IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 01-122646 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 11/26/2025

Section 00 01 07

Seals Page

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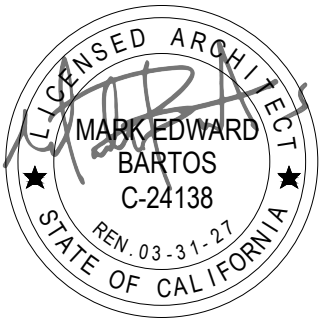

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General Site Preparation

Part 1. General

1.01 Related Documents

A. The Drawings and general provisions of the Contract, including General and Special Conditions and Division 1, General Requirements, apply to the work specified in this section.

B. Parts 1,2,3,4,5,6, Title 24 of the California Code of Regulations (California Building Code) is to be considered an integral part of this section

C. All California Prevailing Wage Laws apply to the work of this section.

1.02 Work Included

A. The following is a general description of the work included in this section. This description does not limit the scope of work shown in the drawings nor does it relieve the Contractor of any responsibility for coordination of **ALL** work of this Contract.

Item	Description
General	• Utility and existing construction identification General Table Listing, Requiring bullet points
Protection	• Utility protection • Landscape protection Expanded descriptions
Marking	• Marking and Notification
Maintenance	• Maintenance of landscaping, protection assemblies

B. Related work may be described in other sections of this Project Manual. All sections of this project manual are related. Contractor shall coordinate the work of this section with all other sections.

1.03 Submittals

A. Provide the following submittals

Item	Description
Catalog Cuts	• n/a
Product Data	• n/a
Samples	• n/a
Shop Drawings	• n/a
Schedule	• Include Schedule entry on Gantt Chart for Installation

1.04 References / Standards

A. The following References and Standards are incorporated into the requirements of this Section as they apply to products, assembly, manufacturing procedures and installation. References shall be utilized in determining “Industry Standards” and other acceptable manufacture and installation methods but shall not relieve the Contractor of any other responsibilities of the Contract. Where conflicts occur between multiple listed references, the Contractor shall assume that the more restrictive standard applies and shall seek determination from the Architect regarding applicable standard.

References	• n/a
Standard	• n/a

1.05 Quality Assurance

A. Provide the following

Item	Description
Supervision	• Full time supervision and observation by the Contractor of all on-site Construction Activities including ordering, procurement and delivery of all materials and products manufactured or assembled off-site.
Qualifications of Workers	• General Contractor shall ensure that all workers providing labor on this project are fully competent and experienced in the area of work being performed. General Contractor shall require subcontractors to remove any unqualified workers from the project.
Product Acceptance	• General Contractor (Superintendent) shall verify and accept all products delivered to site prior to installation.
Substrate Acceptance	• General Contractor (Superintendent) shall verify all substrates / conditions prior to allowing installation of any item.

1.06 Quality Control by Contractor

A. The following specific procedures shall be required to demonstrate adequate levels of quality provided for project components and systems. Exclusion of any item from this list does not relieve the Contractor of any responsibilities for quality procedures covered elsewhere in the Contract Documents.

Item	Description
Supervision	
Underground Items	• GENERAL CONTRACTOR is SOLELY responsible for locating and verifying any underground items prior to beginning operations
Special Inspections	• Refer to DSA Testing and Inspection Sheet
Mock Ups	• N/A

1.07 Quality Control by Owner

A. The following specific procedures shall be required to demonstrate adequate levels of quality provided for project components and systems. Exclusion of any item from this list does not relieve the Contractor of any responsibilities for quality procedures covered elsewhere in the Contract.

Item	Description
Observation	• Review utility locations with the District, Architect prior to commencement.
Inspection	• Per CCR Title 24: Continuous Inspection by DSA Certified inspector
Testing	• Refer to DSA Testing and Inspection Sheet
Special Inspections	• Refer to DSA Testing and Inspection Sheet

1.08 Closeout

A. Provide the following Close Out materials

Item	Description
Record Drawings	• Provide complete record drawings of construction Including all underground utilities

1.09 Warranty

A. Provide written warranty

Item	Description
Warranty Form	
Warranty Period	• 1 year
Warranty Start	• Date of Substantial Completion

Part 2. Products

2.01 Not Used

Part 3. Execution

3.01 Identification

A. Contractor shall perform the following tasks prior to commencement of Site Clearing / Excavation operations:

1. Review full scope of work in field with Architect at regular Project Meeting.
2. Review Existing Facility documents including original plans and utility drawings and drawings for any previous additions. Contractor shall request documents from Architect if they have not been provided prior to commencement of work.
3. Provide USA for all known utilities.
4. Provide visual observation of local vaults, grade boxes, hand holes, manholes and any other visible appurtenance to assess utility runs that may not be documented.
5. Contractor shall provide a high level of diligence in assessing existing utilities.
6. Contractor shall identify and label all incoming and outgoing electrical and communication cabling. Review findings with the Architect at a regular Project Meeting. Do not cut any unidentified wires or cabling.
7. Contractor shall be responsible for repair and replacement of any damaged utilities that may have been identified with or without the aid of specific documentation.

3.02 Protection of Utilities

A. Protect utilities from damage.

B. Provide barriers to prevent machinery and equipment from damaging vaults, boxes, and other appurtenances.

C. Provide layout and marking as required to avoid damage to underground pipes and conduits.

D. Provide barriers, fencing and markers to protect overhead and surface mounted piping, wiring, conduits.

3.03 Protection of Landscaping

A. Protect all existing landscaping to remain.

B. Mark all landscaping to remain with signs, tags or other means to ensure all construction personnel are aware of protection requirements.

C. Provide barriers and fencing to keep all construction activities, including personnel, out of protected area.

D. Provide temporary irrigation by means of automatic system or manual watering.

3.04 Tree Protection

A. Protect all trees to remain

1. Provide plastic tree fencing at the drip line of all trees listed to remain. Fencing shall be staked or otherwise supported so that it remains vertical and taught.
2. Protect limbs and foliage from damage caused by equipment and material handling. Avoid breakage of branches by forklift and crane operations.
3. Provide irrigation until temporary irrigation is installed or throughout summer for non-irrigated trees, Irrigation shall consist of deep watering on a bi-weekly basis. Contractor may be required to construct berms to contain water for deep irrigation.

B. Trimming and Pruning

1. All trimming and pruning of trees shall be done with permission from the Architect after review of the specific situation.
2. Trimming of limbs over 4” in diameter shall be performed under the supervision of the landscape architect or via the services of a licensed tree service.
3. All trimming shall include sealing of stump to as appropriate to the species and the size of the stump.

3.05 Maintenance of Protection Assemblies

A. All protection assemblies shall be maintained for the duration of the project

B. Protection may be removed from a particular area when the work of that area or phase is complete and no further construction operations will occur that may affect the items requiring protection.

C. Protection assemblies shall be repaired or adjusted such that fencing remains vertical and taught.

D. Damage shall be repaired promptly.

E. Temporary breaches of fence for access shall be restored immediately after access is complete.

3.06 Verification

A. Verify that survey benchmark and intended elevations for the Work are as indicated. If variations occur, consult the Architect for direction.

B. Contractor is responsible for coordination of basic survey information among all trades and personnel.

End of Section

Section 02 41 19

Selective Demolition

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.
   3. Salvage of existing items to be reused or recycled.

1.02 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.
B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.03 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at the project site with City Staff / Authorized project Representative.

1.04 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of condition of building / site.
B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection and for dust control. Indicate proposed locations and construction of barriers.
C. Schedule of selective demolition activities with starting and ending dates for each activity.
D. Predemolition photographs or video.
E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.05 CLOSEOUT SUBMITTALS

A. Inventory of items that have been removed and salvaged.

1.06 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.07 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.
G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.08 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
B. Inventory and record the condition of items to be removed and salvaged.

3.02 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.03 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
   2. Arrange to shut off utilities with utility companies.
   3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
      b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
      c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.04 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
C. Remove temporary barricades and protections where hazards no longer exist.

3.05 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   4. Maintain fire watch during and for at least 12 hours after flame-cutting operations.
   5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   6. Dispose of demolished items and materials promptly
B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
C. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area location to be determined prior to start of demolition.
   5. Protect items from damage during transport and storage.
D. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.06 CLEANING

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
   1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

Section 22 11 16

Domestic Water Piping

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes domestic water piping, valves, fittings, controls and accessories specifications.

1.03 REFERENCES

A. ASME B16.18 (American Society of Mechanical Engineers) - Cast Copper Alloy Solder Joint Pressure Fittings.
B. ASME B16.22 (American Society of Mechanical Engineers) - Wrought Copper and Bronze Solder Joint Pressure Fittings.
C. ASME B16.26 (American Society of Mechanical Engineers) - Cast Bronze Fittings for Flared Copper Tubes.
D. ASME B31.9 (American Society of Mechanical Engineers) - Service Piping.
E. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
F. ASTM B32 - Solder Metal.
G. ASTM B42 - Seamless Copper Pipe.
H. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
I. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
J. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
K. AWWA C651 (American Water Works Association) - Disinfecting Water Mains.
L. MSS SP58 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Pipe Hangers and Supports - Materials, Design and Manufacturer.
M. MSS SP-67 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Butterfly Valves.
N. MSS SP69 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Pipe Hangers and Supports - Selection and Application.
O. MSS SP-80 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Bronze Gate, Globe, Angle and Check Valves.
P. MSS SP89 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Pipe Hangers and Supports - Fabrication and Installation Practices.
Q. MSS SP-110 (Manufacturers Standardization Society of the Valve and Fittings Industry) - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
R. ASME A1126.1 (American Society of Mechanical Engineers) - Water Hammer Arrestors.
S. ASSE 1011 (American Society of Sanitary Engineering) - Hose Connection Vacuum Breakers.
T. ASSE 1013 (American Society of Sanitary Engineering) - Backflow Preventers, Reduced Pressure Principle.
U. AWWA C506 (American Water Works Association) - Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types.
V. PDI WH-201 (Plumbing and Drainage Institute) - Water Hammer Arrestors.

1.04 SUBMITTALS

A. Submit restroom design for code, and quality control review. Submit no less than one full set, one half set, and one .pdf soft set.

B. Cut sheets submittal Procedures: Submit 7 sets for approval.
C. Product Data:
   1. Submit data on pipe materials; pipe fittings, valves, and accessories. Submit manufacturers catalog information. Indicate valve data and ratings.
D. Manufacturer's Installation Instructions: Submit installation instructions for valves and accessories.
E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.05 CLOSEOUT SUBMITTALS
A. Project Record Documents: Record actual locations of valves and equipment.
B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.
C. Provide As-Built plans derived from original contract documents. Provide 2 copies as follows:
   1. Soft copy in AutoCAD format burnt on data CD.
   2. Hard copy on full size paper

1.06 QUALITY ASSURANCE
A. Perform Work in accordance with:
   1. City of San José, Public Works 1992 Standard Specifications.
   2. 2022 California Building Code (CBC)
   3. 2022 California Plumbing Code (CPC)
B. Obtain a No-Fee Plumbing Permit from the Department of Public Works. Maintain copy of permit document on site.

1.07 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three year's experience.
B. Installer: Company specializing in performing Work of this section with minimum three year's experience.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Product Requirements: Product storage and handling requirements.
B. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.
C. Provide temporary protective coating on cast iron and steel valves.
D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.09 FIELD MEASUREMENTS
A. Verify field measurements prior to fabrication.

1.10 WARRANTY
A. Provide 1 year warranty against defect in materials and workmanship.

Part 1. PART 2 - PRODUCTS

2.01 WATER PIPING, BURIED BEYOND 5 FEET OF DRINKING FOUNTAIN
A. PVC Pipe: Schedule 40, AWWA C900.

2.02 WATER PIPING, BURIED WITHIN 5 FEET OF DRINKING FOUNTAIN
A. Copper Tubing: ASTM B88, Type K, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, solder, Grade 95TA.

2.03 WATER PIPING, ABOVE GRADE
- A. Copper Tubing: ASTM B88, Type L, hard drawn.
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  - 2. Joints: ASTM B32, solder, Grade 95TA.

2.04 FLANGES, UNIONS, AND COUPLINGS
- A. Pipe Size 3 inches and Under:
  - 1. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.05 GATE VALVES
- A. Up To and Including 3 inches:
  - 1. MSS SP-80, Class 150, bronze body, bronze trim, rising stem, hand
  - 2. wheel, inside screw, solid wedge disc, solder ends.

Part 2. PART 3 – EXECUTION

3.01 EXAMINATION
- A. Verify excavations are to required grade, dry, and not over-excavate

3.02 PREPARATION
- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.

3.03 INSTALLATION
- A. Furnish materials in accordance with City of San Jose Public Work's standards.
- B. Install non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with other trades.
- H. Establish elevations of buried piping to obtain not less than 2 ft of cover.
- I. Excavate and backfill in accordance with City of San Jose Public Work's standards.
- J. Install valves with stems upright or horizontal, not inverted.
- K. Sleeve pipes passing through partitions, walls and floors.
- L. Inserts:
  - 1. Provide inserts for placement in concrete forms.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- M. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9 ASTM F708 and MSS SP89.
  - 2. Support horizontal piping as schedule
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Provide copper plated hangers and supports for copper piping.
  - 7. Prime coat exposed steel hangers and supports.

8. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

N. Install potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, chiller feed lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.

O. Install water hammer arrestor complete with accessible isolation valve on cold water supply piping to lavatories.

P. Place pipe tracing conductor with buried non-metallic potable water pipes.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install valves for shut-off and to isolate equipment, part of systems, vertical risers, and batteries of fixtures.

3.05 ERECTION TOLERANCES

A. Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.06 CLEANING

A. Disinfecting of Domestic Water

B. Prior to starting work, verify system is complete, flushed and clean.

C. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

D. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.

E. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.

F. Maintain disinfectant in system for 24 hours.

G. When final disinfectant residual tests less than 25 mg/L, repeat treatment.

H. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.

I. Take samples no sooner than 24 hours after flushing, from 2 outlets and from water entry, and analyze in accordance with AWWA C651.

J. Provide disinfection report

END OF SECTION

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Section 26 05 10

General Electrical Requirements

Part 1. General

1.01 Description of Work

A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations that are shown on the Drawings, included in these specifications, or otherwise needed for a complete and fully operating facility.

B. Furnish and install all required in-place equipment, conduits, conductors, cables and any miscellaneous materials for the satisfactory interconnection and operation of all associated electrical systems.

1.02 Related Work

A. This Section provides the basic Electrical Requirements to all Sections of Division 26.

1.03 Submittals

A. Submit to the Architect shop drawings, manufacturer's data and certificates for equipment, materials and finish, and pertinent details for each system specified. Information to be submitted includes manufacturer's descriptive literature of cataloged products, equipment, drawings, diagrams, performance and characteristic curves as applicable, test data and catalog cuts. Obtain written approval before procurement, fabrication, or delivery of the items to the job site. Partial submittals are not acceptable and will be returned without review. Furnish manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable Federal, Industry and Technical Society Publication References, and years of satisfactory service of each item required to establish contact compliance. Photographs of existing installations and data submitted in lieu of catalog data are not acceptable and will be returned without approval.

B. Organize submittals for equipment and items related to each specification section together as a package.

C. Proposed substitutions of products will not be reviewed or approved prior to awarding of the Contract.

D. Substitutions shall be proven to the Architect or Engineer to be equal or superior to the specified product. Architect’s decision is final. The Contractor shall pay all costs incurred by the Architect and Engineer in reviewing and processing any proposed substitutions whether or not a proposed substitution is accepted.

E. If a proposed substitution is rejected, the contractor shall furnish the specified product at no increase in contract price.

F. If a proposed substitution is accepted, the contractor shall be completely responsible for all dimensional changes, electrical changes, or changes to other work which is a result of the substitution. The accepted substitution shall be made at no additional cost to the owner or design consultants.

