination Patch Panel Location Designation
  - 4. 1-1 Indicates fiber enclosure number and fiber port number on both origin and destination fiber enclosures.
- I. Equipment Rack/Cabinet Labeling: All equipment racks/cabinets shall be labeled according to their room identifier and a two-digit number. The labels will be engraved plastic plates, with 1"-high white letters on black background. The labels will be attached to the cross member at the top front of each frame or rack with appropriately sized sheet metal screws. Self-adhesive strips, glues, etc. are unacceptable. Racks and cabinets within the same room shall be numbered sequentially from left to right, when facing the front of the racks/cabinets.
  - 1. Example: MDF-01
  - 2. <u>MDF</u> Room Designation
  - 3. <u>01</u> Rack Identifier
- J. Telecommunications Main Grounding Busbars (TMGB, TGB): All telecom grounding busbars shall be labeled using large font (16 pitch) self-laminating labels. Labels shall indicate "TMGB" or "TGB". If more than 1 busbar is in the room, include a numerical indication (ex: TMGB-1).

## 3.10 MISCELLANEOUS PROJECT REQUIREMENTS

A. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. On a daily basis and at the

completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.

- B. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Contractor shall supply pull string and pull rope for the installation of all cables in existing conduits. For all underground conduits left with available capacity, Contractor shall replace pull strings with ¼-inch pull rope during the course of his work. Contractor must seal all underground low voltage conduits within manholes, underground vaults/pull boxes, and underground conduits that enter a facility, with an approved mechanical water/gas/airtight plug. Unused conduits shall be sealed with a blank plug.
- C. Seismic Requirements: Contractor will install all equipment racks, equipment cabinet enclosures, cable runways, etc. according to DSA and local, state and/or federal code. Contractor will notify District's Project Manager of such requirements and shall provide such bracing as required. Contractor to coordinate all installation with the structural Engineer of Record.
- D. Safety Requirements: Contractor will utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.
- E. Specification/Drawing Status: All specifications and drawings related to this project will be "frozen" after shop drawing approval. The District reserves the right to negotiate any future changes with the Contractor at any time.

## 3.11 MISCELLANEOUS SUPPORT REQUIREMENTS

- A. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the District's Project Manager.
- B. Contractor shall expedite shipment of all materials, components and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor's pricing as provided below. The system cost herein shall include administration/maintenance training for at least five (5) District representatives with a minimum allotment of two (2) eight-hour sessions. All training shall include written and/or video materials that shall remain the property of District. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one (1) copy of each will be required. The administration/maintenance training shall include, but not be limited to, the following:
  - 1. Review of as-built documentation, including a site demonstration.
  - 2. All warranty information.

- C. Minimum standards for maintenance purposes shall include optional access to service on a 24 hour-a-day, 365 day-a-year basis. In addition, Contractor shall, upon notification, respond as follows:
  - 1. Emergency Response: Contractor must respond by utilizing remote diagnostics capabilities (as applicable) within thirty minutes of notification. If necessary, Contractor must dispatch at least one certified technician for arrival on-site within two hours of notification.
  - 2. Non-Emergency Response: Contractor shall respond by utilizing remote diagnostics capabilities and or cause dispatch of at least one certified technician for arrival on-site within one business day of notification.
  - 3. Definition of "Emergency": For maintenance purposes, "emergency" shall be defined as one or more of the following conditions:
    - a. Defects of any riser pairs and/or components involving at least ten percent (10%) of any riser cable's capacity.
    - b. Defects of station cable pairs and/or components involving at least ten percent (10%) of any department or group of voice and/or data stations.
    - c. Defects significantly impairing any single attendant console.
    - d. Defects of any fiber optic cable and/or components involving at least ten percent (10%) of any department or group's fiber-based systems and/or stations.
    - e. Any pre-defined failure as submitted by District and agreed to be Contractor.

### 3.12 FINAL ACCEPTANCE

- A. The District or District's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The District or District's representative will conduct a final job review once the Contractor has finished the job. This review will take place within one (1) week after the Contractor notifies the District.
- C. Two (2) copies of all certification data and drawings for all identifications shall be provided to the District before the District's review.
- D. The District or District's representative will review the installation and certification data prior to the system acceptance.
- E. The District or District's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the District reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the Contractor.

- F. In the event that repairs or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within ten (10) days from the time they are discovered.
- G. The Contractor shall provide two (2) copies of an "operating and servicing manual" for the system within fourteen (14) calendar days of District's final acceptance of the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system (11"x17"); equipment specification cut sheets, complete performance test data, complete warrantee information and replacement parts list with current prices listed, contact information for repair and warranty work requests.
  - 1. The Contractor shall mount a full size 30" x 48" bond copy of each scaled Site Plan within MDF room and each IDF room with removable Plexiglas front cover. Frame and cover shall be sized to house the site plan and floor plan drawings. Coordinate location of frame with District's Project Manager prior to installation.
  - 2. The Contractor shall hand to the District a copy of any applicable installation specific software configurations including all log-in passwords in CD format.

# END OF SECTION

## SECTION 32 84 00

## PLANTING IRRIGATION

## PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
  - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- 1.2 SUMMARY
  - A. Provide complete, automatically controlled, spray sprinkler, turf rotor, bubbler and/or drip underground irrigation system as shown on Drawings.
  - B. This Section includes but is not limited to: excavating, backfilling, finish grading, piping, valves, sprinklers, specialties, controls, and wiring for automatic control irrigation system.
  - C. Related Sections include the following:
    - 1. 32 90 00 Planting.
    - 2. 01 56 39 Temporary Tree and Plant Protection.