1.04 Quality Assurance

A. Codes: All electrical equipment and materials, including installation and testing, shall conform to the latest editions following applicable codes:

1. California Electrical Code (CEC).

2. Occupational Safety and Health Act (OSHA) standards.

3. All applicable local codes, rules and regulations.

4. Electrical Contractor shall posses a C-10 license and all other licenses as may be required. Licenses shall be in effect at start of this contract and be maintained throughout the duration of this contract.

B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply.

C. Standards: Equipment shall conform to applicable standards of American National Standards Institute (ANSI), Electronics Industries Association (EIA), Institute of Electrical and Electronics Engineers (IEEE), and National Electrical Manufacturers Association (NEMA).

D. Underwriter Laboratories (UL) listing is required for all equipment and materials where such listing is offered by the Underwriters Laboratories. Provide service entrance labels for all equipment required by the NEC to have such labels.

E. The electrical contractor shall guarantee all work and materials installed under this contract for a period of one (1) year from date of acceptance by owner.

F. All work and materials covered by this specification shall be subject to inspection at any and all times by representatives of the owner. Work shall not be closed in or covered before inspection and approval by the owner or his representative. Any material found not conforming with these specifications shall, within 3 days after being notified by the owner, be removed from premises; if said material has been installed, entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the contractor.

1.05 Drawings

A. Drawings: The electrical Drawings shall govern the general layout of the completed construction.

1. Locations of equipment, panels, pullboxes, conduits, stub-ups, ground connections are approximate unless dimensioned; verify locations with the Architect prior to installation.

2. Review the Drawings and Specification Divisions of other trades and perform the electrical work that will be required for those installations.

3. Should there be a need to deviate from the Electrical Drawings and Specifications, submit written details and reasons for all changes to the Architect for approval.

4. The general arrangement and location of existing conduits, piping, apparatus, etc., is approximate. The drawings and specifications are for the assistance and guidance of the contractor, exact locations, distances and elevations are governed by actual field conditions. Accuracy of data given herein and on the drawings is not guaranteed. Minor changes may be necessary to accommodate work. The contractor is responsible for verifying existing conditions. Should it be necessary to deviate from the design due to interference with existing conditions or work in progress, claims for additional compensation shall be limited to those for work required by unforeseen conditions as determined by the Architect.

5. All drawings and divisions of these specifications shall be considered as whole. This contractor shall report any apparent discrepancies to the Architect prior to submitting bids.

6. The contractor shall be held responsible to have examined the site and compared it with the specifications and plans and to have satisfied himself as to the conditions under which the work is to be performed. He shall be held responsible for knowledge of all existing conditions whether or not accurately described. No subsequent allowance shall be made for any extra expense due to failure to make such examination.

1.06 Closeout Submittals

A. Manuals: Furnish manuals for equipment where manuals are specified in the equipment specifications.

1.07 Coordination

A. Coordinate the electrical work with the other trades, code authorities, utilities and the Architect.

B. Provide and install all trenching, backfilling, conduit, pull boxes, splice boxes, etc. for all Utility Company services to the locations indicated on the Drawings. All materials and construction shall be in accordance with the requirements for all the Utility Companies. Prior to performing any work, the Electrical Contractor shall coordinate with the various Utility Companies to verify that all such work and materials shown on the Drawings are of sufficient sizes and correctly located to provide services on the site. The Electrical Contractor shall verify with all the Utility Companies that additional contractor furnished and installed work is not required. If additional work, materials, or changes are required by any of the Utility Companies, the Electrical Contractor shall advise the Architect of such changes and no further work shall then be performed until instructed to do so by the Architect.

C. Utility Company charges shall be paid by the Owner.

D. Contractor shall pay all inspection and other applicable fees and procure all permits necessary for the completion of this work.

D. Where connections must be made to existing installations, properly schedule all the required work, including the power shutdown periods.

E. When two trades join together in an area, make certain that no electrical work is omitted.

1.08 Job Conditions

A. Operations:

1. Keep the number and duration of power shutdown periods to a minimum.

2. Show all proposed shutdowns and their expected duration on the construction schedule. Schedule and carry out shutdowns so as to cause the least disruption to operation of the Owner's facilities.

3. Carry out shutdown only after the schedule has been approved, in writing, by the owner. Submit power interruption schedule 15 days prior to date of interruption.

B. Construction Power: Contractor shall make all arrangements and provide all necessary facilities for temporary construction power from the owner’s on site source. Energy costs shall be paid for by the Owner

C. Storage: Provide adequate storage for all equipment and materials which will become part of the completed facility so that it is protected from weather, dust, water, or construction operations.

1.09 Damaged Products

A. Notify the Architect in writing in the event that any equipment or material is damaged. Obtain approval from the Architect before making repairs to damaged products.

1.10 Locations

A. General: Use equipment, materials and wiring methods suitable for the types of locations in which they are located.

B. Dry Locations: All those indoor areas which do not fall within the definition below for Wet Locations and which are not otherwise designated on the Drawings.

C. Wet Locations: All locations exposed to the weather, whether under a roof or not, unless otherwise designated on the Drawings.

1.11 Safety and Indemnity

A. The Contractor is solely and completely responsible for conditions of the job site including safety of all persons and property during performance of the work. This requirement will apply continually and not be limited to normal working hours. The contractor shall provide and maintain throughout the work site proper safeguards including, but not limited to,

enclosures, barriers, warning signs, lights, etc. to prevent accidental injury to people or damage to property.

B. No act, service, drawing review or construction review by the Owner, the Engineer or their Consultants is intended to include reviews of the adequacy of the Contractors safety measures in or near the construction site.

C. The Contractor performing work under this Division of the Specifications shall hold harmless, indemnify, and defend the Owner, the Engineer, their consultants, and each of their officers, agents and employees from any and all liability claims, losses, or damage arising out of or alleged to arise from bodily injury, sickness, or death of a person or persons and for all damages arising out of injury to or destruction of property arising directly or indirectly out of or in connection with the performance of the work under this Division of the Specifications, and from the Contractor's negligence in the performance of the work described in the construction contract documents, but not including liability that may be due to the sole negligence of the Owner, the Engineer, their Consultants or their officers, agents and employees.

D. The project work area does not contain asbestos materials. However, if a work area is encountered that does contain asbestos materials, the contractor is advised to coordinate with the owner and it's asbestos abatement consultant all measures necessary to provide installation of conduit, and hangers. All asbestos containing materials related work shall conform to the directions given by the owner. Nothing herein shall be construed to create a liability for American Consulting Engineers regarding asbestos abatement measures.

1.12 Access Panels and Doors

A. The Contractor shall install access panels as required where floors, walls or ceilings must be penetrated for access to electrical, control, fire alarm or other specified electrical devices. The minimum size panel shall be 14” x 14” in usable opening. Where access by a service person is required, minimum usable opening shall be 18” x 24”.

B. All access doors installed lower than 7’-0” above finished floor and exposed to public access shall have keyed locks.

C. Where specific information or details relating to access panels differ from these specifications, shown on drawings and or details or on other Divisions of work, these requirements shall supersede these specifications.

D. Approved Manufacturers: Subject to compliance with requirements under Architectural Specifications, Milcor, Karp, Nystrom or Cesco.

1. Milcor Style K (plaster)

2. Milcor Style DW (gypsum board)

3. Milcor Style M (masonry)

4. Milcor Style “Fire Rated” where required.

Part 2. Products

2.01 Standard of Quality

A. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality and do not prohibit the use of equal products of other manufacturers provided they are approved by the Architect prior to installation.

B. Material and Equipment: Provide materials and equipment that are new and are current products of manufacturers regularly engaged in the production of such products. The standard products shall have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period includes use of equipment and materials of similar size under similar circumstances. For uniformity, only one manufacturer will be accepted for each type of product.

C. Service Support: Submit a certified list of qualified permanent service organizations including their addresses and qualification for support of the equipment. These service organizations shall be convenient to the equipment installation and able to render service to the equipment on a regular and emergency basis during the warranty period of the contract.

D. Manufacturer's Recommendations: Where installation procedures are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendation shall be cause for rejection of the equipment or material.

2.02 Nameplates

A. For each piece of electrical equipment, provide a manufacturer's nameplate showing his name, location, the pertinent ratings, the model designation, and shop order number.

B. Identify each piece of equipment and related controls with a rigid laminated engraved plastic nameplate. Unless otherwise noted, nameplates shall be melamine plastic 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 0.5 by 2.5 inches unless otherwise noted. Where not otherwise specified, lettering shall be a minimum of 0.25 inch high normal block style. Engrave nameplates with the inscriptions indicated on the Drawings and, if not so indicated, with the equipment name. Securely fasten nameplates in place using two stainless steel or brass screws.

2.03 Fasteners

A. Fasteners for securing equipment to walls, floors and the like shall be either hot-dip galvanized after fabrication or stainless steel.

2.04 Finish Requirements

A. Equipment: Refer to each electrical equipment section of these Specifications for painting requirements of equipment enclosures. Repair any final paint finish which has been damaged or is otherwise unsatisfactory, to the satisfaction of the Architect.

B. Wiring System: In finished areas, paint all exposed conduits, boxes and fittings to match the color of the surface to which they are affixed.

Part 3. Execution

3.01 Workmanship

A. Ensure that all equipment and materials fit properly in their installation.

B. Perform any required work to correct improperly fit installation at no additional expense to the owner.

C. All electrical equipment and materials shall be installed in a neat and workmanship manner in accordance with the NECA Standard of Installation Manual and Workmanship of the entire job shall be first class in every respect.

3.02 Equipment Installations

A. Provide the required inserts, bolts and anchors, and securely attach all equipment and materials to their supports.

B. Do all the cutting and patching necessary for the proper installation of work and repair any damage done.

C. Earthquake restraints: all electrical equipment, including conduits over 2 inches in diameter, shall be braced or anchored to resist a horizontal force acting in any direction as per Title 24, part 2, table 16a-o, part 3.

D. Structural work: All core drilling, bolt anchor insertion, or cutting of existing structural concrete shall be approved by a California registered structural consulting engineer prior to the execution of any construction. At all floor slabs and structural concrete walls to be drilled, cut or bolt anchors inserted, the contractor shall find and mark all reinforcing in both faces located by means of x-ray, pach-ometer, or prof-ometer. Submit sketch showing location of rebar and proposed cuts, cores, or bolt anchor locations for approval.

3.03 Field Tests

A. Test shall be in accordance with Acceptance testing specifications issued by the National Electrical Testing Association (NETA).

B. Perform equipment field tests and adjustments. Properly calibrate, adjust and operationally check all circuits and components, and demonstrate as ready for service. Make additional calibration and adjustments if it is determined later that the initial adjustments are not satisfactory for proper performance. Perform equipment field test for equipment where equipment field tests are specified in the equipment Specifications. Give sufficient notice to the Architect prior to any test so that the tests may witnessed.

C. Provide instruments, other equipment and material required for the tests. These shall be of the type designed for the type of tests to be performed. Test instrument shall be calibrated by a recognized testing laboratory within three months prior to performing tests.

D. Operational Tests: Operationally test all circuits to demonstrate that the circuits and equipment have been properly installed and adjusted and are ready for full-time service. Demonstrate the proper functioning of circuits in all modes of operation, including alarm conditions.

E. Re-testing will be required for all unsatisfactory tests after the equipment or system has been repaired. Re-test all related equipment and systems if required by the Architect. Repair and re-test equipment and systems which have been satisfactorily tested but later fail, until satisfactory performance is obtained.

F. Maintain records of each test and submit five copies to the Architect when testing is complete. All tests shall be witnessed by the Architect. These records shall include:

1. Name of equipment tested.
2. Date of report.
3. Date of test.
4. Description of test setup.
5. Identification and rating of test equipment.
6. Test results and data.
7. Name of person performing test.
8. Owner or Architect's initials.

G. Items requiring testing shall be as noted in the additional electrical sections of these specifications.

3.04 Cleaning Equipment

A. Thoroughly clean all soiled surfaces of installed equipment and materials.

3.05 Painting of Equipment

A. Factory Applied: Electrical equipment shall have factory applied painting system which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test and the additional requirements specified in the technical section.

B. Field Applied: Paint electrical equipment as required to match finish of adjacent surfaces.

3.06 Records

A. Maintain one copy of the contract Drawing Sheets on the site of the work for recording the "as built" condition. After completion of the work, the Contractor shall carefully mark the work as actually constructed, revising, deleting and adding to the Drawing Sheets as required. The following requirements shall be complied with:

1. Cable Size and Type: Provide the size and type of each cable installed on project.

2. Substructure: Where the location of all underground conduits, pull boxes, stub ups and etc. where are found to different than shown, carefully mark the correct location on the Drawings. Work shall be dimensioned from existing improvements.

3. Size of all conduit runs.

4. Routes of concealed conduit runs and conduit runs below grade.

5. Homerun points of all branch circuit.

6. Location of all switchgear, panels, MCC, lighting control panels, pullcans, etc.

7. Changes made as a result of all approved change orders, addendums, or field authorized revisions.

8. As Builts: At the completion of the Work the Contractor shall review, certify, correct and turn over the marked up Drawings to the Architect for his use in preparing "as built" plans.

9. As built Drawings shall be delivered to the Architect within ten (10) days of completion of construction.

3.07 Clean Up

A. Upon completion of electrical work, remove all surplus materials, rubbish, and debris that accumulated during the construction work. Leave the entire area neat, clean, and acceptable to the Architect.

3.08 Mechanical and Plumbing Electrical Work

A. The requirements for electrical power and/or devices for all mechanical and plumbing equipment supplied and/or installed under this Contract shall be coordinated and verified with the following:

1. Mechanical and Plumbing Drawings.

2. Mechanical and Plumbing sections of these Specifications.

3. Manufacturers of the Mechanical and Plumbing equipment supplied.

B. The coordination and verification shall include the voltage, ampacity, phase, location and type of disconnect, control, and connection required. Any changes that are required as a result of this coordination and verification shall be a part of this Contract.

C. The Electrical Contractor shall furnish and install the following for all mechanical and plumbing equipment:

1. Line voltage conduit and wiring.

2. Disconnect switches.

3. Manual line voltage controls.

D. Automatic line voltage controls and magnetic starters unless otherwise noted, shall be furnished by the Mechanical and/or Plumbing Contractor and installed and connected by the Electrical Contractor. All line voltage control wiring installed by the Electrical Contractor shall be done per directions from the Mechanical and/or Plumbing Contractor.

E. All low voltage control wiring for Mechanical and Plumbing equipment shall be installed in conduit. Furnishing, installation and connection of all low voltage conduits, boxes, wiring and controls shall be by the Mechanical and/or Plumbing Contractor.

F. Manual motor starters, where required, shall have toggle type operators with pilot light and melting alloy type overload relays, SQUARE D COMPANY, Class 2510, Type FG-1P (surface) or Type FS-1P (flush) or ITE, WESTINGHOUSE or GENERAL ELECTRIC equal.

3.09 Access Doors

A. The Electrical Contractor shall furnish and install access doors wherever required whether shown or not for easy maintenance of electrical systems: As an example, fire alarm devices, controls, junction boxes, etc. Access doors shall provide for complete access to equipment for both removal and replacement of equipment.

End of Section

Section 26 05 19

Low Voltage Wire and Cable

Part 1. General

1.01 Description of Work

A. The work of this Section consists of providing all wire and cable rated 600 volts or less, including splices and terminations, as shown on the Drawings and as described herein.

1.02 Related Work

A. See the following Specification Section for work related to the work in this Section:

1. 26 05 33 Conduits, Raceways and Fittings.

2. 26 05 34 Junction and Pull Boxes.

1.03 Submittals

A. Submit complete material list with the manufacturer's specifications and published descriptive literature for all materials proposed for use.

1.04 Quality Assurance

A. Field tests shall be performed as specified in paragraph 3.04 of this Section.

Part 2. Products

2.01 Conductors

A. Conductors shall be copper, type THHN/THWN/MTW oil and gasoline resistant, 600 volt rated insullation.Minimum power and control wire size shall be No. 12 AWG unless otherwise noted.

B. Conductors shall be stranded except that sizes #10 and smaller for receptacle circuits shall be solid and of the sizes indicated.

C. Minimum power and control wire size shall be No. 12 AWG unless otherwise noted.

D. All conductors used on this Project shall be of the same type and conductor material

2.02 Cables

A. All individual conductors shall be copper with type THHN/THWN, 600 volt rated insulation.

B. Insulation Marking - All insulated conductors shall be identified with printing colored to contrast with the insulation color.

C. Color Coding - As specified in paragraph 3.03.

D. Special Wiring - Where special wiring is proposed by an equipment manufacturer, submit the special wiring requirements to the Owner's Representative and, if approved, provide same. Special wire shall be the type required by the equipment manufacturer.

E. Other Wiring - Wire or cable not specifically shown on the Drawings or specified, but required, shall be of the type and size required for the application and as approved by the Owner's Representative.

F. Manufacturer - Acceptable manufacturers including Cablec, Southwire, or equal.

2.03 Terminations

A. Manufacturer - Terminals as manufactured by T&B, Burndy or equal.

B. Cable Termination for Copper - Crimp style two hole NEMA spade terminals designed and rated for copper cable.

C. Wire Terminations - Crimp on ring-tongue terminals, insulated sleeve, of proper size for the wire used.

D. End Seals - Heat shrink plastic caps of proper size for the wire on which used.

2.04 Tape

A. Tape used for terminations and cable marking shall be compatible with the insulation and jacket of the cable and shall be of plastic material.

Part 3. Execution

3.01 Cable Installation

A. Clean Raceways - Clean all raceways prior to installation of cables as specified in Section 26 05 33 - Conduits Raceway and Fittings.

B. Cable Pulling - Exercise care in pulling wires and cables into conduit or wireways so as to avoid kinking, putting undue stress on the cables or otherwise abrading them. No grease will be permitted in pulling cables. Only soapstone, talc, or UL listed pulling compound will be permitted. The raceway construction shall be complete and protected from the weather before cable is pulled into it. Swab conduits before installing cables and exercise care in pulling, to avoid damage to conductors.

C. Bending Radius - Cable bending radius shall be per applicable code. Install feeder cables in one continuous length.

D. Equipment Grounding Conductors - Provide an equipment grounding conductor, whether or not it is shown on the Drawings, in all conduits or all raceways.

E. Panelboard Wiring - In panels, bundle incoming wire and cables which are No. 6 AWG and smaller, lace at intervals not greater than 6 inches, neatly spread into trees and connect to their respective terminals. Allow sufficient slack in cables for alterations in terminal connections. Perform lacing with plastic cable ties or linen lacing twine. Where plastic panel wiring duct is provided for cable runs, lacing is not necessary when the cable is properly installed in the duct.

F. Provide #10awg conductors for all 20 amp 120v branch circuits over 100 feet.

3.02 Cable Terminations and Splices

A. Splices - UL Listed wirenuts.

B. Terminations - Shall comply with the following:

1. Make up and form cable and orient terminals to minimize cable strain and stress on device being terminated on.

2. Burnish oxide from conductor prior to inserting in oxide breaking compound filled terminal.

3.03 Circuit and Conductor Identification

A. Color Coding - Provide color coding for all circuit conductors. Insulation color shall be white for neutrals and green for grounding conductors. Ungrounded conductor colors shall be as follows:

VOLTAGE	208/120V	480/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Grey
Ground	Green	Green

B. Color coding shall be in the conductor insulation for all conductors #10 AWG and smaller; for larger conductors, color shall be either in the insulation or in colored plastic tape applied at every location where the conductor is readily accessible.

C. Circuit Identification - All underground distribution and service circuits shall be provided with plastic identification tags in each secondary box and at each termination. Tags shall identify the source transformer of the circuit and the building number(s) serviced by the circuit.

3.04 Field Tests

A. All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects, and shall show an insulation resistance between phase conductors and ground of not less than the requirements of the CEC. All circuits shall be tested for proper neutral connections.

End of Section

Section 26 05 26

Grounding

Part 1. General

1.01 Description of Work

A. The work of this section consists of furnishing, installing, connection and testing of all grounding systems as specified herein and as shown on the Drawings.

1.02 Related Work

A. See the following specification sections for work related to work in this section.

1. Section 26 05 10 - Electrical General Requirements.

2. Section 26 05 19 - Low Voltage Wire and Cable

1.03 Submittals: In accordance with Section 26 05 10 Submittals.

A. Submit manufacturer's literature for review.

1.04 Standards and Codes

A. American Society for Testing and Materials (ASTM) Publication:

1. B8-1986, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

2. B228-1988, Copper Clad Steel Conductors Specification.

B. The latest editions following applicable codes:

1. California Electrical Code (CEC).

2. Occupational Safety and Health Act (OSHA) standards.

3. All applicable local codes, rules and regulations.

1.05 Quality Assurance

A. Each and every concealed connection must be inspected by the Owner's Representative before it is covered up by the Contractor.

Part 2. Products

2.01 General

A. The grounding system shall consist of the grounding conductors, ground bus, ground fittings and clamps, and bonding conductors as shown on the Drawings and as required by codes and local authorities.

2.02 System Components

A. Ground Rods: Ground rods shall be cone pointed copper clad Grade 40 HS steel rods conforming to ASTM B228. The welded copper encased steel rod shall have a conductivity of not less than 27% of pure copper. Rods shall be not less than 3/4-inch in diameter and ten feet long, unless otherwise indicated. Rods longer than ten feet shall be make up of ten foot units joined together with threaded couplings. The manufacturer's trademark shall be stamped near the top.

B. Ground Conductors: Buried conductors shall be medium-hard drawn bare copper; other conductors shall be soft drawn copper. Sizes over No. 6 AWG shall be stranded conforming to ASTM B8. In all conduit runs, a green insulated copper ground wire, sized to comply with codes, shall be installed.

C. Ground Connections: Exposed ground connections shall be high copper alloy bolted pressure types or exothermically welded type as notes. Buried connections shall be either exothermically welded type or approved compression types for connection of copper to copper or copper to steel, as required. Lug for attachment of cables to steel enclosures shall be of the binding post type with a 1/2-13NC stud. Each post shall accommodate cables from #4 AWG to #2/0 AWG.

D. Ground Rod Boxes: Boxes shall be nine-inch diameter precast concrete units with cast iron traffic covers. Units shall be 12 inches deep. Covers shall be embossed with the wording "Ground Rod".

E. Ground Bus: 2” x 1/4” x (length as specified on drawings) copper busbar. Provide isolation stand off bushings. Provide drilled and tapped 3/8” diameter holes on 2 foot centers. Provide “ALCU” lugs and bronze bolts. Connect busbar to main grounding system and bond to metallic domestic cold water pipe with #8 ground conductor.

Part 3. Execution

3.01 Installation

A. Ground all equipment, including, but not limited to, panel boards, terminal cabinets and outlet boxes, for which a ground connection is required per the NEC, even though not specifically shown on the Drawings.

B. The ground pole of receptacles shall be connected to their outlet boxes by means of a copper ground wire connecting to a screw in the back of the box.

C. Provide a ground rod box for each ground rod so as to permit ready access for the connection and/or removal of any pressure connectors to facilitate testing.

D. Where ground rods must be driven to depths over ten feet, increase rod diameter used, sufficiently to prevent the rod from bending or being damaged.

E. Make embedded or buried ground connections, taps and splices with exothermically welded connections or approved compression type connectors.

F. Make connections of grounding conductors to equipment ground buses and enclosures using binding post type connectors.

G. Effectively bond structural steel for buildings to the grounding system, "UFER" ground.

H. Install a ground rod in each primary handhole. Connect the ground conductor installed for each primary duct bank to the ground rod in each handhole. Bond metal conduits to handhole ground rod.

3.02 Testing

A. Conduct ground resistance tests using a ground resistance tester with a scale reading of 25 ohms maximum.

B. Test methods shall conform to IEEE Standard 81 using the three electrode method. Conduct test only after a period of not less than 48 hours of dry weather.

C. Take resistance readings for each ground rod individually and for each system as a whole without benefit of chemical treatment or other artificial means. Ground resistance readings shall not exceed 25 ohms. If readings are not to the Contracting Officer's approval, provide lengthened or additional ground rods (maximum of two additional rods).

D. Furnish to the Owner's Representative a test report with recorded data of each ground rod location and each system.

End of Section

Section 26 05 33

Conduits, Raceways and Fittings

Part 1. General

1.01 Description of Work

A. The work of this section consists of furnishing and installing conduits, raceways and fittings as shown on the Drawings and as described herein.

1.02 Related Work

A. See the following specification sections for work related to the work in this section:

1. 26 05 43 Underground Ducts.
2. 26 05 44 In Grade Pull Boxes
3. 26 05 19 Low Voltage Wire and Cable.
4. 26 05 34 Junction and Pull Boxes

1.03 Submittals

A. Catalog Data: Provide manufacturer's descriptive literature.
B. Single Submittal: A single complete submittal is required for all products by this Section.

Part 2. Products

2.01 Conduits, Raceways

A. Electrical Metallic Tubing (EMT) shall be hot-dip galvanized after fabrication. Couplings shall be compression or setscrew type.

B. Flexible Conduit: Flexible metal conduit shall be galvanized steel.

C. Galvanized Rigid Steel Conduit (GRS) shall be hot-dip galvanized after fabrication. Couplings shall be threaded type.

D. Rigid Non-metallic Conduit: Rigid non-metallic conduit shall be PVC Schedule 40 (PVC-40 or NEMA Type EPC-40) conduit approved for underground use and for use with 90°C wires.

E. The use of “MC Cable shall not be permitted without written approval.

2.02 Conduit Supports

A. Supports for individual conduits shall be galvanized malleable iron one-hole type with conduit back spacer.

B. Supports for multiple conduits shall be hot-dipped galvanized Unistrut or Superstrut channels, or approved equal. All associated hardware shall be hot-dip galvanized.

C. Supports for EMT conduits shall be galvanized pressed steel single hole straps.

D. Clamp fasteners shall be by wedge anchors. Shot in anchors shall not be allowed.

2.03 Fittings

A. Provide threaded-type couplings and connectors for rigid steel conduits. Provide compression (watertight) steel type (die-cast zinc or malleable iron type fittings not allowed), or setscrew type for EMT. Provide threaded couplings and Meyers hubs for rigid steel conduit exposed to weather.

B. Fittings for flexible conduit shall be Appleton, Chicago, IL, Type ST, O-Z Gedney Series 4Q by General Signal Corp., Terryville, CT, T & B 5300 series, or approved equal.

C. Fittings for use with rigid steel shall be galvanized steel or galvanized cast ferrous metal; access fittings shall have gasketed cast covers and be Crouse Hinds Condulets, Syracuse, NY, Appleton Unilets, Chicago, IL, or approved equal. Provide threaded-type couplings and connectors; setscrew type and compression-type are not acceptable.

D. Fittings for use with rigid non-metallic conduit shall be PVC and have solvent-weld-type conduit connections.

E. Union couplings for conduits shall be the Erickson type and shall be Appleton, Chicago, IL, Type EC, O-Z Gedney 3-piece Series 4 by General Signal Corp., Terryvile, CT, or approved equal. Threadless coupling shall not be used.

F. Bushings

1. Bushings shall be the insulated type.
2. Bushings for rigid steel shall be insulated grounding type, O-Z Gedney Type HBLG, Appleton Type GIB, or approved equal.

G. Conduit Sealants

1. Fire Retardant Types: Fire stop material shall be reusable, non-toxic, asbestos-free, expanding, putty type material with a 3-hour rating in accordance with UL Classification 35L4 or as specified on the Drawings.

Part 3. Execution

3.01 Conduit, Raceway and Fitting Installation

A. For conduit runs exposed to weather provide rigid metal (GRS).

B. For conduit run underground, in concrete or masonry block walls and under concrete slabs, install minimum ¾" size nonmetallic (PVC) with PVC elbows. Where conduits transition from underground or under slab to above grade install wrapped rigid metal (GRS) elbows and risers.

C. For conduit runs concealed in steel or wood framed walls or in ceiling spaces or exposed in interior spaces above six feet over the finished floor, install EMT.

D. Flexible metal conduit shall be used only for the connection of recessed lighting fixtures and motor connections unless otherwise noted on the Drawings. Liquid-tight steel flexible conduit shall be used for motor connections.

E. The minimum size raceway shall be 3/4-inch unless indicated otherwise on the Drawings.

F. Installation shall comply with the CEC.

G. From pull point to pull point, the sum of the angles of all of the bends and offset shall not exceed 270 degrees.

H. Conduit Supports: Properly support all conduits as required by the NEC. Run all conduits concealed except where otherwise shown on the drawings.

1. Exposed Conduits: Support exposed conduits within three feet of any equipment or device and at intervals not exceeding NEC requirements; wherever possible, group conduits together and support on common supports. Support exposed conduits fastened to the surface of the concrete structure by one-hole clamps, or with channels. Use conduit spacers with one-hole clamps.
   a. Conduits attached to walls or columns shall be as unobtrusive as possible and shall avoid windows. Run all exposed conduits parallel or at right angles to building lines.
   b. Group exposed conduits together. Arrange such conduits uniformly and neatly.
2. Support all conduits within three feet of any junction box, coupling, bind or fixture.
3. Support conduit risers in shafts with Unistrut Superstrut, or approved equal, channels and straps.

H. Moisture Seals: Provide in accordance with NEC paragraphs 230-8 and 300-5(g).

I. Where PVC conduit transitions from underground to above grade, provide rigid steel 90's with risers. Rigid steel shall be half-lap wrapped with 20-mil tape and extend minimum 12" above grade.

J. Provide a nylon pull cord in each empty raceway.

K. Provide galvanized rigid steel factory fittings for galvanized rigid steel conduit.

L. Slope all underground raceways to provide drainage; for example, slope conduit from equipment located inside a building to the pull box or manhole located outside the building.

M. Conduits shall be blown out and swabbed prior to pulling wires.

End of Section

Section 26 05 34

Junction and Pull Boxes

Part 1. General

1.01 Description of Work

A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations shown on the drawings, included in these Specification, or otherwise needed for a complete and fully operating facility. The work shall include but not be limited to the following:

B. Furnish and install all required material, supports and miscellaneous material for the satisfactory interconnection of all associated electrical systems.

1.02 Related Work

A. See the following specification sections for work related to the work of this section.

1. 26 05 10 General Electrical Requirements.

2. 26 05 33 Conduits, Raceway and Fittings.

3. 26 05 19 Low Voltage Wire and Cable.

1.03 Standards and Codes

A. Submit in accordance with the requirements of Section 26 05 10: Electrical General Provisions, the following items:

1. Pull boxes larger than 6"x 6"x 4".

Part 2. Products

2.01 Outlet boxes, Junction and Pull boxes

A. Standard Outlet Boxes: Galvanized, one-piece die formed or drawn steel, knock-out type of size and configuration best suited to the application indicated on the Drawings. Minimum box size shall be 4 inches square by 1-1/2 inches deep with mud rings as required.

B. Switch boxes: Minimum box size shall be 4 inches square by 1-1/2 inches deep with mud rings as required. Install multiple switches in standard gang boxes with raised device covers suitable for the application indicated.

C. Conduit bodies: Cadmium plated, cast iron alloy. Conduit bodies with threaded conduit hubs and neoprene gasketed, cast iron covers. Bodies shall be used to facilitate pulling of controls or to make changes in conduit direction only. Splices are not permitted in conduit bodies. Crouse-Hinds Form 8 Condulets, Appleton Form 35 Unilets or equal.

D. Sheet Metal Boxes: Use standard outlet or concrete ring boxes wherever possible; otherwise use a minimum 16 gauge galvanized sheet metal, NEMA I box sized to Code requirements with covers secured by cadmium plated machine screws located six inches on centers. Circle AW Products, Hoffman Engineering Company or equal.