### 1.3 DEFINITIONS

- A. Certified Landscape Irrigation Auditor (CLIA): a person certified to perform landscape irrigation audits by the Irrigation Association Certification Board.
- B. Lateral (Circuit) Piping: Downstream from control valves to sprinklers, rotors, emitters and specialties. Piping is under pressure during flow.
- C. Mainline Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- D. The following are industry abbreviations for plastic materials:
  - 1. ASME: American Society of Mechanical Engineers.
  - 2. ASTM: American Society for Testing and Materials.
  - 3. AWG-UF: American Wire Gauge Underground Feeder
  - 4. NFPA: National Fire Protection Association.
  - 5. PSIG: Pounds per Square Inch Gauge.

- 6. PVC: Polyvinyl Chloride Plastic.
- 7. SDR: Standard Direct Ratio.
- 8. V: Volt

## 1.4 PERFORMANCE REQUIREMENTS

- A. Location of Sprinklers, Rotors, Emitters and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent, head to head, water coverage of turf and planting areas indicated with uniform coverage and minimum over-spray onto paving and no spray onto buildings and structures.
- B. Minimum Working Pressures: The following are minimum rated pressure requirements for piping, valves, and specialties, unless otherwise indicated:
  - 1. Irrigation Main Piping: 200 psig.
  - 2. Lateral (Circuit) Piping: 150 psig.
- C. Irrigation Schedule: In accordance with DSA Title 24, Part 1 Outdoor Water Use Requirements, Contractor shall prepare two (2) three (3) irrigation schedules, one for plant establishment, one for the established landscape and one for temporarily irrigated areas if applicable. Each schedule shall indicate the number of gallons used and shall target the Estimated Total Water Use (ETWU) and not exceed the Maximum Applied Water Allowance (MAWA) calculated on the Irrigation Plan "California Water Efficient Landscape Worksheet." Irrigation Schedule shall be submitted at substantial completion. After acceptance of substantial completion, Contractor shall laminate schedule in plastic and place in controller enclosure prior to final completion and end of maintenance. In preparing the Irrigation Schedule, the Contractor shall consider the following:
  - 1. Irrigation interval (days between irrigation).
  - 2. Irrigation run times.
  - 3. Number of cycle starts to avoid runoff.
  - 4. Amount of applied water scheduled to be applied on a monthly basis.
  - 5. Application rate setting.
  - 6. Root depth setting.
  - 7. Plant type setting.
  - 8. Soil type.
  - 9. Slope factor setting.
  - 10. Shade factor setting.
  - 11. Irrigation uniformity or efficiency setting.
- D. Certified Landscape Irrigation Audit (CLIA): requirements for CLIA shall apply to landscape projects 2,500 square feet and larger.

## 1.5 SUBMITTALS

- A. Product and Project Data: With-in 14 days after award of the contract, furnish the Owner's Representative with submittal data on all items intended for installation. Substitute equipment or material installed without the approval of the Owner's Representative will be removed and replaced with specified items at this Contractor's expense. Submit manufacturer's technical data and installation instructions for irrigation components conforming to requirements of Division 1, Section 01 34 00 Submittals, Shop Drawings and Product Data. Include pressure ratings, rated capacities, and settings of irrigation components. Submittal shall include the following:
  - 1. Backflow device including cage and/or blanket.
  - 2. Main, lateral (circuit) and sleeving pipe.
  - 3. Pipe fittings, primer and cement.
  - 4. Tracer wire and/or warning tape.
  - 5. Isolation valves.
  - 6. Remote control valves.
  - 7. Valve boxes.
  - 8. Sprinklers, rotors, bubblers, drip emitters.
  - 9. Swing joints.
  - 10. Tree bubbler drain tubes.
  - 11. Controllers. Include wiring diagrams, enclosures and mounting methods.
  - 12. Control wires. Include splice kits and conduit.
  - 13. Valve identification tags.
  - 14. Irrigation Wiring Diagram: Contractor shall prepare and submit an irrigation wire diagram showing location of control wire, common wire, spare control wire and spare common wire with quantities noted at each run shown on copy of irrigation plan in a legible size and format.
  - 15. Irrigation installation firm qualifications in accordance with "quality assurance".
  - 16. Name and contact information of certified irrigation auditor performing the irrigation audit for this project for landscape projects of 2,500 square feet and larger.
- B. Coordination Drawings: During the course of construction, maintain orderly set of irrigation drawings and details on project site during installation of irrigation system. Record daily changes showing piping and major system components. Measure and neatly record dimensions for all mainlines, control wire runs, and all other pertinent information facilitating maintenance and extension of the irrigation system to within one (1) foot horizontally and six (6) inches vertically. Indicate interface and spatial relationship between piping, system components, adjacent utilities, and proximate structures. Up to date coordination drawings shall be available for review prior to meetings with the Owner's Representative.