E. Flush Mounted Pull boxes and Junction boxes: Provide overlapping covers with flush head cover retaining screws, prime coated.

Part 3. Execution

3.01 Outlet Boxes

A. General:

1. All outlet boxes shall finish flush with building walls, ceilings and floors except in mechanical and electrical rooms above accessible ceiling or where exposed work is called for on the Drawings.

2. Install raised device covers (plaster rings) on all switch and receptacle outlet boxes installed in masonry or stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.

3. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

B. Box Layout:

1. Outlet boxes shall be installed at the locations and elevations shown on the drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.

2. Locate switch outlet boxes on the latch side of doorways.

3. Outlet boxes shall not be installed back to back nor shall through-wall boxes be permitted.

4. For outlets mounted above counters, benches or backsplashes, coordinate location and mounting heights with built-in units. Adjust mounting height to agree with required location for equipment served.

C. Supports:

1. Outlet Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.

2. Fixture outlet boxes installed in suspended ceiling of gypsum board or lath and plaster construction shall be mounted to 16 gauge metal channel bars attached to main ceiling runners.

3. Fixture outlet boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above where pendant mounted lighting fixture are to be installed on the box.

4. Fixture Boxes above tile ceilings having exposed suspension systems shall be supported directly from the structure above.

5. Outlet and / or junction boxes shall not be supported by grid or fixture hanger wires at any locations.

3.02 Junction and Pull Boxes

A. General:

1. Install junction or pull boxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not shown on the Drawings.

2. Locate pull boxes and junction boxes in concealed locations above removable ceilings or exposed in electrical rooms, utility rooms or storage areas.

3. Install raised covers (plaster rings) on boxes in stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.

4. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

5. Identify circuit numbers and panel on cover of junction box with black marker pen.

B. Box Layouts:

1. Boxes above hung ceilings having concealed suspension systems shall be located adjacent to openings for removable recessed lighting fixtures.

C. Supports:

1. Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.

2. Boxes installed in suspended ceilings of gypsum board or lath and plaster construction shall be mounted to 16 gauge metal channel bars attached to main ceiling runners.

3. Boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above.

4. Boxes mounted above suspended acoustical tile ceilings having exposed suspension systems shall be supported directly from the structure above.

End of Section

Section 26 05 43

Underground Ducts

Part 1. General

1.01 Description of Work:

A. The work of this section consists of furnishing and installing raceways, raceway spacers and encasing material with necessary excavation for underground ducts.

B. Encasement - Encasement shall be sand for all other raceways.

C. Where required - All raceways, where run underground in and excavation shall be installed in compliance with the requirements of this Section. Conduits run underground without encasement shall be as indicated in the Drawings.

1.02 Related Work:

A. See the following specification sections for work related to the work of this section.
1. 26 05 33 Conduit Raceway and Fittings

1.03 Standards and Codes:

A. Work and material shall be in compliance with and according to the requirements of the latest revision of the following standards and codes.

B. National Fire Protection Association (NFPA), National Electrical Code (NEC) - Latest Revision:
1. Underground Installations NEC - Article 300
2. Rigid Nonmetallic Conduit NEC - Article 347

C. California Electrical Code (CEC).

D. Construction of Underground Electric Supply and Communication Systems, State of California Public Utilities Commission, General Order No. 128.

1.04 Submittals:

A. As specified in Section 26 05 10.

B. Catalog Data: Provide manufacturer's descriptive literature.

C. Single Submittal: A single complete submittal is required for all products covered by this Section.

Part 2. Products

2.01 Raceways:

A. As specified in Section 26 05 33 Conduits, Raceways and Fittings.

2.02 Spacers:

A. Molded plastic as furnished by the raceway manufacturer, to cradle and position the raceways in the excavation for placing the encasement.

B. Shape to accurately fit the raceway, provide the correct raceway spacing, to interlock in place and stack.

Part 3 Execution

3.01 Excavation:

A. As specified in Section 31 23 00, Excavation and Backfill and as required for the work shown on the Drawings.

3.02 Raceway:

A. Install raceways in spacers. Spacers installed at intervals of five feet and within one inch each side of all bends and joints.

B. Solvent weld connections.

3.03 Sand Encasement:

A. As shown on drawings and specified in Section 31 23 00 - Excavation and Backfill.

3.04 Backfill:

A. As shown on drawings and specified in Section 31 23 00 - Excavation and Backfill.

End of Section

Section 26 05 44

In Grade Pull Boxes

Part 1. General

1.01 Description of Work:

A. The work of this section consists of providing all labor, supervision, tools, materials, and performing all work necessary to furnish and install pre-cast concrete vaults, and pull boxes with necessary excavation.

1.02 Related Work:

A. See the following specification sections for work related to the work of this section.
   1. 26 05 43 Underground Ducts.

1.03 Standards and Codes:

A. Work and material shall be in compliance with and according to the requirements of the latest revision of the following standards and codes.
   1. National Fire Protection Association (NFPA), National Electrical Code (NEC) - Latest Revision.
   2. California Electrical Code (CEC).
   3. American Society for Testing and Materials (ASTM):
      a. A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.
      b. A 615 - Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
      c. C 33 - Concrete Aggregates.
      d. C 478 - Pre-cast Reinforced Concrete Vault Sections, Specification for.

1.04 Submittals:

A. Catalog Data: Provide manufacturer's descriptive literature.

B. Single Submittal: A single complete submittal is required for all products covered by this Section.

Part 2. Products

2.01 Materials and Equipment:

A. General Requirements:

1. Concrete vaults and pull boxes for electrical power, controls and other communication circuits shall consist of pre-cast reinforced concrete boxes, extensions' bases, and covers as specified herein and as indicated on the Drawings. Pre-cast units shall be the product of a manufacturer regularly engaged in the manufacture of pre-cast vaults and

pull boxes. Acceptable manufacturers are Christy, Utility Vault, Brooks, Associated Concrete or equal.

B. Construction:

1. Pre-cast concrete vaults and pull boxes for electrical power distribution and communication circuits with associated risers and tops shall conform to ASTM C478 and ACI 318. Vaults and pull boxes shall be the type noted on the Drawings and shall be constructed in accordance with the applicable details as shown. Tops, walls and bottoms shall consist of reinforced concrete. Walls and bottom shall be of monolithic concrete construction. Duct entrances and windows shall be located near the corners of structures to facilitate cable racking. Provide all necessary lugs, rabbets, and brackets. Set pulling-in irons and other built-in items in place prior to pouring concrete. A pulling-in iron shall be installed in the wall opposite each duct entrance. All steel other than "rebar" shall be hot dipped galvanized after fabrication.

C. Cable Racks:

1. Vaults shall be provided with galvanized cable racks, including rack arms and insulators, and shall be adequate to accommodate the indicated cables; porcelain insulators shall be provided for electrical vaults only.

D. Covers:
1. The word "ELECTRICAL" shall be cast in the top face of all electrical power vault and cable boxes.
2. The words "FIRE ALARM" shall be cast in the top face of all fire alarm vault and cable boxes.
3. The word "SIGNAL" shall be cast in the top face of all telecom, intercom, CATV, data, EMS, security and/or clock vault and cable boxes.

E. Sumps:

1. Where indicated on the drawings, drain sumps shall be provided.

F. Concrete:

1. Aggregates used in the concrete mix, either coarse or fine, excluding light weight aggregates, shall conform to ASTM C 33. Aggregates shall be properly graded and free of deleterious substances to produce a homogeneous concrete mix when blended with cement.

G. Cement:

1. The cement shall be Type II low alkali Portland cement and shall meet the requirement of ASTM C 150.

H. Compressive Strength:

1. Sufficient cement content shall be used per batch to produce a minimum compressive strength of 3,000 psi at 28 days.

I. Reinforcing Steel:
1. Welded wire mesh for street lighting boxes shall conform to ASTM A 185.

2. Reinforcing bars for primary and secondary electrical vaults and pull boxed, and communication vaults and pull boxes shall be intermediate grade billet steel conforming to ASTM A 615.

J. Ladders:

1. Ladders for vaults shall be sized as required, stationary galvanized steel.

Part 3. Execution

3.01 Installation:

A. Pre-cast vaults and pull boxes shall be installed approximately where indicated on the Drawings. The exact location of each vault or pull box shall be determined after careful consideration has been given to the location of other utilities, grading, and paving. All vaults, cable boxes and secondary pull boxes shall be installed with a minimum of 6-inch thick crushed rock or sand bedding.

B. Paved areas:

1. Vaults and pull boxes located in areas to be paved shall be installed such that the top of the cover shall be flush with the finished surface of the paving.

C. Unpaved Areas:

1. In unpaved areas, the top of vaults and pull box covers shall be approximately 2 inches above finished grade.

D. Joint Seals:

1. Section joints of pre-cast vaults and pull boxes shall be sealed with compound as recommended by the manufacturer.

E. Trenching, Backfilling, and Compaction:

1. Trenching, backfilling and compaction shall be as specified in Section 31 23 00 - Excavation and Backfill.

F. Grounding:

1. Ground rods an associated copper ground loop shall be installed in all vaults. Ground loop shall be properly connected to the cable shielding, at each cable joint or splice by means of a minimum number 4 AWG or equivalent braided tinned copper wire. Ground rods shall be protected with a double wrapping of pressure-sensitive plastic tape for a distance of two inches above and six inches below concrete penetrations. Ground wires shall be neatly and firmly attached to vault cable support racks.

End of Section

Section 26 28 16

Circuit Breakers

Part 1. General

1.01 Description of Work

A. The work of this Section consists of providing circuit breakers as shown on the Drawings and as described herein.

1.02 Related Work: See the following Specification Sections for work related to the work in this Section.

A. 26 05 10 General Electrical Requirements

B. 26 24 13 Switchboards

C. 26 24 16 Panelboards and Distribution Panels

1.03 Submittals

A. Shop Drawings - Each circuit breaker furnished under this Contract, submit manufacturer's name, catalog data, and the following information:

1. Terminal connection sizes.

2. Voltage rating.

3. Breaker manufacturer, types, trip ratings and interrupting ratings.

B. Single Submittal - A single complete submittal is required for all products covered by this Section.

C. Closeout Submittals: Submit in Section 26 05 10, operation and maintenance data for circuit breakers including nameplate data, parts lists, manufacturer's circuit breaker timer, current, coordination curves, factory and field test reports and recommended maintenance procedures.

1.04 Warranty

A. Manufacturer shall warrant specified equipment free from defects in materials and workmanship for the lesser of one (1) year from the date of installation of eighteen (18) months from the date of purchase.

Part 2. Products

2.01 Circuit Breaker: Each circuit breaker shall consist of the following

A. A molded case breaker with an over center toggle-type mechanism, providing quick-make, quick-break action. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Circuit breakers shall have variable magnetic trip elements which are set by a single adjustment to assure uniform tripping characteristics in each pole.

B. Breaker shall be calibrated for operation in an ambient temperature of 40°C.

C. Each circuit breaker shall have trip indication by handle position and shall be trip-free.

D. Three pole breakers shall be common trip.

E. The circuit breakers shall be constructed to accommodate the supply connection at either end of the circuit breaker. Circuit breaker shall be suitable for mounting and operation in any position.

F. Breakers shall be rated as shown on Drawings.

G. Series rating of circuit breakers shall not be allowed unless specifically noted on drawings. Breakers shall be UL listed. Circuit breakers shall have removable lugs.

H. Lugs shall be UL listed for copper and aluminum conductors.

I. Breakers shall be UL listed for installation of mechanical screw type lugs.

J. Circuit breakers serving HACR rated loads shall be HACR type. Circuit breakers serving other motor loads shall be motor rated.

K. Breakers indicated as “current limiting “ (CL), shall be of the non-fused type; Square D I-Limiter, Cutler Hammer Limit-R, or ITE Sentron only.

Part 3. Execution

3.01 Mounting

A. The highest breaker operating handle shall not be higher than 72 inches above the floor.

End of Section

SECTION 27 10 00

LOW VOLTAGE STRUCTED CABLING

PART 1. General

1.1 Description Of Work

A. The work to be performed under this Section consists of providing all wire and cables used for the data network including terminations as shown on the Drawings and as described herein. Systems included is Category 6 data station distribution. The intention of the data cabling is to provide a category 6 network that is capable of running at gigabit Ethernet speeds. The cabling, the terminations and the jacks used must meet these standards.

B. Furnishing, installing, and connecting all data outlets, complete with wall plates and/or covers, as shown on the Drawings or within this section.

C. Furnishing, installing, and connecting all data and low voltage equipment as specified within this section. Equipment includes but may not be limited to floor racks, wall equipment cabinets, wire management and fiber and category 6 patch panels

D. Final documentation submittal shall be provided in both hard and electronic copy.

1.2 Related Work

A. See the following specification sections for work related to the work of this section:

1. 26 05 10 General Electrical Requirements.

2. 26 05 33 Conduits, Raceways and Fittings.

1.3 Standards And Codes

A. Work and materials shall be in compliance with and according to the requirements of the latest revision of the following Standards and Codes:

1. National Electrical Manufacturers Association (NEMA):

2. WC 5-1973 (R1985), Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

3. WC7-1988, Cross-Linked-Thermosetting-Polyethylene, Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

4. National Fire Protection Association (NFPA), National Electrical Code (NEC) - Latest Revision.

5. California Electrical Code (CEC).

6. Underwriters Laboratories (UL):

a. 44-83 (R1988), Rubber-Insulated Wires and Cable.

b. 83-1983 (R1989), Thermoplastic-Insulated Wires and Cables.

c. 510-1986, Insulating Tape.

d. EIA/TIA-568, EIA/TIA TSB-36 and TSB-40

1.4 Submittals

A. In accordance with Section 26 05 10.

1. Within thirty-five (35) calendar days after the date of award of the contract, the contractor shall submit to the Architect for review, eight (8) copies of a complete submission. The submission shall consist of four (4) major sections, with each section separated with insertable index tabs. The first section shall be the "index", which shall include the project title and address, name of the firm submitting the proposal and the name of the Architect. Each page in the submission shall be numbered chronologically and shall be summarized in the index. The second section shall include a copy of the authorized distributor's valid C-10 California State Contractors License, letters of factory authorization and guaranteed service, list of projects of equal scope and list of proposed instrumentation to be used by the contractor. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications.

2. The manufacturer's representative shall provide a letter with submittals from the manufacturer of all major equipment stating that the manufacturer's representative is an authorized distributor.

3. In order to establish quality and standards of performance of equipment required by the Owner, the specified Data Systems is that of Panduit/Belden Integrity System. All mechanical, electrical and general information set forth on the respective data sheets for each specified item shall be considered as part of these Specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality. The Architect reserves the right to require a complete sample tested by an independent testing laboratory to prove equality. The decision of the Architect regarding equality of proposed equal items will be final.

4. Where specific make and models of equipment have been specified, the words “or equal” are understood to appear after the item specified. All parties understand that any substitution(s) of specified products are done for the purpose of cost savings to the Owner. Therefore, any material substitutions or deviations proposed by the Contractor shall be included with the initial bid and shall show a line item credit to the Owner for each item substituted in lieu of specified products.

5. Shop Drawings: Provide Shop drawings for the layout of the MDF room. The shop drawings should include the location of all racks and equipment and shall include elevations of the walls and racks. The shop drawings shall be provided to the architect, engineer and owner for review and approval prior to the installation of

the equipment in the MDF room. Shop drawings shall be approved by the Architect, Engineer and the District Technology Representative. Coordinate the shop drawings with the district Security representative, Fire Alarm Contractor and PA/Intercom Contractor.

1.5 Qualifications

A. The Contractor shall be from an established and locally run business, which has been operating and installing the specified products for a minimum of five years.

B. The Contractor shall be factory certified for installation of the product specified. Proof of certification shall be included in the submittal.

C. The contractor for this work shall have completed at least three- (3) similar size and complexity project experience. The contractor shall provide at least 50% of their technicians, having been trained by the manufacture, to perform all copper and fiber cable terminations.

D. The contractor shall be able to extend the manufacturer's warranties for this project directly to the end-user.

1.6 Quality Assurance

A. The data system shall carry the manufacturer's performance warranty for each cable link as defined by TIA/EIA-568A for a period of 15 years from the date of registration by the manufacture and extended directly to the school district. All active components shall extend their normal manufacture's warranty.

B. Field tests shall be performed as specified within this specification.

C. No splices will be permitted in feeder or drop cables. If splices are required the Contractor must designate desired location on system maps and obtain owners approval prior to any cable pulling on that run.

D. Where specific make and models of equipment have been specified, the words "or equal" are understood to appear after the item specified. If a bidder proposes to offer a substitution item, it is bidders responsibility, to prove that such an item is an equal and will meet the intent and requirements to the specifications. A detailed explanation as well as literature or other documentation shall be provided. In all cases the final decision as to acceptability of an alternate item will be made by the Owner. Unless otherwise noted, it is assumed that all equipment offered is exactly as specified.

1.07 Product Guarantee:

A. All structured cabling system must be installed per the following:

1. Meet all TIA/EIA commercial building wiring standards
2. Panduit categorized product must be used in conjunction with an Equivalent or higher Category UL or ETL verified cable.
3. Panduit Products must be installed per Panduit instruction sheets.
4. Belden products must be installed per Belden guidelines and in accordance with

TIA/EIA standards

Note: All Networks shall be installed per applicable standards and manufacturer's guidelines.

PART 2. PRODUCTS

2.1 Copper Conductors

A. Category 6 – Data station cables shall be Category 6, 4 Pair UTP 24 AWG solid bare copper in a PVC jacket. The Cable is CM-LS type and must be indoor/outdoor rated. The Cable is a high-speed, high performance, 100-ohm cable. It is capable of carrying high bit-rate signaling for extended distances in building distribution systems. The cable shall exceed the EIA/TIA-568A Commercial Building Wiring Standard for Category 6 cables. All cables used on this project shall be of the same type and conductor material. All cables are to be terminated to the appropriate RJ45 station jack or patch panel. All cables shall be numbered and labeled. Category 6 cables shall be as manufactured by Belden, Berk-Tek, Mohawk or Leviton.

B. Cable shall be routed in conduit or above T-bar ceiling through "J" hooks from outlet to patch panel.

2.2 Fiber Conductors:

A. Fiber Optic – Multimode Fiber Optic cables shall be 12 strands fiber loose tube style. Crush resistance rating shall be defined by EIA-455-41. Impact resistance shall be defined by EIA-455-25. Cable shall be UL listed for NEC compliance. Cable shall be glass type 62.5125 μm with maximum attenuation of 3.25/1.0 dB/km. Terminate multimode fiber optical cables using approved "SC" connectors. Twelve-strand fiber cable shall be Lucent Fitel Loose Tube type, Belden, Berk-Tek or Commscope. Fiber Optic cables routed underground inside conduit shall have the DryBlock water blocking tape. One 12 strand, multimode fiber optic cables with proper termination, service loops and installation in fiber management units at both ends is required between each IDF and the MDF.

B. Cables shall be installed in conduit between each IDF and the MDF fiber patch panels. Minimum bend shall not be less than 7.5 inches or fifteen times the cable diameter.

C. A service loop of at least 20 feet is to be coiled into every Christie box and labeled for all cables passing through a pull can. A service loop of 30 feet shall be provided at each termination end of the cable run. The service loop shall be left in a neat workmanship manner, secured appropriately with all bend radius specifications observed.

D. All Multimode fibers are to be field terminated to ST style connectors and connected to the Fiber patch panel.

2.3 Patch Panels

A. Giga-channel modular patch panel shall be 48 port. Patch panel shall match existing on site. Patch panels shall mount to existing standard IDF racks. At each IDF and the MDF provide proper quantity of Giga-channel patch panels with appropriate giga-channel mini-jacks to terminate all incoming data cables and 10% open connectors.

B. A horizontal wire manager as specified above shall follow each patch panel.

PART 3. Execution

3.1 Cable Installation

A. Clean Raceways - Clean all raceways prior to installation of cables as specified in Section 16110 - Conduits Raceway and Fittings.

B. All "J" hooks are to be placed with a maximum distance of 4 feet between hooks. Cable will be attached to hooks in such a way such as not to affect any electrical property of the cable.

C. Cable Pulling - Exercise care in pulling wires and cables into conduit or raceways so as to avoid kinking, putting undue stress on the cables or otherwise abrading them. No grease will be permitted in pulling cables. Only soapstone, talc, or UL listed pulling compound will be permitted. The raceway construction shall be complete and protected from the weather before cable is pulled into it. Swab conduits before installing cables and exercise care in pulling, to avoid damage to conductors.

D. Bending Radius - Cable bending radius shall be per applicable code and manufacturer recommendations. Install feeder cables in one continuous length.

E. All low voltage system conduit stub out and nipples shall have end bushing.

F. Examine areas and conditions under which LAN system is to be installed. Notify contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installed.

G. All backbone cable will be run through clean conduit with appropriately placed junction boxes.

H. All fiber backbones will be connected to patch points. All CATV drop and backbone cables will be connected to specified equipment including splitters to make a complete functioning system. All telephone cross connects from backbone 110 blocks to station cable 110 blocks will be done to district telephone systems supplier requirement. All voice cross connects from the feeder cables in the MDF to the PBX cross-connect field will be done by District personnel or their representative.

I. All data and telephone station cabling can be run in J-Hooks above accessible ceiling or in conduit in non-accessible space then through raceway running to their respective station outlet unless otherwise specified.

J. All cabling can be run in J-Hooks above accessible ceiling or in conduit in non-accessible space

3.2 Installation Of Wiring Devices

A. Mounting Heights: Measure locations of wall outlets from the finished floor to the center of the outlet box. Adjust boxes so that the front edge of the box shall not be farther back from the finished wall plane than 1/4-inch. Adjust boxes so that they do not project beyond the finished wall.

B. The MDF floor racks and wire management will be installed in the exact location specified in writing by the owner at the time of installation. The general location is shown in the drawings.

C. IDF equipment cabinets are to be mounted on 3/4" fire treated backboard at an exact location to be specified by the district. The general IDF locations are shown in the drawings.

D. All cables are to be terminated to panels installed as part of this section.

E. All patch points, CATV splitter outputs, telephone 110 blocks and station outlets are to be labeled to district specifications.

3.3 Testing

A. Test all station cables for continuity, polarity and pairing on all pairs.

B. All data cat-6 cables are to be tested for compliance with the latest 1000Tx network standard and EIA/TIA 568B performance parameters for 100Base Tx Ethernet using a hand held network scanner. Network analyzer is to be a Fluke DSP 4000 / 6000 or Penta scanner. The tester used must meet the standards of the manufacture for the cabling and termination connectors used. Hardcopy and softcopy results are to be provided for all jacks tested. Softcopy results to be provided on a Windows 98 compatible disk.

C. All multi-mode fiber optic strands are to be tested bi-directionally at both 850nm and 1300nm. Tests are to be performed using a power meter and light source or an OTDR to measure attenuation from coupler-to-coupler at the distribution panels. No strand is to exhibit more than 3.75 dB/km at 850nm, 1.5 dB/km at 1300nm. Fiber optic cables shall be tested prior to installation or the manufacture certification.

D. Any cables that fail to meet the stated test requirements are to be repaired/replaced by the contractor prior to acceptance by the Moreland School District.

End of Section

Section 31 10 00

Site Clearing

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing site utilities.
7. Temporary erosion and sedimentation control.

1.02 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at the Project Site.

1.03 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the Project Site.

1.04 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

PART 2 - PRODUCTS

2.01 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."
C. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control Drawings and requirements of authorities having jurisdiction.
B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
C. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.03 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."
B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.04 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
   1. Arrange with utility companies to shut off indicated utilities.
B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.
C. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.05 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
   1. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
   2. Use only hand methods or air spade for grubbing within protection zones.
B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding a loose depth of 6 inches, and compact each layer to a density equal to adjacent original ground.

3.06 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.
B. Strip topsoil to depth of 12 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.07 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

Section 32 12 20

Flexible Paving

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: All labor, materials, equipment, tools, accessories, transportation, and services as required for furnishing and installing Flexible Paving improvements as indicated on the Plans and these Specifications including, but not necessarily limited to:

1. Asphalt base course
2. Asphalt surface course
3. Asphalt concrete game courts
4. All prime, tack, and seal coats

1.02 PRICE AND PAYMENT PROCEDURES

A. Refer to Section 012000, Price and Payment Procedures.

1.03 REFERENCES

A. Definitions

1. Asphalt Surface Course: The top layer or lift of asphaltic concrete pavement.
2. Asphalt Base Course: The lift or lifts of asphaltic concrete pavement constructed on the aggregate base course or prepared subgrade and upon which the asphalt surface course is constructed. It shall not be the top lift of an asphalt pavement.
3. Aggregate Base Course: The layer of aggregate base constructed on a prepared subgrade and upon which asphaltic concrete is constructed.
4. Subgrade: The prepared soil upon which the pavement section as shown on the drawings is constructed. It is the foundation for the pavement structure.

B. **SECTION 39 - HOT MIX ASPHALT**

39-1 General. – Hot Mix Asphalt shall conform to 2010 Caltrans Standard Specifications and these Special Provisions.

39-1.01A Summary. – Produce and place Hot Mix Asphalt (HMA) Type A and Rubberized Hot Mix Asphalt (RHMA-G) Type G in accordance with Section 39 of the 2010 Caltrans Standard Specifications except otherwise specified in these Special Provisions.

Base course: 3/4” maximum gradation for HMA Type A

Asphalt binder for HMA Type A shall be PG 64-10 or PG 64-16 as specified in Section 92, “Asphalts.” Aggregate used in HMA Type A shall comply with ¾-inch Types A and B as specified in Section 39-1.02E, “Aggregate.”

Aggregate used in RHMA-G shall comply with ½-inch RHMA-G as specified in section 39-1.02E, “Aggregate.”

39-1.02B Tack Coat. – Tack coat must comply to Section 94, "Asphaltic Emulsions" of the Standard Specifications. Mixing and application shall conform to Section 39-1.09, "Subgrade, Tack Coat, and Geosynthetic Pavement Interlayer," and this section. Use SS-1h for Tack Coat.

39-2 Standard Construction Process (modified)

39-2.01 General. – Delete and replace the entire Section 39-2 of 2010 Caltrans Standard Specifications with the following provisions when the compacted HMA lift thickness is equal to or greater than 0.15 foot.

39-2.02 ACCEPTANCE CRITERIA

39-2.02A Testing. – The Engineer samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance—Standard Construction Process (modified)

Quality characteristic	Test method	HMA type			
		A	B	RHMA-G	OGFC

Aggregate gradation [a]	California Test 202	JMF ± tolerance [b]	JMF ± tolerance [b]	JMF ± tolerance [b]	JMF ± tolerance [b]
Sand equivalent (min) [c]	California Test 217	47	42	47	--
Asphalt binder content (%)	California Test 379 or 382	JMF ± 0.45	JMF ± 0.45	JMF ± 0.50	JMF ± 0.50
HMA moisture content (%, max)	California Test 226 or 370	1.0	1.0	1.0	1.0
Percent of maximum theoretical density (%) [e, f]	California Test 375	91-97	91-97	91-97	--
Stabilometer value (min) [c, d]	California Test 366				
No. 4 and 3/8" gradings		30	30	--	--
1/2" and 3/4" gradings		37	35	23	--
Percent of crushed particles	California Test 205				
Coarse aggregate (% min)					
One fractured face		90	25	--	90
Two fractured faces		75	--	90	75
Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.)					
One fractured face		70	20	70	90
Los Angeles Rattler (% max)	California Test 211				
Loss at 100 rev.		12	--	12	12
Loss at 500 rev.		40	50	40	40
Air void content (%) [c, e]	California Test 367	3-6	3-6	3-6	--
Fine aggregate angularity (% min)	California Test 234	45	45	45	--
Flat and elongated particles (% max by weight @ 5:1)	California Test 235	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) [f]	California Test 367				
No. 4 grading		76.0–80.0	76.0–80.0	Report only	--
3/8" grading		73.0–76.0	73.0–76.0		
1/2" grading		65.0–75.0	65.0–75.0		
3/4" grading		65.0–75.0	65.0–75.0		
Voids in mineral aggregate (% min) [f]	California Test 367				
No. 4 grading		17.0	17.0	--	--
3/8" grading		15.0	15.0	--	
1/2" grading		14.0	14.0	18.0–23.0 [g]	
3/4" grading		13.0	13.0	18.0–23.0 [g]	
Dust proportion [f]	California Test 367				
No. 4 and 3/8" gradings		0.9–2.0	0.9–2.0	Report only	--
1/2" and 3/4" gradings		0.6–1.3	0.6–1.3		
Smoothness	Section 39-1.12	12-foot straight-edge and must-grind	12-foot straight-edge and must-grind	12-foot straight-edge and must-grind	12-foot straight-edge and must-grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92

Asphalt rubber binder	Various	--	--	Section 92-1.01D(2) and section 39-1.02D	Section 92-1.01D(2) and section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Various	--	--	Section 39-1.02D	Section 39-1.02D

[a] The Engineer determines combined aggregate gradations containing RAP under California Test 367.
[b] The tolerances must comply with the allowable tolerances in section 39-1.02E.
[c] The Engineer reports the average of 3 tests from a single split sample.
[d] California Test 304, Part 2.13.
[e] The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
[f] Report only if the adjustment for the asphalt binder content TV is less than or equal to ±0.3 percent from the OBC value submitted on a *Contractor Hot Mix Asphalt Design Data* form.
[g] Voids in mineral aggregate for RHMA-G must be within this range.

No single test result may represent more than 750 tons or 1 day's production, whichever is less.
For any single quality characteristic except smoothness, if 2 consecutive acceptance test results do not comply with the specifications:

6. Stop production.
7. Take corrective action.
8. Make necessary adjustment.
9. Take plant produced samples and split each sample into 4 parts in the Engineer's presence. Test 1 part for compliance with the specifications and submit 3 parts to the Engineer. The Department tests 1 part for compliance with the specifications and reserves and stores 2 parts.
10. Demonstrate compliance with the specifications before resuming production and placement.

39-2.03 Dispute Resolution – Delete and replace the entire Section 39-1.06 of 2010 Caltrans Standard Specifications with the following provisions:

The contractor shall work with the Engineer to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer within 5 business days of receiving a test result if you dispute the test result.

If you or the Engineer dispute the other's test results, submit your test results and copies of paperwork including worksheets used to determine the disputed test results. An independent third party performs referee testing. Before the third party participates in a dispute resolution, it must be qualified under AASHTO Materials Reference Laboratory program, and the Department's Independent Assurance Program. The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen by the contractor and the Engineer. The independent third party laboratory shall not have any current contract with the contractor, HMA producer, or the Engineer.

If the Engineer's portion of the split samples or acceptance samples are not available, the independent third party uses any available material representing the disputed HMA for evaluation. The means and methods shall be an accepted AASHTO, ASTM, or Caltrans standard or approved by the Engineer.

If the independent third party determines the Engineer's test results are valid, the Engineer deducts the independent third party's testing costs from payments. If the independent third party determines the contractor's test results are valid, the Engineer pays the independent third party's testing costs. (How should the City handle the payment? Pay the contractor through the bid item to pay for the third party's cost???)

39-2.04 Transporting, Spreading, and Compacting. – The contractor shall determine the number of rollers required to obtain the specified density and surface finish.

Compact RHMA-G as specified for HMA Type A except do not use pneumatic-tired rollers.