- C. Submittals at Substantial Completion:
  - 1. Irrigation Record Drawings. Contractor shall record information gathered on "Coordination Drawings" onto a clean set of Irrigation Plans for documentation of as-built conditions.
  - 2. Controller Legend: Upon approval of record drawing submittal, prepare two (2) legible, reduced to 11" by 17" in size, non-fading, waterproof copies of the Record Irrigation Drawings, laminated between two (2) .020 mm (minimum) plastic sheets, printed on front side only. Attach one (1) copy to door of controller or enclosure and deliver one (1) copy to Owner. Plan sheet shall include the following information:
    - a. Installing Contractor's company name, phone number and address.
    - b. Color coded zone identification by valve.
    - c. Zone start time.
    - d. Zone water duration.
    - e. Type of planting irrigated.
    - f. Valve size, station numbers and controller designations.
  - 3. For landscape projects 2,500 square feet and larger, Contractor shall retain the services of a third party Certified Landscape Irrigation Auditor to perform a landscape irrigation water audit and prepare an irrigation audit report compliant with MWELO 492.12 including, but not limited to inspection, system tune-up, system test with distribution uniformity, correcting over-spray or runoff and configuring controllers with application rate, soil type, plant factors, slope, sun exposure and other factors necessary for accurate programming. Submit preliminary report at substantial completion, allow for adjustments during maintenance and submit report confirming irrigation installation is compliant with DSA MWELO at final completion.
  - 4. Submit Irrigation Schedule for review and approval in accordance with DSA Title 24, Part 1 at substantial completion. Once approved, laminate in plastic and place inside controller enclosure for final completion at end of maintenance period.
  - 5. Contractor shall provide the owner with one (1) quick coupler key with hose swivel per each five (5) quick couplers.
  - 6. Irrigation System Leak Test Results.
  - 7. Irrigation backflow preventer certification.
  - 8. Central control installation certification from a factory authorized representative.
  - 9. Booster pump installation certification from factory-authorized representative.
  - 10. Operation and Maintenance Data: For irrigation systems, to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures," include data for the following:
    - a. Automatic-control valves.

- b. Sprinklers, rotors and/or emitters.
- c. Controllers.

### 1.6 QUALITY ASSURANCE

- A. Governing Agency Requirements:
  - 1. For projects subject to review and approval by local governing agencies, Contractor shall comply with the State of California Model Water Efficient Landscape Ordinance at a minimum and shall conform to local codes and/or ordinances, whichever may be more stringent.
  - 2. For projects under review of DSA, Contractor shall comply with the State of California Model Water Efficient Landscape Ordinance requirements at a minimum.
- B. Installer Qualifications:
  - 1. Experience: The irrigation installation firm shall have contracted for and successfully completed construction of a minimum of five (5) California public school district construction projects, approved by the Division of the State Architect (DSA), within the past five (5) years of similar size, complexity, budget and scope.
  - 2. Licensure: The irrigation installation firm shall hold a current, active C27 "Landscaping Contractor" license classification by the California State License Board that has been consistently active for at least five (5) years and that has not been suspended or revoked.
  - 3. Supervision: The irrigation installation firm shall have a qualified and experienced irrigation technician on site during irrigation installation.
  - 4. Drip Irrigation: The irrigation installation firm shall have contracted for and successfully complete construction of a minimum of five (5) drip irrigation installations within the past five (5) years of similar size and complexity.
- C. Manufacturer Qualifications: Provide underground irrigation system as a complete unit. Each type component produced by a single acceptable manufacturer, including heads, valves, controls and accessories.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Pipe crossings beneath fire Lanes: Comply with NFPA 24-10, Depth of Cover at Fire Access Lanes.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination".
- G. All work and materials shall be in strict accordance with the latest rules and regulations of the State Fire Marshal, Safety Orders of the Division of Industrial

Safety, California Electrical Code, California Administrative Code, part 4, Title 24, "Basic Mechanical Regulations" and other applicable state or local laws or ordinances. Nothing in these drawings or specifications is to be construed as permitting work which does not conform to the codes or regulations.

H. Contractor shall provide all licenses, fees and other charges required for completion of the work.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver piping 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 piping protected from direct sunlight. Support to prevent sagging and bending.

## 1.8 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
  - 1. Notify Owner's Representative no fewer than two days in advance of proposed interruption of water service.
  - 2. Do not proceed with interruption of water service without Owner's Representative's written permission.
- B. Interruption of Existing Irrigation Service: Do not interrupt existing to remain irrigation service. Prior to demolition work and prior to beginning irrigation work, review project site and meet with Owner Representative to review locations and connections of existing to remain irrigation system. Coordinate with General Contractor to ensure existing irrigation remains in place and operable through the duration of construction. In the event existing irrigation is shut off or damaged during construction, contractor shall provide temporary connections or modifications to continue water service to existing to remain planting material or turf to maintain in a healthy growing condition throughout construction. In the event water service is not available, contractor shall apply water through manual delivery means as necessary. Obtain approval from Owner's Representation two days in advance of any planned disruptions in water service.

## 1.9 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

## 1.10 MAINTENANCE

A. Irrigation maintenance shall coincide with planting maintenance, refer to Specification 32 90 00 "Planting". In the event planting is not part of this work, maintenance shall begin at written approval from Owner's Representative of substantial completion, run ninety (90) calendar days and until receipt of Owner's Representative's written acceptance of completion of punch list items.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Use new materials of brands shown or Drawings, specified herein or approved equal.
- B. Use existing materials if shown on Drawings.
- C. Substitution of sprinklers, rotors, drip, valves and controllers will not be allowed due to variation in flows, precipitation rates, friction losses, and sizing and maintaining consistency with client equipment standards.
- 2.2 PIPES, TUBES, AND FITTINGS
  - A. Above Grade Irrigation Mainline Piping: Steel Pipe, ASTM A 53/A 53M, Schedule 40, Type S or E, Grade A or B, galvanized with threaded ends.
    - 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe with threaded ends.
    - 2. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
    - 3. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
    - 4. Cast-Iron Flanges: ASME B16.1, Class 125.
    - 5. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, galvanized.
  - B. Mainline piping (unless specified otherwise on Drawings):
    - 1. Class 200 (C900), gasketed, purple reclaimed water PVC pipe, ASTM D-2241, NSF approved (size 6" and larger).
    - 2. Class 315 purple reclaimed water PVC pipe, ASTM D-2239, NSF approved (size 2-1/2" to 4")
    - 3. Schedule 40 purple reclaimed water PVC pipe, ASTM D-1785, NSF approved (size 2" and smaller).