To determine density, the contractor shall take one (1) 4-inch or 6-inch diameter density core for every 250 tons of HMA from random locations the Engineer designates. Take density cores in the Engineer's presence and backfill and compact holes with authorized material.

The Engineer tests the core from each 250 tons of HMA production and determines the percent of theoretical maximum density for each density core by determining the density core's density and dividing by the theoretical maximum density.

Density cores must be taken from the final layer, cored through the entire pavement thickness shown.

Each density core test result shall represent 250 tons of HMA when determining a deduction. If the percent of theoretical maximum density does not comply with the specifications, the Engineer may accept the HMA and take a payment deduction as shown in the following table:

Reduced Payment Factors for Percent of Theoretical Maximum Density

HMA Type A and B and RHMA-G percent of theoretical maximum density	Reduced payment factor	HMA Type A and B and RHMA-G percent of theoretical maximum density	Reduced payment factor
91.0	0.0000	97.0	0.0000
90.9	0.0125	97.1	0.0125
90.8	0.0250	97.2	0.0250
90.7	0.0375	97.3	0.0375
90.6	0.0500	97.4	0.0500
90.5	0.0625	97.5	0.0625
90.4	0.0750	97.6	0.0750
90.3	0.0875	97.7	0.0875
90.2	0.1000	97.8	0.1000
90.1	0.1125	97.9	0.1125
90.0	0.1250	98.0	0.1250
89.9	0.1375	98.1	0.1375
89.8	0.1500	98.2	0.1500
89.7	0.1625	98.3	0.1625
89.6	0.1750	98.4	0.1750
89.5	0.1875	98.5	0.1875
89.4	0.2000	98.6	0.2000
89.3	0.2125	98.7	0.2125
89.2	0.2250	98.8	0.2250
89.1	0.2375	98.9	0.2375
89.0	0.2500	99.0	0.2500
< 89.0	Remove and replace	> 99.0	Remove and replace

39-3 Method Construction Process. – Follow the entire Section 39-3 of the 2010 Caltrans Standard Specifications when the compacted HMA lift thickness is less than 0.15 foot.

Section 39-4 Quality Control/Quality Assurance Construction Process. – Not Applicable.

Section 39-5 RESERVED

Section 39-6 Payment. – The contract price paid for HMA or RHMA-G shall include full compensation for furnishing all labor, materials, tools, equipment, quality control, traffic control and incidentals and for doing all the work involved in placing HMA for roadways, spreading sand, sweeping, and removing excess sand from the pavement surface, complete in place, including bituminous seals, aggregate, and compaction as shown on the plans, as specified in these Special Provisions, and as directed by the Engineer.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Contractor shall notify the Engineer at the completion of the various stages of the operation as indicated below and shall allow two (2) working days for testing operations prior to proceeding with subsequent construction.

1. After all rough grading is complete and subgrade has been prepared to receive aggregate base

2. After final placement and compaction of aggregate base or subbase and subgrade has been prepared to receive asphalt lifts or other following operation.
3. When paving equipment is at the site and paving operation is ready to start.

1.05 SUBMITTALS

A. Within thirty five (35) days after award of contract, but before any asphalt pavement is installed, the Contractor shall submit to the Engineer for his approval, in accordance with Section 013000, Administrative Requirements, of these Specifications, the following:
   1. The proposed mix design for each type of asphaltic concrete specified.
      a. The mix design shall include mix number, gradation and source of aggregate, percentage and type of asphalt binder used, bin quantities, and supplier.
   2. Soil Sterilant: Submit written recommendation from a State of California appropriately licensed individual along with complete product data from proposed manufacturer, for review by Engineer.

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Installers/Applicators/Erectors
      a. Provide at least one person who shall be trained in the skills required, and who shall be familiar with the design and application of the Work described for this Section, and who shall be present at all times during progress of the Work of this Section and shall direct all work performed under this Section.
      b. For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel trained in the skills required.

B. Tolerances: Tolerances for subgrade, subbase and finished grade shall be as specified by DTSS Section 19, Earthwork, except that Contractor shall deliver the full aggregate base and asphaltic concrete thickness shown. No combination of high and low tolerances that compromise the section will be permitted.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Materials: Attention is directed to Section 6, Control of Materials, of the City of Standard Specifications and these Special Provisions. All materials required to complete the work under this contract shall be furnished by the Contractor.

B. Storage and Handling Requirements
   1. Use all means necessary to protect asphaltic concrete pavement materials before, during, and after installation and to protect the installed work and materials of all other trades.
   2. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the City.

1.08 WARRANTY

A. Final Guarantee: Contractor shall provide guarantee per Section 7-1.23, Final Guarantee, of the City Standard Specifications.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Description: All equipment furnished for the hauling, spreading, compaction, and spraying of asphalt concrete mixes, asphalt coatings, and aggregate base courses shall be as specified in Section 26, Aggregate Bases, and Section 39, Asphalt Concrete, of the City Standard Specifications and shall be subject to the approval of the Engineer.

2.02 MATERIALS:

A. STREET AND PARKING LOT IMPROVEMENTS

1. Subgrade: All subgrade shall be Class "A" as specified in Section 21, Subgrade Preparation, of the City Standard Specifications.
2. Aggregate Base: All aggregate base shall be Class 3 aggregate base as specified in Section 321100, Base Courses, of these specifications.
3. Prime Coat: All prime coat shall be SS-1h asphaltic emulsion as specified in Section 93, Liquid Asphalts, of the City Standard Specifications.
4. Binder: All asphalt cement used in asphalt concrete shall be as specified in Section 39 Hot Mix Asphalt of these Special Provisions.
5. Tack Coat: All tack coat shall be SS-1h asphaltic emulsion as specified in Section 94, Asphaltic Emulsions, of the City Standard Specifications.
6. Asphalt Base Course: All asphalt base courses shall be Type "A", three fourths inch (3/4") maximum gradation, hot mix asphalt as specified in Section 39 Hot Mix Asphalt of these Special Provisions..
7. Asphalt Paving Wearing Courses
   a. All asphalt surface courses shall be Type "A", three fourths inch (3/4") maximum gradation, hot mix asphalt as specified in Section 39 Hot Mix Asphalt of these Special Provisions.
8. Trench Repair within existing asphalt: Type "A", one half inch (1/2") maximum size aggregate, hot mix asphalt as specified in Section 39 Hot Mix Asphalt of these Special Provisions.
9. Fog Seal: All fog seal shall be SS-1h asphaltic emulsion as specified in Section 37-3, Fog Seal Coat and Section 94, Asphaltic Emulsions, of the City Standard Specifications.
10. Other Materials: Furnish all other material required for a complete pavement installation.

B. GAME COURTS

1. Sub Grade: All subgrade shall be Class "A" as specified in Section 21, Subgrade Preparation, of the City Standard Specifications.
2. Aggregate Base: All aggregate base shall be Class 3 aggregate base as specified in Section 321100, Base Courses, of these specifications.
3. Prime Coat: Shall be SS-1h Emulsion as per Section 4, Emulsion, of the City Standard Specifications.
4. Tack Coat: Shall be SS-1h as per Section 94, Asphaltic Emulsions, of the City Standard Specifications.
5. Asphalt Concrete: Shall be paving asphalt, PG 64-10 with the following aggregate grading requirements:
   a. Surface course: Type "A" one half inch (1/2") maximum gradation hot mix asphalt.
   b. Base course: Type "A", three fourths inch (3/4") maximum gradation hot mix asphalt.
6. Asphalt Paving Wearing Courses: Trench Repair within existing asphalt: Type "A", one half inch (1/2") maximum gradation hot mix asphalt as specified in Section 39 Hot Mix Asphalt of these Special Provisions.
7. Acrylic Surface with Color and Filler: "The Plexipave Acrylic Latex Color Surface System" as manufactured by California Products Co., Cambridge, MA. and as supplied by Fraser-Edwards Co., 2412 Harrison Street, San Francisco, CA 94110, Phone: (415) 826-9595, Fax: (415) 826-4125; "The Novacrylic Novaplay Standard" as manufactured by Nova USA and as distributed by L&M Distributing, Inc., P.O. Box 10548, San Rafael, CA 94912-0548, Phone: (415) 459-5565, Fax: (415) 459-5569; or an approved equal. The Contractor or subcontractor shall be certified or recommended, in writing, by the approved supplier/distributor to apply the acrylic surfacing system. Colors shall be as shown on the plans. Line color shall be white.
8. Plaster Sand: Shall be clean, free from deleterious or other foreign materials, and graded as follows:

Passing No. 10 sieve	100%
Passing No. 40 sieve	30-70%
Passing No. 80 sieve	10-30%

Passing No. 200 sieve (incl. wash)	0-2%

9. Water: The water in all mixtures shall be fresh and potable.
10. Other Materials: Furnish all other material required for a complete pavement installation.

PART 3 - EXECUTION

3.01 GENERAL

A. Ambient Conditions
   1. Do not work under weather conditions that will adversely affect the quality of paving.
   2. Prime Coat, Seal Coat and Paint Binder
      a. Apply only when the ambient temperature is above fifty degrees Fahrenheit (50°F) and when temperature has not been below thirty five degrees Fahrenheit (35°F) for twelve (12) hours immediately prior to application.
      b. Do not apply when base or surfaces are wet or contain an excess of moisture.
   3. Construct asphaltic concrete surface course only when atmospheric temperature is above 40 degrees F and when base is dry.
   4. Acrylic Surfacing System
      a. Do not apply filler coat unless ambient temperature is fifty degrees Fahrenheit (50°F) and rising. Do not apply filler coat if surface temperature of asphaltic concrete court is above one hundred and forty degrees Fahrenheit (140°F).
      b. Rain will damage filler coat if it has not had time to dry. Therefore, when rain is threatening, work should be stopped. As soon as the rain is over, and the sun comes out, the surface should be swept free of all puddles and allowed to dry prior to resuming work.
   5. Color Coat
      a. If rain is threatening, work should cease. Do not apply color coat over a damp or wet surface or when the temperature is below sixty degrees Fahrenheit (60°F). Colors shall be applied as shown on the plans.

B. Examination
   1. Verification of Conditions: Prior to all Work of this Section, carefully inspect the installed work of all other trades, and verify that all such work is complete to the point where this installation may properly commence.
      a. Verify that asphaltic concrete pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
      b. Discrepancies: In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
      c. Notification: Notify the Engineer at least forty eight (48) hours before commencing with any phase of the work.
   2. Pre-installation Testing
      a. All aggregate base or subgrade shall have been completely tested and approved by the Engineer prior to placement of any prime coat.

C. Preparation
   1. Protection of In-Place Conditions
      a. Surrounding areas, surfaces and appurtenances already in place shall be protected during installation of flexible paving.
      b. Before beginning base and paving work and during construction, take all steps necessary for protection of existing improvements. As the asphalt concrete is being placed, extreme care shall be taken not to discolor or damage the curbs, fences, or wall surfaces. If damage occurs, repair, and if satisfactory repair cannot be made, remove and replace the section as directed.

3.02 INSTALLATION

A. STREET AND PARKING LOT IMPROVEMENTS

1. Installation

a. Subgrade

i. Subgrade shall be prepared in accordance with Section 21, Subgrade Preparation, of the City Standard Specifications. Relative compaction shall be as designated in Section 21-1.05, Compaction of the City Standard Specifications.

ii. Compaction: The top six inches (6”) of subgrade shall be compacted to ninety five percent (95%) relative density.

iii. Soil Sterilant: Shall be applied to the surface of the subgrade soil of areas to be paved prior to baserock operations after scarification and compaction; uniformly applied per manufacturer’s recommendations; minimum rate of ten pounds (10 lbs.) per acre and watered with a minimum of three gallons (3 gal.) per one hundred square feet (100 sf). Contractor shall take all precautions necessary to avoid spray onto or runoff into planting areas.

b. Aggregate Base

i. Placement: Place the aggregate base course in accordance with Section 321100, Base Courses.

ii. Compaction: Compact the aggregate base course as specified in Section 10-3, Earthwork of these specifications and Section 26, Aggregate Bases, of the City Standard Specifications. Compact to ninety five percent (95%) minimum relative density.

iii. Water the base course after compaction.

c. Placement of Prime Coat

i. Apply prime coat to the prepared aggregate base or subgrade in accordance with Section 93, Liquid Asphalts, of the City Standard Specifications.

ii. Timing: In accordance with Section 93, Liquid Asphalts, of the City Standard Specifications, apply the prime coat the day prior to placing asphaltic concrete surfacing.

iii. Coverage: Apply prime coat per City Standard Specifications.

d. Binder: Apply paint binder in accord with DTSS Section 39.4. Paint binder shall be diluted with equal parts of water and applied to all vertical surfaces of existing pavement, curbs, gutters, catch basins, and construction joints in the surfacing, existing bases and pavements to be surfaced, and other surfaces designated by the Engineer. Asphaltic paint binder shall be provided in sufficient quantity to produce a thin, uniform black, glossy coat of asphalt. Pools in unevenly distributed areas shall be redistributed by means of hand brooms.

e. Installation of Flexible Paving

i. Before placing surfacing, additional prime coat or paint binder shall be applied to areas where the prime coat or paint binder has been destroyed.

ii. Construct the asphalt base course(s) (as required) and the asphalt surface course as specified in Section 39 Asphalt of these Special Provisions. Tack coat, as specified below, shall be applied between all lifts of asphalt paving.

iii. The completed pavement surface shall be smooth, dense, and uniform in texture and appearance. The surface shall be free of ridges, indentations, embedded segregated aggregate, and cracking. The pavement shall be free draining and free of all "birdbaths."

f. Tack Coat

i. Apply the specified asphaltic emulsion tack coat between lifts or course of asphalt paving in accordance with Section 94, Asphaltic Emulsions, of the City Standard Specifications.

ii. Tack coats shall be applied at the rate of 0.1 gallons per square yard in accordance with Section 94, Asphaltic Emulsions, of the City Standard Specifications.

g. Fog Seal

i. SS-1h asphaltic emulsion shall be applied at the rate of 0.2 gallons per square yard in accordance with Section 37-3, Fog Seal Coat, and Section 94, Asphaltic Emulsions, of the City Standard Specifications.

h. Tolerances
   i. Asphaltic Paving: Plus or minus 0.05 feet at any point from line and grade shown on the Drawings.
   ii. Conforms shall form a smooth, pond free transition between existing and (N) pavement.