- 4. Fittings to be schedule 80 PVC.
- 5. 6" and larger pipe to be secured with Lemco stainless steel LB series joint restraints or approved equal.
- C. Lateral piping (unless specified otherwise on Drawings):
  - 1. Schedule 40 purple reclaimed water PVC pipe, ASTM D 2466, NSF approved.
  - 2. Fittings to be schedule 40 PVC.
- D. Sleeves (unless specified otherwise on Drawings):
  - 1. For irrigation piping, use schedule 40 purple PVC pipe, NSF approved, size and quantity as required for irrigation piping, unless specified otherwise on Drawings.
  - 2. For irrigation wiring, use schedule 40 PVC pipe, UL listed, NEMA TC-6, ANSI/UL651, ASTM F512, for outdoor, direct bury applications, PVC, size and quantity as required, unless noted otherwise on Drawings.
  - 3. Fittings to be schedule 40.
- 2.3 VALVES:
  - A. BACKFLOW PREVENTION DEVICE AND BOOSTER PUMPS: As indicated on the Drawings installed using above grade steel pipe.
  - B. QUICK-COUPLERS: As indicated on the Drawings.
  - C. REMOTE CONTROL VALVES: As indicated on the Drawings.
  - D. VALVE BOXES:
    - 1. In paved areas, use Christy concrete utility box, size as required.
    - 2. In planting areas, use *Rainbird* plastic underground enclosure. Boxes shall have locking lid, bolt and washer, size as required, color to be green in turf areas and black in planting areas and purple for recycled water systems.
    - 3. Valve boxes to be rectangular for remote control valves and ball or gate valves and round for quick coupling valves.
    - 4. Valve box lids shall be labeled "IRRIGATION".

### E. PULL BOXES AND SPLICE BOXES:

- 1. In paved areas, use Christy concrete utility box, size as required.
- 2. In planting areas, use Carson plastic underground enclosure. Boxes shall have locking lid, bolt and washer, size as required, color to be green in turf areas, black in planting areas, and purple for recycled water systems.

- 3. Valve boxes to be rectangular for remote control valves and ball or gate valves and round for quick coupling valves.
- 4. Valve box lids shall be labeled "IRRIGATION".
- F. WIRE MESH AT VALVE BOXES: 1/2 inch by 1/2 inch, 16 gauge, galvanized wire mesh hardware cloth.
- G. VALVE IDENTIFICATION TAGS: Shall be plastic yellow in color for potable water systems and purple in color for recycled water systems with 1 1/8" stamped black letters indicating controller/station number.
- H. SAND BACKFILL: shall consist of natural sand, manufactured sand, existing of native material, or combinations thereof, and shall conform to ASTM c-40 organic impurities, ASTM d-2419 sand equivalent and a pH value between 4.5 and 9.
- I. VALVE BOX ROCK: shall be <sup>3</sup>/<sub>4</sub>" or smaller drain rock or pea gravel unless specified otherwise on Drawings.
- J. VALVE BOX SUPPORT BRICK: shall be common red brick unless specified otherwise on Drawings.
- 2.4 AUTOMATIC CONTROL SYSTEM:
  - A. CONTROLLER: As indicated on Drawings.
  - B. AUTOMATIC CONTROLLER GROUNDING: Contractor shall install grounding recommended by manufacturer for installation method detailed on this project.
  - C. WIRING: All 24 v line to be #14-1 awg-uf. Control wire insulation to be red in color and spare wire to be yellow in color. 24 v common wire to be #12-1 awg-uf, insulation to be white in color and spare common insulation shall be black in color.
  - K. SPLICING MATERIALS: manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
  - L. CONNECTORS: Shall be or 3M "DBY" connectors or equal.
- 2.5 TRACER WIRE/DETECTABLE WARNING TAPE:
  - A. Install tracer wire or detectable warning tape as indicated on Drawings.
  - M. Tracer Wire: #8 solid Bare Copper Wire.
  - N. Detectable Warning Tape: Electronically detectable plastic tape with metallic core, Terra Tape D, manufactured by Griffolyn Co., or equal, two (2) inches in width, continuously imprinted "caution buried water line".
- 2.6 CONCRETE THRUST BLOCKING:

### TURNER SENIOR ACADEMY CAMPUS LODI UNIFIED SCHOOL DISTRICT LODI, CALIFORNIA

- A. Shall be clean, Portland cement concrete, cast in place, five sacks of cement per cubic yard mixture with a 28-day compressive strength of 2,500 psi.
- 2.7 SPRINKLERS, DRIP SYSTEM, BUBBLERS, EMITTERS:
  - A. As indicated on Drawings.

# PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Refer to Division 31 "Earthwork" for excavating, trenching, and backfilling.
- B. Install piping and wiring in sleeves under sidewalks, roadways, and parking lots, and under or through footings and building walls.
  - 1. Install piping sleeves by boring or jacking under existing paving if possible.
  - 2. Install a minimum of two (2) three (3) inch diameter sleeves in each location for irrigation piping and a minimum of one (1) two (2) inch diameter electrical conduit sleeving in each location for irrigation wire.
  - 3. Sleeves shall extend twelve (12) inches beyond edges of paving and walls with ends capped.
- C. Provide minimum cover over top of underground piping according to the following:
  - 1. Irrigation Mainline Piping: Minimum depth of 24 inches below finished grade to top of pipe.
  - 2. Lateral Piping: Minimum depth of 18 inches below finished grade to top of pipe.
  - 3. Sleeves containing control wires, mainline and/or lateral piping beneath standard paving: Minimum depth of 24 inches from finish surface to top of sleeve.
  - 4. Sleeves containing control wires, mainline and/or lateral piping beneath vehicular paving including fire lanes/emergency vehicle access (EVA): Minimum depth of 36 inches from finish surface to top of sleeve.
  - 5. Drip Irrigation: Install drip and/or emitter lines and tubing as detailed on Drawings.
- D. Excavate trenches with vertical sides, uniform bottom, free of deleterious materials, and wide enough for pipes to lay side by side, fully supported on bottom. Minimum 3" clearance between pipes. Twelve (12") inch minimum width for mainlines and six (6") inch minimum width for lateral lines.
- E. Trenches with pressure pipe and control wiring to be backfilled with sand to 6 inches minimum above top of pipe. Continue backfilling in 6 inch layers with soil free of rocks or waste materials. Compact soil to a density equal to the surrounding undisturbed soil, but not less than 90%. Any subsequent depressions shall be filled

at the Contractor's expense. Particular attention is directed to firmly tamp and moistening around sprinkler heads and quick-couplers.

- 1. For irrigation pipes three (3) inches and larger in size, install additional six (6) inch depth sand beneath piping.
- F. Trenches and backfill installed under paving, asphalt concrete or concrete shall be backfilled with sand and compacted in layers equal in density to the adjacent undisturbed soil or to 90% compaction, using manual or mechanical tamping devices. All trenches shall be left flush with the adjoining grade.
  - 1. The Contractor shall set in place, cap and pressure test pressurized mainline under paving prior to the paving installation.
  - 2. For irrigation pipes three (3) inches and larger in size, install additional six (6) inch depth sand beneath piping.

#### 3.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Owner's Representative's approval before excavation.

#### 3.3 PIPING APPLICATIONS

- A. Install components having pressure rating equal to or greater than system operating pressure.
- B. Piping in control valve boxes and above ground may be joined with flanges instead of joints indicated.
- C. Aboveground Irrigation Mainline Piping: Use any of the following piping materials for each size range:
  - 1. NPS 4 and Smaller: Steel pipe; malleable-, gray-, or cast-iron fittings; and threaded joints.
  - 2. NPS 5 and Larger: Steel pipe; malleable-, gray-, or cast-iron fittings; and threaded joints.
- D. Underground irrigation main piping shall be purple recycled water pipe, polyvinyl chloride (Type I) plastic pipe PVC 1120 and NSF approved, Schedule 40 PVC solvent-weld, unless otherwise indicated on Drawings.
- E. Underground Irrigation Lateral (Circuit) piping shall be purple recycled water pipe, polyvinyl chloride (Type I) plastic pipe PVC 1120 and NSF approved, schedule 40 PVC solvent-weld, unless otherwise indicated on Drawings.
- F. Mainline pipe sizes 6" and larger shall use gasketed pipe with bell fittings. Where solvent weld joints are required, contractor shall additionally install concrete thrust blocking.

- H. Mainline Fittings and Couplings: Schedule 80, PVC pipe, solvent weld up to 4" and gasketed with bell fittings 6" and larger pipe.
- I. Risers to Aboveground Sprinklers and Specialties: ASTM A-120 Schedule 40 galvanized steel pipe with 150 lb. banded galvanized malleable iron fittings.
- J. Double Swing Joint Assembly (unless specified otherwise on Drawings):
  - 1. Install per manufacturers recommendations.
  - 2. Install double swing joint at all sprinkler heads and quick couplers.
  - 3. Elbows shall be PVC Class 1220, Schedule 40.
  - 4. Install as follows:
    - a. Screw 2 inch long nipple horizontally into plastic tee or ell at lateral line.
    - b. Screw on elbow and a 6 inch long nipple.
    - c. Screw on another elbow and a 2 inch long nipple and install riser vertically to head, or quick coupler valve.
    - d. Swing joint must offset to the right.
- K. Sleeves: Schedule 40 PVC pipe and socket fittings; and solvent-cemented joints.
- L. Transition Fittings: Use transition fittings for plastic-to-metal pipe connections according to the following:
  - 1. Couplings:
    - a. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
    - b. Underground Piping NPS 2 and Larger: AWWA transition coupling.
  - 2. Fittings:
    - a. Aboveground Piping: Plastic-to-metal transition fittings.
    - b. Underground Piping: Union with plastic end of same material as plastic piping.
- M. Dielectric Fittings: Use dielectric fittings for dissimilar-metal pipe connections according to the following:
  - 1. Underground Piping:
    - a. NPS 2 and Smaller: Dielectric couplings or dielectric nipples.
    - b. NPS 2-1/2 and Larger: Prohibited except in valve box.
  - 2. Above ground Piping:
    - a. NPS 2 and Smaller: Dielectric unions.
    - b. NPS 2-1/2 to NPS 4: Dielectric flanges.

#### TURNER SENIOR ACADEMY CAMPUS LODI UNIFIED SCHOOL DISTRICT LODI, CALIFORNIA

- 3. Piping in Valve Boxes or Vaults:
  - a. NPS 2 and Smaller: Dielectric unions.
  - b. NPS 2-1/2 to NPS 4: Dielectric flanges.
- 4. Dielectric fittings are specified in Division 22 Plumbing.