B. GAME COURTS
1. Installation
   a. Subgrade
      i. Subgrade for court work shall be prepared in accordance with Section 21, Subgrade Preparation, of the City Standard Specifications. Relative compaction shall be as designated in Section 21-1.05, Compaction, of the City Standard Specifications.
      ii. Compaction: The top six inches (6") of subgrade shall be compacted to ninety five percent (95%) relative density.
      iii. Soil Sterilant: Shall be applied to the surface of the subgrade soil of areas to be paved prior to baserock operations after scarification and compaction; uniformly applied per manufacturer's recommendations; minimum rate of ten pounds (10 lbs.) per acre and watered with a minimum of three gallons (3 gal.) per one hundred square feet (100 sf) Contractor shall take all precautions necessary to avoid spray onto or runoff into planting areas.
   b. Aggregate Base
      i. Placement: Place the aggregate base course in accordance with Section 321100, Base Courses.
      ii. Compaction: Compact the aggregate base course as specified in Section 10-3, Earthwork, of these specifications and Section 26, Aggregate Bases, of the City Standard Specifications. Compact to ninety five percent (95%) minimum relative density.
      iii. Water the base course after compaction.
   c. Placement of Prime Coat
      i. Prime coat shall be applied as per Section 39-4.02 of the 1988 Caltrans Standard Specifications.
   d. Binder: Apply paint binder in accord with DTSS Section 39.4. Paint binder shall be diluted with equal parts of water and applied to all vertical surfaces of existing pavement, curbs, gutters, catch basins, and construction joints in the surfacing, existing bases and pavements to be surfaced, and other surfaces designated by the Engineer. Asphaltic paint binder shall be provided in sufficient quantity to produce a thin, uniform black, glossy coat of asphalt. Pools in unevenly distributed areas shall be redistributed by means of hand brooms.
   e. Installation of Flexible Paving
      i. Before placing surfacing, additional prime coat or paint binder shall be applied to areas where the prime coat or paint binder has been destroyed.
      ii. Asphalt concrete base course and surface course shall be constructed in accordance with the applicable sections of the Section 39 Hot Mix Asphalt of these Special Provisions.
      iii. Asphalt concrete pavement courses shall be compacted as specified in Section 39 Hot Mix Asphalt of these Special Provisions.
      iv. Tack coat shall be applied in accordance with, and to the surfaces designated in, Section 39-4.02 of the 1988 Caltrans Standard Specifications.
      v. The asphalt surface to be coated shall be sound, smooth and free from dust, dirt, or oily materials.
   f. Tack Coat

i. Apply the specified asphaltic emulsion tack coat between lifts or course of asphalt paving in accordance with Section 94, Asphaltic Emulsions of the City Standard Specifications.
ii. Tack coats shall be applied at the rate of 0.1 gallons per square yard in accordance with Section 94, Asphaltic Emulsions, of the City Standard Specifications.

g. Tolerances
i. After asphalt concrete surface course has been constructed, but prior to applying filler and color coats, the entire court area shall be flooded and inspected for low spots or "birdbaths". Court surface variation should not exceed 1/8 inch in ten feet, when measured in any direction with a straightedge in any one plane. The court surface shall not exceed a slope of one inch in ten feet in any plane. Any ponding or "birdbath" remaining forty five (45) minutes after flooding which cover an area greater than one square inch, shall be filled with the approved acrylic patching and leveling compound. Should drainage be inadequate or should "birdbaths" or depressions occur, no further work shall proceed until these deficiencies are rectified.

h. Acrylic Surfacing System
i. Asphalt concrete shall be cured a minimum of 14 days prior to application of acrylic surfacing system, without the use of curing compounds.
ii. Prior to the application of the acrylic surfacing and color coats, the Contractor shall saw-cut the asphalt for the footings for posts, benches, etc. The size of the footings shall be per manufacturer's specifications. The saw-cut areas shall be limited to the footing size with no "over cutting" allowed at the corners of the footings. All footings and posts shall be installed prior to the applications of the acrylic surfacing and color coats.
iii. Filler Coat: Shall be applied as follows:
a) Filler coat shall be applied per the manufacturer's specifications. Surface shall be dry and clear. Filler coat shall be applied over entire court area.
b) Place contents of filler coat container in an approved plaster mixer; add not more than the volume of water recommended by the manufacturer.
c) Apply the blended mixture using a rubber-faced squeegee.
d) Remove all ridges and lap marks with a scraper before proceeding with additional applications.
e) Minimum amount of undiluted filler coat to be used in all applications shall not be less than eight gallons (8 gal.) per one thousand square feet (1,000 sf) of area total.
f) In applying the material to a dark surface on a very hot day, it may be necessary to use the maximum specified dilution on the first coat. After the first coat is applied, the reflective characteristics of the product will reduce the surface temperature, and subsequent applications will very likely not need the same dilution. Filler coat windrows should not be allowed to drop long distances and spatter. The application of the windrows should be made as close to the surface as possible and the width of the windrow controlled closely, so the material is not spread out over an excessive area. In spreading, two squeegee operators can only handle approximately sixty to feet (60"-80")of windrow. If the material begins to dry out in the windrow and becomes impossible to spread, the material must be discarded.
g) Since filler coat applications dry very rapidly, the time between applications will usually be about thirty (30) minutes on a clear day. In any event, subsequent applications can be applied as soon as the material is dry to the touch and will not scuff under foot.

i. Color Coat: Shall be applied as follows:

i. Color coat shall be applied per the manufacturer's specifications. Surface shall be dry and clear. Entire court area and out-of-bound areas shall be covered with appropriate color coat.
ii. Place contents of color coat container in an approved plaster mixer. Add not more than the volume of water recommended by the manufacturer.
iii. Apply the blended mixture by spreading with a rubber-faced squeegee and smoothing out with a long handled hair broom.
iv. Minimum amount of undiluted color coat to be used is eight gallons (8 gal.) per one thousand square feet (1,000 sf) of area total for all applications.

j. Playing Lines
i. After the final color coat has dried for a minimum of forty eight (48) hours, accurately lay out playing lines by snapping a chalk line, and apply line paint by hand brush method. Paint shall be applied in such a manner that the surface of the courts may be seen.
ii. The finished lines shall be straight, and no jagged edges shall be acceptable.

3.03 REPAIR

A. Pavement Repair: All existing pavement to receive an asphalt concrete overlay (with or without reinforcing fabric) shall be repaired as follows prior to commencing overlay operations:
1. Cracks one eighth inch (1/8") to one half inch (1/2") in width shall be cleared of dirt and other deleterious materials and repaired with a hot, liquid asphalt crack sealer applied in accordance with the manufacturer's recommendations or with slurry seal.
2. Cracks or holes larger than one half inch (1/2") in width shall be cleared of dirt and other deleterious materials and repaired with hot-mix asphalt concrete or slurry seal.

3.04 SITE QUALITY CONTROL

A. Non-Conforming Work: Upon direction of the Engineer, cut out and/or rework all surfaces and subgrade areas which do not meet the requirements of this Section; perform all remedial measures at no additional cost to the City.

END OF SECTION

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Section 32 17 13

Parking Bumpers

PART 1 - GENERAL

1.01 SUMMARY
- A. Section Includes:
  1. Precast concrete wheel stops.
  2. Resilient wheel stops.

1.02 ACTION SUBMITTALS
- A. Product Data:
  1. Precast concrete wheel stops.
  2. Resilient wheel stops.

PART 2 - PRODUCTS

2.01 PARKING BUMPERS
- A. Precast Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete; 4000-psi minimum compressive strength; 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners , transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
  1. Surface Appearance: Smooth, free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
  2. Surface Sealer: Manufacturer's standard salt-resistant, clear sealer, applied at precasting location.
  3. Mounting Hardware: Galvanized-steel spike or dowel, 1/2-inch diameter, 14-inch minimum length, hardware as standard with wheel-stop manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION
- A. Verify that pavement is in suitable condition to begin installation in accordance with manufacturer's written instructions.
- B. Install wheel stops in accordance with manufacturer's written instructions unless otherwise indicated.
- C. Install wheel stops in bed of adhesive before anchoring to substrate.
- D. Securely anchor wheel stops to substrate with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 32 17 13

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Section 32 17 23

Pavement Markings

PART 1 - GENERAL

1.01 SUMMARY
- A. Section Includes:
  1. Painted markings applied to asphalt paving.
  2. Painted markings applied to concrete surfaces.

1.02 PREINSTALLATION MEETINGS
- A. Preinstallation Conference: Conduct conference at the Project Site.

1.03 ACTION SUBMITTALS
- A. Product Data:
  1. Pavement-marking paint, solvent-borne.
  2. Pavement-marking paint, acrylic.
  3. Pavement-marking paint, latex.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS
- A. Accessibility Standard: Comply with applicable provisions in 2010 ADA Standards for Accessible Design and City of San Jose requirements.

2.02 PAVEMENT-MARKING PAINT
- A. Pavement-Marking Paint, Solvent-Borne: MPI #32, solvent-borne traffic-marking paint.
  1. Color: As indicated, see plan
- B. Lead and chromate free, ready mixed, complying with FS TT-P-1952F, Type II, with drying time of less than [45] minutes.
  1. Color: As indicated, see plan
- C. Pavement-Marking Paint, Latex: MPI #97, latex traffic-marking paint.
  1. Color: As indicated, see plan

2.03 PAINTING AND COATING FOR DEVORATIVE MARKING
- A. See Section 099000

PART 3 - EXECUTION

3.01 PAVEMENT MARKING
- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow asphalt paving or concrete surfaces to age for a minimum of 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to asphalt paving or concrete surface.

END OF SECTION 32 17 23

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Section 32 17 26

Tactile Warning Surfacing

SECTION 32 17 26
TACTILE WARNING SURFACING

PART 1 - GENERAL

1.01 SUMMARY
- A. Section Includes:
  1. Cast-in-place detectable warning tiles.
  2. Surface-applied detectable warning tiles.
  3. Detectable warning mats.

1.02 ACTION SUBMITTALS
- A. Product Data: For each type of product.
- B. Samples for each type of exposed finish requiring color selection.

PART 2 - PRODUCTS

2.01 TACTILE WARNING SURFACING, GENERAL
- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for tactile warning surfaces and 2022 CBC chapter 11b
  1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.

2.02 DETECTABLE WARNING TILES
- A. Cast-in-Place Detectable Warning Tiles: Accessible truncated-dome detectable warning tiles configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.
  1. Material: Cast-fiber-reinforced polymer concrete tile
  2. Color: Safety yellow.
  3. Shapes and Sizes:
     a. Rectangular panel, 12 by 12 inches
     b. Radius panel, nominal 24 inches deep by 6-foot outside radius.
  4. Dome Spacing and Configuration: center-to-center 2.3” to 2.4” spacing in square pattern.
  5. Mounting:
     a. Permanently embedded detectable warning tile wet-set into freshly poured concrete.
- B. Surface-Applied Detectable Warning Tiles: Accessible truncated-dome detectable warning concrete tiles configured for surface application on existing concrete walkway surfaces, with slip-resistant surface treatment on domes, field of tile, and beveled outside edges.
  1. Material: Cast-fiber-reinforced polymer concrete tile] [Molded glass- and carbon-fiber-reinforced polyester.
  2. Color: Safety yellow.
  3. Shapes and Sizes:
     a. Rectangular panel, 12 by 12 inches.
     b. Radius panel, nominal 24 inches deep by 6-foot outside radius.
  4. Dome Spacing and Configuration: center-to-center 2.3” to 2.4” spacing in square pattern.
  5. Mounting: Adhered and /or fastened to existing concrete walkway.

2.03 DETECTABLE WARNING MATS

A. Surface-Applied Detectable Warning Mats: Accessible truncated-dome detectable warning resilient mats, UV resistant, manufactured for adhering to existing concrete walkway surfaces, with slip-resistant surface treatment on domes, field of mat, and beveled outside edges.
   1. Material: Modified rubber compound, UV resistant.
   2. Color: As indicated by manufacturer's designations.
   3. Shapes and Sizes:
      a. Rectangular panel, 24 by 36 inches.
   4. Dome Spacing and Configuration: center-to-center 2.3” to 2.4” spacing in square pattern.
   5. Mounting: Adhered to pavement surface with adhesive and/or fastened with fasteners.

2.04 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:
   1. Furnish Type 304 stainless-steel fasteners for exterior use.
   2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

B. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.

C. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

PART 3 - EXECUTION

3.01 INSTALLATION OF TACTILE WARNING SURFACING

A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

C. Cast-in-Place Detectable Warning Tiles: Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedments in wet concrete by tamping or vibrating. Set surface of tile flush with surrounding concrete and adjacent tiles. Remove concrete from tile surfaces and clean using methods recommended in writing by manufacturer.

D. Removable Cast-in-Place Detectable Warning Tiles: Set each detectable warning tile accurately and firmly in place with embedding anchors and fasteners attached, and firmly seat tile back in wet concrete by tamping or vibrating. Set surface of tile flush with surrounding concrete and adjacent tiles. Remove concrete from tile surfaces and clean tiles using methods recommended in writing by manufacturer.

E. Surface-Applied Detectable Warning Tiles: Prepare existing paving surface by grinding and cleaning as recommended by manufacturer. Apply adhesive to back of tiles in amounts and pattern recommended by manufacturer, and set tiles in place. Install anchor devices through face of tiles and into pavement using anchors located as recommended by manufacturer. Apply sealant in continuous bead around perimeter of installation.

F. Surface-Applied Detectable Warning Mats: Prepare existing paving surface by grinding and cleaning as recommended by manufacturer. Apply adhesive to back of mat and set mat in place. Firmly seat mat in adhesive bed. Install anchor devices through face of mat and into pavement using anchors located as recommended by manufacturer. Set heads of anchors flush with mat surface. Apply sealant in continuous bead around perimeter of mat.

G. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.

H. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 321726

Section 32 31 13

Chain Link Fencing and Gates

Part 1. General

1.01 Related Documents

A. The Drawings and general provisions of the Contract, including General and Special Conditions General Requirements, apply to the work specified in this section.

B. Parts 1,2,3,4,5,6, Title 24 of the California Code of Regulations (California Building Code) is to be considered an integral part of this section. Items noted here are those specifically related to the General Contractor'

C. All California Prevailing Wage Laws apply to the work of this section.

1.02 Work Included

A. The following is a general description of the work included in this section. This description does not limit the scope of work shown in the drawings nor does it relieve the Contractor of any responsibility for coordination of **ALL** work of this Contract.

Item	Description
General	• Provide chain link fencing where shown on drawings. Provide required fence repairs where indicated on drawings. • New chain-link fence and plastic slats where shown on Drawings • New hinged gates where shown on Drawings

B. Related work may be described in other sections of this Project Manual. All sections of this Project Manual and all other Contract Documents shall be considered related by the Contractor.

1.03 Submittals

A. Provide the following submittals per the requirements of

Item	Description
Catalog Cuts	• Description
Product Data	• Description
Samples	• Plastic Slats
Shop Drawings	• Layout of fencing with field verified dimension • Coordination with work by others, if any, such as footings and paving
Schedule	• Include Schedule entry on Gantt Chart

1.04 References / Standards

A. The following References and Standards are incorporated into the requirements of this Section as they apply to products, assembly, manufacturing procedures and installation. References shall be utilized in determining “Industry Standards” and other acceptable manufacture and installation methods but shall not relieve the Contractor of any other responsibilities of the Contract. Where conflicts occur between multiple listed references, the Contractor shall assume that the more restrictive standard applies and shall seek determination from the Architect regarding applicable standard.

References	• ASTM-A392 Specification for Zinc-coated Steel Chain Link Fencing • ASTM A 653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy Coated (Galvannealed) by the Hot-Dip Process • ASTM-F567 Practice for Installation of Chain Link. • ASTM-F626 Specification for Fence Fittings • ASTM-F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Weld, for Fence Structures • ASTM F1553 Guide for Specifying Chain Link Fence • Unless otherwise shown or specified, all materials and methods involved in chain link fence fabrication shall conform to Section 80 of the State of California, Department of Transportation Standard Specifications (DTSS).

1.05 Quality Assurance

A.

Item	**Description**
Supervision	• Full time supervision and observation by the Contractor of all on-site Construction Activities including ordering, procurement and delivery of all materials and products manufactured or assembled off-site.
Qualifications of Workers	• General Contractor shall ensure that all workers providing labor on this project are fully competent and experienced in the area of work being performed. General Contractor shall require subcontractors to remove any unqualified workers from the project. • Chain Link Fencing shall be installed by a firm that has not less than 5-years successful experience in the installation of systems similar to those required.
Product Acceptance	• General Contractor (Superintendent) shall verify and accept all products delivered to site prior to installation. • Installer shall fully inspect all related work by other trades prior to commencing installation of new chain link fencing.
Substrate Acceptance	• General Contractor (Superintendent) shall verify all substrates / conditions prior to allowing

installation of any item.

1.06 Quality Control by Contractor

A. The following specific procedures shall be required to demonstrate adequate levels of quality provided for project components and systems. Exclusion of any item from this list does not relieve the Contractor of any responsibilities for quality procedures covered elsewhere in the Contract Documents.

Item	Description
Supervision	
Testing	• n/a
Special Inspections	• Per DSA Testing and Inspection Form
Mock Ups	• n/a

1.07 Quality Control by Owner

A. The following specific procedures shall be required to demonstrate adequate levels of quality provided for project components and systems. Exclusion of any item from this list does not relieve the Contractor of any responsibilities for quality procedures covered elsewhere in the Contract.