## 3.4 VALVE APPLICATIONS

- A. Backflow Prevention Devices:
  - 1. New and relocated backflow devices must be tested at time of installation. Contractor shall have test performed by a Certified Backflow Tester who has a current State of California Contractor's license C-36 or General Contracting License.
  - 2. For new backflow preventer installation, a Certified Tester shall test and provide results and certification to the Owner's Representative within five (5) days of the date of testing and to provide any testing data or certification required by the local water provider. A Department of Public Health sticker shall be place on backflow device before the system is accepted by the Owner's Representative.
  - 3. Install per local codes and water purveyor requirements.
  - 4. A Department of Public Health sticker shall be placed on backflow device before the system is accepted by the Owner's Representative.
- B. Underground Gate/Ball Valves: Install in control-valve box as detailed on drawings.
- C. Underground, Manual Control Valves: Install in manual control-valve box as detailed on drawings.
- D. Remote Control Valves: Install in control-valve box as detailed on drawings.
- E. Drain Valves: Install in control-valve box as detailed on drawings.
- F. Install each valve in a separate valve box (unless noted otherwise in Drawings and details) and in appropriate locations as shown on Drawings. Allow 12 inches between valve boxes and between valve boxes and walls or walks or landscape edges. Boxes shall be arranged perpendicular and parallel to each other and aligned in a row.

## 3.5 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings. Piping shown on drawings is diagrammatic. General arrangement of piping shall be followed as near as practical. Where piping is shown running continuously in paving and adjacent to planting area, intent is to install piping within planting areas where practical.

- B. Install pipe sleeves at all points where pipes pass through concrete, asphalt or masonry. In footings, allow 1 inch clearance around pipe, and in other locations allow ½ inch. Each end of sleeve shall extend 6 inches beyond edge of paving or structure above. Provide removable non-decaying plug at each end of sleeve to prevent intrusion of earth and debris.
- C. If drain valves are used, install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- D. Install piping free of sags and vertical bends.
- E. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install fittings for changes in direction and branch connections. Pipe bending shall not exceed manufacturer recommended radii.
- G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
- H. Install dielectric fittings to connect piping of dissimilar metals.
- I. Install underground thermoplastic piping according to ASTM D 2774 and ASTM F 690.
- J. Lay piping on solid sub-base, fully and evenly supported by bedding, uniformly sloped without humps or depressions.
- K. Install PVC piping in dry weather when temperature is above 40 degrees F (5 degrees C). Allow joints to cure at least 24 hours at temperatures above 40 degrees F (5 degrees C) before testing unless otherwise recommended by manufacturer.
- L. Snake pipe a minimum of one (1) additional foot per one hundred (100) feet of pipe to allow for expansion and contraction.
- M. Cap or plug openings as soon as lines have been installed to prevent intrusion of debris.
- N. Thrust Blocking: Install concrete thrust blocking, at a minimum, on pressurized mainline three (3) inches and four (4) inches in size at changes in direction, connections or branches from mainline and dead ends and as necessary to prevent pipe movement thrusts created by internal water pressure. Concrete shall be placed directly on the fitting perpendicular to the line of thrust and also against the undisturbed earth. The amount of concrete shall be in accordance to the pressure, angle and soil type. Refer to pipe manufacturer for calculating exact size of thrust blocking material, 2019 CPC and IAPMO installation standards.
- O. Joint Restraints: Install joint restraints per manufacturer recommendations on pressurized mainlines six (6) inches and larger at changes in direction, connections or branches from mainline and dead ends and as necessary to prevent pipe movement thrusts created by internal water pressure.

P. After installation of pipe lines and sprinkler risers, and prior to installation of sprinkler heads, automatic valves and quick couplers, thoroughly flush all lines with a full head of water to remove any foreign material, scale, sediment, etc.

### 3.6 TRACER WIRE

- A. Install as detailed along all new irrigation mainline piping on bottom of trench, carefully run to avoid stress from backfilling and shall be continuous throughout the mainline pipe runs. Fasten tracer wire to mainline at eight (8) foot intervals with tape. Take precautions to ensure tape is not damaged or misplaced during backfill operations.
- B. Tracer wire shall follow mainline pipe and branch lines, originating in irrigation valve box at gate, ball or remote control valve located closest to irrigation point of connection and run to ball, gate and/or remote control valves at the end of mainline runs or shall loop entire system where mainlines are looped.
- C. Record locations of tracer wire origin and terminations on project record drawings.

## 3.7 DETECTABLE WARNING TAPE

A. Install tape with printed side up, directly over mainline pipe and on top of sand backfill, 18 inches below grade. Take precautions to ensure tape is not damaged or misplaced during backfill operations.

### 3.8 JOINT CONSTRUCTION

- A. Refer to Division 22 Section "Piped Utilities -- Basic Materials and Methods" for basic pipe joint construction.
- B. Install threaded pipe joints as follows:
  - 1. Use pipe joint sealant for all plastic to plastic and plastic to steel joints, do not apply to sprinkler inlet ports.
  - 2. For PVC, hand tighten only. Do not over tighten threaded joints. Thread until fitting stops, then add a half turn.
  - 3. Use pipe joint compound and/or Teflon tape for all steel to steel joints.
- C. Install gasketed joint per manufacturer recommendations (printed on pipe material) and using the lubricant supplied with the pipe.

### 3.9 SPRINKLER INSTALLATION

A. Locate part-circle sprinklers to maintain a minimum distance of six (6) inches from adjacent paving and edges and twelve (12) inches clearance from walls, fences and other structures, unless otherwise indicated on Drawings.

- B. Spray sprinklers shall not be installed less than 24" from non-permeable surfaces unless the adjacent non-permeable surface is constructed to drain entirely to the landscape area.
- C. Swing Joint Assembly:
  - 1. Install triple swing joint at all sprinkler heads and quick couplers.
  - 2. Elbows shall be PVC Class 1220, Schedule 40.
  - 3. Install as follows:
    - a. Screw 2 inch long nipple horizontally into plastic tee or ell at lateral line.
    - b. Screw on elbow and a 6 inch long nipple.
    - c. Screw on another elbow and a 2 inch long nipple.
    - d. Screw on another elbow and install riser vertically to head, or quick coupler valve.
    - e. Swing joint must offset to the right.
- D. Sprinkler Installation:
  - 1. Install sprinklers heads as shown on drawings and details.
  - 2. Install plumb to finish grade.
  - 3. Tool tighten all sprinkler body covers and nozzles.

### 3.10 DRIP/EMITTER INSTALLATION

- A. Minimum cover sub-surface drip tubing: Drip and/or emitter lines shall be installed as detailed on Drawings and below the mulch top dressing layer.
- B. Minimum cover of tubing to individual shrubs: Shrub bubbler tubing shall be installed to a depth of (4) inches and rising to the surface at target shrub rootball. No more than one (1) inch of tubing shall be exposed at shrub rootball.
- C. Backfill after lines have been reviewed, tested for leaks and approved by Owner's Representative.
- D. Assembling drip system shall keep pipe and tubing free from dirt and debris, pipe ends shall be cut square, deburred and cleaned.
- E. Flush piping prior to installing remote control valve assembly (control zone kit assembly).
- F. Follow manufacturer recommendations.
- 3.11 AUTOMATIC-CONTROL SYSTEM INSTALLATION:
  - A. Exact location of controllers shall be reviewed and approved by Owner's Representative.

- B. Provide connection to nearest available 110 volt electrical service.
- C. Prior to installation of hardscape, coordinate and install electrical supply and control wire conduit, size and quantity as required for each controller and spare wiring. Install pull boxes and conduit from clock location.
- D. Contractor shall install grounding system per manufacturer recommendations.
- E. Control wiring shall be neatly coiled beneath controller terminal strip and labeled with corresponding station number. Controller terminal strip cover plate shall fasten securely in place.
- F. Contractor is responsible to provide fully automatic system operated by specified controller(s). Contractor shall install quantity of red wiring equal to the number of stations on the specified irrigation controller(s), plus five (5) yellow spare control wires for each controller, a common white wire and a spare common black wire. Example, 24 station clock shall have 24 control wires, 5 spare control wires and 2 common wires installed with mainline and running through all associated valve boxes. Wires shall be installed per plans and details from remote control valve(s) to controller(s).
- G. Example of mainline that is not looped and terminates in 3 locations with a 24 station clock and 18 stations used:
  - 1. Wire quantities shall be:
    - 18 red control wires for stations 1-18
    - 6 red control wires for un-used stations 19-24
    - 1 white common wire
    - 1 black spare common wire
    - 5 yellow spare wires
  - 2. Wire runs:
    - 18 red control wires (stations 1-18) shall run from controller to corresponding valve.
    - 6 red control wires (un-used stations 19-24) shall run from controller and loop through each valve box associated with that controller.
    - 1 white common wire shall run from controller and connect to each valve associated with that controller.
    - 1 black spare common wire shall run from controller and connect to each valve associated with that controller.
    - 5 yellow spare control wires shall run from controller and loop through each valve box associated with that controller.
  - 3. Contractor shall label all wires with water-proof marking with corresponding station number or as spare control wire, spare common wire or spare stations 19-24.

- H. Wiring path is not shown on drawings and shall run from specified controller(s) to irrigation pull box if shown, then to the nearest irrigation mainline location, follow mainline (existing and/or new) to each remote control valve. Indicate wire location on record drawings where it does not follow mainline. Common and spare wires shall loop through entire system. Wiring may be shown on drawings only where required for future irrigation extensions.
- I. Irrigation Central Control System standard for this project must be compatible with owner's central control software and hardware. Contractor shall ensure controller communicates properly with project central computer and receives daily downloads for weather updates.

### 3.12 CONNECTIONS/ELECTRICAL WIRING

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Ground equipment according to Division 26 Section.
- C. Connect wiring according to Division 26 Section.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- E. 24 volt splices to be made with 3M Co. #3577 splice kit, as to manufacturer's instructions. Splices to be made only at valve box or pull box.

### 3.13 REMOTE CONTROL VALVE WIRING

- A. Wires shall be installed in gray UL approved electrical conduit between controller and pull box. Pull box to be located in ground nearest controller. Top of box to be flush with finish grade.
- B. Provide separate irrigation wire sleeves under concrete or asphalt for irrigation wires, size and quantity as required, three (3) inches minimum in diameter, 24" minimum cover in planting areas and 36" minimum cover under fire lanes and pavements.
- C. Wires from the pull box to remote control valves shall be direct burial. The wiring shall be bundled and secured to the lower side of the irrigation pipe at ten (10) foot intervals with plastic electrical tape. Sufficient slack shall be left in the wire to provide for expansion and contraction.
- D. Provide 24 inches excess of coil of control wires in each 100 feet of run to controller.
- E. Provide 24 inches excess of coil of control wires in each valve box and pull box.
- F. Control wires to be buried a minimum of 24 inches below finish grade.

- G. Wiring shall be tested for continuity, open circuits and unintentional grounds prior to connecting to equipment.
- H. Install irrigation wire splice boxes where wire splices are necessary.

## 3.14 LABELING AND IDENTIFYING

A. Valve Identification Tags: Install valve identification tag on each remote control valve with corresponding controller station number.

## 3.15 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service for irrigation pumps and central control systems: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including mounting, electrical connections, water connections, grounding and proper communication on site, with hand-held remotes and with central computer software. Make repairs and/or adjustments as recommended. Submit factory-authorized service representative's written approval of installation at Substantial Completion.
- B. For landscape projected 2,500 square feet and larger, after substantial completion, Contractor shall schedule an Irrigation Audit to be performed by a third party certified landscape irrigation auditor. Contractor shall make necessary adjustments, if any, during maintenance period and provide written certification of installation from certified landscape irrigation auditor as part of final completion and end of maintenance.
- C. Perform the following field tests and inspections in the presence of the Inspector and/or Owner's Representative with 72 hours advance notice. Contractor shall record date, time, names of those present and results and submit to Owner's Representative prior to requesting substantial completion review:
  - 1. Leak test of pressurized mainline: After installation of mainline and prior to installing remote control valves, quick coupling valves or other valve assemblies and prior to backfilling trenches, test the mainline for leaks as follows:
    - a. Testing shall occur with trenches open. Center load piping with small amounts of backfill between fittings to prevent pipe displacement, arching or slipping. Fittings to be visible for testing.
    - b. Exercise care in filling the system with water to prevent excessive surge pressure and water hammer
    - c. Test pressurized mainline piping under hydrostatic pressure of 125 psi for eight (8) continuous hours, minimum. Coordinate with Owner's Representative for initial observation of beginning test and observation after test. Install two (2) pressure gauges at opposite ends of mainline system. Pressurize system up to a minimum of 125 psi the day preceding the scheduled test and verify the pressure is holding at both ends. Inspect system early the following day in the presence of the

Owner's Representative and note pressure. One hour later, verify pressure has not dropped more than five (5) psi in the presence of the Owner's Representative.

- d. Correct deficiencies revealed by test and repeat pressure test to the satisfaction of the Owner's Representative.
- 2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
- 3. Coverage Test: When the irrigation system has been completed, the Contractor, in the presence of the Architect and Owner's Representative, shall perform a Coverage Test to determine if the coverage of water is complete and adequate, the sprinkler heads and/or emitters function according to manufacturers' data and according to the intent of the construction documents. Replace irrigation components not performing satisfactorily and/or respace sprinklers and/or nozzles and/or emitters as necessary to provide complete irrigation coverage of plant material.
  - a. For new turf areas, Contractor shall demonstrate irrigation coverage over amended soil and prior to installation of sod and/or seeded turf.
- 4. Substantial Completion Review: At substantial completion of this Section, work shall be reviewed for conformance with the Drawings and Contractor shall make recommended repairs and/or corrections in a timely manner and prior to final completion.
  - a. For landscape projects 2,500 square feet and larger, at substantial completion, contractor shall submit Certified Landscape Irrigation Auditor preliminary report on irrigation system.
  - b. At substantial completion, Contractor shall submit documentation per 1.5 "submittals at substantial completion" to Architect for review and acceptance.
  - c. At substantial completion, Contractor shall deliver spare parts to District Representative per 1.5 "Submittals at substantial completion".
- 5. Final Completion Review: After substantial completion repairs and/or corrections have been completed and at the end of the maintenance period, work shall be reviewed for final completion and approved by Owner's Representative in writing.
  - a. For landscape projects 2,500 square feet and larger, at final completion, Contractor shall submit Certified Landscape Irrigation Auditor final report confirming irrigation installation is compliant with DSA MWELO requirements.

### 3.16 CLOSING IN UN-INSPECTED WORK

A. The Contractor will pay all costs necessitated by required opening, restoration and correction of all work closed in or concealed before inspection, testing as required, and approval by authorized inspections.

## 3.17 STARTUP SERVICE

- A. Verify that controllers are installed and connected according to the Contract Documents.
- B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 16 Sections.
- C. Complete startup checks according to manufacturer's written instructions.

## 3.18 MAINTENANCE SCHEDULE

- A. Fine tune and adjust irrigation system weekly coinciding with the landscape and/or turf planting maintenance period.
- B. Adjust settings of controllers within WELO water budget and with seasonal changes.
- C. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.
- D. Adjust sprinklers so they will be flush with, or not more than 1/2 inch above, finish grade.
- E. Fill irrigation trenches due to settling.

### 3.19 CLEANING

- A. Completely flush dirt and debris from piping before installing sprinklers and other devices.
- B. After completion, cleanup and remove all resultant debris from site.

#### 3.20 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain controller and automatic control valves. Refer to Division 1 Section "Demonstration and Training."
- 3.21 GUARANTEE (Project Close-out Item)
  - A. Furnish a written Guarantee to the Owner, dated from the date of Final Acceptance, against defective workmanship, materials or components and guaranteeing repair or replacement for a period of 1 year; further guarantee restoration of all damage caused by leaks in the Irrigation System for a like period.

- C. Submit duplicate copies of the Guarantee for approval by the Owner's Representative. Approval is mandatory before final payment and acceptance.
- D. The guarantee for the irrigation system shall be made in accordance with the form attached at the end of this Section. The guarantee form shall be retyped onto the Contractors letterhead and contain the information shown.

## TURNER SENIOR ACADEMY CAMPUS LODI UNIFIED SCHOOL DISTRICT LODI, CALIFORNIA

# GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse or neglect excepted.

We agree to repair or replace any defects in materials and workmanship which may develop during the period for one (1) year from the date of acceptance and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice.

The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system and equipment in operating conditions. This shall not relieve the Contractor of his responsibilities under this Guarantee.

In the event of failure to make such repairs or replacements within a reasonable time after receipt of written notice form the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

| Project:                           |
|------------------------------------|
|                                    |
| Location:                          |
|                                    |
| Name of Contractor:                |
| Signed: (Authorized Signature)     |
| Print Name of Authorized Signature |
| Address:                           |
|                                    |
| Phone: Date of Acceptance:         |

# **END OF SECTION**