Item	Description
Observation	
Inspection	• Per CCR Title 24: Continuous Inspection by DSA Certified inspector
Testing	• Refer to DSA Testing and Inspection Sheet
Special Inspections	• Refer to DSA Testing and Inspection Sheet

1.08 Closeout

A. Provide the following Close Out materials

Item	Description
Product Manuals	• Maintenance and Operations instructions / manuals provided by all product / material manufacturers.
System Manuals	• Maintenance and Operations instructions / manuals provided by subcontractors for assemblies / systems.
Paint. Tools/Materials	• n/a
Surplus Materials	• n/a
Training	• n/a

1.09 Warranty

A. Provide written warranty

Item	Description
Warranty Form	• Contractor, Subcontractor and Manufacturer to provide warranty against defects in materials or workmanship. Replacement or repair of such defects shall be repaired or replaced in a timely fashion at no additional cost to the Owner.
Warranty Period	• 1 year
Warranty Start	• Date of Substantial Completion

Part 2. Products

2.01 Acceptable Manufacturers

A. USX-Cyclone

B. San Jose Steel

C. Anchor Fence

D. Products from qualified manufacturers having a minimum of five years experience manufacturing galvanized coated chain link fencing will be acceptable by the architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.

E. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

2.02 Fencing Materials

A. Posts:

1. Posts: Intermediate posts shall be hot dipped galvanized Sch. 40 steel pipe, 2-3/8 inches outside diameter. Terminal posts shall be 2-7/8 inches outside diameter for fences 6'-0" and higher.

B. Chain link fence accessories:

1. Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing.

C. Top Rail and Tension Wire:

1. The fence shall have a continuous top rail for its full length of galvanized steel 1-3/8 inches outside diameter tubing, weighing 1.73 pounds per foot; and a bottom galvanized 6-gauge tension wire.

D. Truss Braces:

1. Truss braces and truss rods with turnbuckle attachments shall be installed between terminal posts and each adjacent intermediate post; sizes and specific locations as engineered by the fabricator and approved on the shop drawing. Braces, trusses, and hardware fittings shall be galvanized to match posts, rails, and fabric.

E. Fittings:

1. All fixed component parts, such as post tops, bands, connections and rail ends, shall be galvanized . All hog rings and tie wire shall be galvanized wire. Terminal post tops shall be simple C-shaped without ornamentation. Provide posts tops that permit the passage of top rail for intermediate posts.

F. Post caps:

1. Formed steel, cast malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post.

G. Top rail and brace rail ends:

1. Pressed steel per for connection of rail and brace to terminal posts

H. Top rail sleeves:

1. 7” expansion sleeve with spring, allowing for expansion and contraction of top rail

I. Wire ties:

1. 9 gauge galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge for rails and braces. Hog ring ties of 12-1/2 gauge for attachment of fabric to tension wire.

J. Tie Wires:

1. Secure fabric with 9 gauge aluminum ties to intermediate posts at 1'-2" on center spacing and to rails at 2'-0" on center spacing. Secure fabric to tension wire with galvanized hog rings spaced 1'-0" on center.

K. Tension (stretcher) bars:

1. One piece lengths equal to 2 inches less than full height of fabric with a minimum cross-section of 3/16" x 3/4" or equivalent fiber glass rod. Provide tension (stretcher) bars where chain link fabric meets terminal posts.

L. Truss rods & tightener:

1. Steel rods with minimum diameter of 5/16

M. Nuts and bolts are galvanized

Part 3. Execution

3.01 General

A. Layout

1. Prior to commencing installation, Contractor shall stake layout and request a review by the District Representative to determine adjustments on site from locations shown on drawings.

B. Verify areas to receive fencing are completed to final grades and elevations.

3.02 Installation

A. Chain Link Fence

1. Fabric: Shall be installed on the side of the posts closest to the street; tops and bottom selvage knuckled and attached to posts with 9-gauge hog rings spaced no further than twelve inches apart. Attach so that fabric remains in tension after pulling force is released. Leave approximately 2" between finish grade and bottom selvage.

B. Posts:

1. Space line posts uniformly, maximum spacing 10'-0" on center.

C. Concrete Set:

1. Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, minimum 1'-0" which, and depths approximately 6"(152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

D. Termination Posts:

1. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more. Install horizontal pipe brace at mid-height for fences 6’-0” and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Adjust truss rod, ensuring posts remain plumb.

E. Tension Wire:

1. Provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties. Secure tension wire to fabric with 12-1/2 gauge hog rings 24” on center.

F. Tension (stretcher) Bars:

1. Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15” on center.

G. Top Rail:

1. Install lengths, 21’-0” maximum. Connect joints with sleeves for rigid connections for expansion/contraction. Top rail shall pass through openings provided in the post tops and each length shall be coupled with a sleeve coupling, or by a 3 inch long swaged end. Fabric shall be attached to the top rail by means of double-wrap tie wires spaced at intervals of approximately 2'-0".

H. Tie Wires:

1. Bend ends of wire to minimize hazard to persons and clothing

I. Fasteners

1. Install nuts on side of fence opposite fabric side for added security

J. Slats:

1. Install slats in accordance with manufacturer’s instructions

End of Section

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Section 32 31 19

Ornamental Fence

Part 1. General

1.01 Work Included

A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the industrial ornamental aluminum fence system defined herein at District Office Annex Portable.

1.02 Related Sections

A. N/A

1.03 System Description

A. The manufacturer shall supply a total industrial ornamental aluminum fence system of the Ameristar® Echelon II® Majestic™ design. The system shall include all components (i.e., pickets, rails, posts, gates and hardware) required.

1.04 Quality Assurance

A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.05 References

A. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

C. ASTM D523 - Test Method for Specular Gloss.

D. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

E. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

F. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

G. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

H. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.

1.06 Submittal

A. The manufacturer's submittal package shall be provided prior to installation.

1.07 Product Handling and Storage

A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft.

Part 2. Products

2.01 Manufacturer

A. The industrial ornamental aluminum fence system shall conform to Ameristar Echelon II, Majestic 3-Rail, style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

2.02 Material

A. Aluminum material for fence framework (i.e., tubular pickets, rails, and posts) shall conform to the requirements of ASTM B221. The aluminum extrusions for posts and rails shall be Alloy and Temper Designation 6005-T5. The aluminum extrusions for pickets shall be Alloy and Temper Designation 6063-T52.

B. The manufactured framework shall be subjected to the Ameristar thermal stratification coating process (high-temperature, in-line, multi-stage, and multi-layer) including, as a minimum, a six-stage pretreatment/wash, and an electrostatic spray application of a polyester finish. The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2.

C. Material for fence pickets shall be 1" square x 0.062" thick (.125” wall for Invincible) extruded tubing. The cross-sectional shape of the rails shall conform to the manufacturer's ForeRunner™ design with outside cross-section dimensions of 1.75" square. The top wall and internal web of the rail shall be 0.070" thick; the sidewalls shall be 0.070" thick for superior vertical load strength. Picket holes in the ForeRunner rail shall be spaced 4.715” o.c., except for Invincible style 6’ long, which shall be, spaced 4.98” o.c. Picket retaining rods shall be 0.125” diameter galvanized steel. Fence posts and gate posts shall meet the minimum size requirements of Table 1. High quality PVC grommets shall be supplied to seal all picket-to-rail intersections.

D. Bracket to rail attachments shall be made using specially designed one-way tamperproof security nuts with carriage bolt. Bracket to post connections shall be made using self-drilling hex-head screws.

E. Aluminum castings shall be used for all rings, post caps, finials, and miscellaneous adornments.

2.03 Fabrication

A. Pickets, rails, and posts shall be pre-cut to specified lengths. ForeRunner rails shall be pre-punched to accept pickets.

B. The rail inner slide shall be fully inserted into the rail outer channel to form the raceway for the internal retaining rod. Grommets shall be inserted into the pre-punched holes in the rails, and pickets shall be inserted through the grommets so that pre-drilled picket holes align with the internal raceway of the two-part ForeRunner rails. (Note: This can best be accomplished by using an alignment template). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the pre-drilled holes in each picket, thus completing the panel assembly.

C. Completed panels shall be capable of supporting a 300 lb. load (applied at midspan) without permanent deformation. Panels shall be biasable to a 25% change in grade.

D. Gates shall be fabricated using 1.75” sq. reinforced ForeRunner rail material, 2” sq. x .250” gate ends, and 1” sq. x .125” pickets. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall be joined by welding.

Part 3. Execution

3.01 Preparation

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 Fence Installation

A. Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.03 Fence Installation Maintenance

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed surfaces; 1) Remove all metal shavings from cut area. 2) Apply custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1& 2 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.04 Gate Installation

A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

3.05 Cleaning

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

Table 1 – Minimum Sizes for Echelon II Posts				
Fence Posts	Panel Height			
2-1/2" x 2-1/2" x .080" Alum. w/ reinforced web	Up to & Including 6' Height			
3" x 3" x .120" Alum.	Over 6' Up to & Including 8' Height			
4" x 4" x .250" Alum.	Over 8' Height Up to 10'			
Gate Leaf	Gate Height			
	Up to & Including 4'	Over 4' Up to & Including 6'	Over 6' Up to & Including 8'	Over 8' Up to & Including 10'
Up to 4'	3" x 3" x .120" Alum.	4" x 4" x .250 Alum. or 3" x 12 Ga. steel	4" x 11 Ga. steel	4" x 11 Ga. steel
4'1" to 6'	4" x 4" x .250 Alum. or 3" x 12Ga. steel	3" x 12 Ga. steel	4" x 11 Ga. steel	4" x 11 Ga. steel
6'1" to 8'	4" x 11 Ga. steel	4" x 11 Ga. steel	4" x 11 Ga. steel	6" x 3/16" steel
8'1" to 10'	4" x 11 Ga. steel	4" x 11 Ga. steel	6" x 3/16" steel	6" x 3/16" steel
10'1" to 12'	4" x 11 Ga. steel	6" x 3/16" steel	6" x 3/16" steel	6" x 3/16" steel
12'1" to 14'	6" x 3/16" steel	6" x 3/16" steel	6" x 3/16" steel	6" x 3/16" steel

Table 2 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117 & D1654	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 3 – Echelon II – Post Spacing By Bracket Type						
Span	For CLASSIC, GENESIS, & MAJESTIC 8' Nominal (92.625" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Industrial Universal (BB302)	Industrial Universal (BB303)	Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± ½" O.C.	96"	96.5"	96"	96-1/2"	*97.5"	*98"
Span	For CLASSIC, GENESIS, & MAJESTIC 6' Nominal (67.75" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Industrial Universal (BB302)	Industrial Universal (BB303)	Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± ½" O.C.	71.5"	72"	71.5""	72"	*73"	*73.5"
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel.						

End Of Section

Section 33 30 00

Sanitary Sewerage Utilities

SECTION 33 30 00
SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.01 SUMMARY
- A. Section Includes: All labor, materials, equipment, tools, accessories, transportation, and services as required for the installation and construction of Sanitary Sewerage Utilities as shown on the plans.
- B. Related Requirements
  1. Consult all other Specification sections, determine the extent and character of related work, and properly coordinate work specified herein with that specified elsewhere to produce a complete operational installation.

1.02 REFERENCES
- A. Reference Standards
  1. Section 1301, Trench Excavation, Bedding, and Backfill of the City Standard Specifications.
  2. Section 1302, Pipe Installation of the City Standard Specifications.
  3. CLR, Title 24, Part 5, 2007 California Plumbing Code.
  4. Section 207-8, Vitrified Clay Pipe of the APWA Standard Specifications.
  5. Section 207-19, Polyethylene (PE) Solid Wall Pipe of the APWA Standard Specifications.
  6. ASTM C-700, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
  7. ASTM D-3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  8. ASTM F-714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.03 SUBMITTALS
- A. Product Data: Submit for each type of product specified.

1.04 DELIVERY, STORAGE, AND HANDLING
- A. Materials: Attention is directed to Section 6, Control of Materials of the City Standard Specifications and these Special Provisions. All materials required to complete the work under this contract shall be furnished by the Contractor.
- B. Handling: Pipe, fittings, precast concrete manhole sections, and cast iron frames and manhole covers shall be handled carefully at all times. Only suitable equipment and appliances shall be used for the safe loading, hauling, unloading, handling, and placing of materials. Special care shall be exercised so that the preformed resilient joints on pipe and fittings are not damaged.

1.05 WARRANTY
- A. Final Guarantee: Contractor shall provide guarantee per Section 7-1.23, Final Guarantee of the City Standard Specifications.

PART 2 - PRODUCTS

2.01 SANITARY SEWERAGE EQUIPMENT
- A. Materials

1. For the sanitary sewer system, SDR 21 plastic pipe or vitrified clay pipe (VCP) shall be used.
2. VCP shall be extra strength in accordance with ASTM C-700.
3. Plastic pipe shall conform to ASTM D-3330 of ASTM F-714.
4. Use PVC C900 under one to three feet (1'-3') of soil.
5. Use ABS rigid wall under three to thirty feet (3'-30')
6. Joints and joint material for concrete pipe shall conform to Section 1302-4.2, Field Joining of Pipe of the City Standard Specifications.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protection of In-Place Conditions
   1. Surrounding areas, surfaces and appurtenances already in place shall be protected during installation of sanitary sewerage utilities.

3.02 INSTALLATION

A. Excavation, backfill, pipe laying and joints shall conform to the City Standard Specifications.
B. Backfill shall conform to Section 1301, Trench Excavation, Bedding, and Backfill of the City Standard Specifications, except that ninety five percent (95%) relative compaction on the top six (6) inches of trench shall be required only where surface improvements other than plantings are made under this contract.
C. Lines shall be flushed in accordance with the City Standard Specifications.
D. No trench shall be left open at the end of the day except as specifically authorized by the Project Engineer.
E. Debris Control: The interior of the sewer pipe shall be kept clean of dirt and debris at all times. When work is not in progress, open ends of pipe and fittings shall be temporarily plugged.
F. VCP shall be used between sewer main and property line. Provide cleanout at property line per CPC requirements.

3.03 SYSTEMS STARTUP

A. Flushing and Cleaning
   1. After all backfilling and pavement restoring operations have been completed, the Contractor shall flush and clean all sanitary sewer lines under the supervision of the Engineer's representative.
   2. During the flushing and cleaning operation, a wire screen with a one quarter inch (1/4") mesh or smaller shall be placed over the downstream outlet of the lower manhole to prevent any debris from being washed into the existing sewer system.

3.04 ADJUSTING

A. Frames, Grates and Covers
   1. Frames, grates and covers of all surface structures (manholes, clean outs, etc.) shall be adjusted to proposed finish grade. Grade rings shall be supplied and installed as required.
   2. Frames of new or adjusted surface structures shall be supported by concrete with minimum dimensions as follows: six inches (6") wide by ten inches (10") deep.
B. Structures within Paved Areas
   1. A structure located in an area resurfaced with asphalt concrete shall not be constructed to final grade until the adjacent pavement or surfacing has been compacted.
   2. The Contractor shall be responsible for referencing structures prior to paving and locating them after paving operations are completed.

3. After asphalt concrete resurfacing is complete, the asphalt shall be cut out six inches (6") wider than the frames of all surface structures. Each frame shall then be raised too finished grade (sloped as necessary) and concrete shall be placed to approximately one and one half inches (1-1/2") below finish grade as noted above. After concrete collar has cured, a tack coat shall be applied and asphaltic concrete placed to finish grade. (See related City of San José Detail Drawings.)

END OF SECTION

PHOENIX FENCE

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WEBSITE: www.phoenixfence.ca

Commercial Chain Link Fence Specifications and Standards

	Specification #2 **Heavy Construction**	**Specification #3** **Medium Construction**
Height:	3′(0.9m) – 12′(3.65m) overall fabric height. Optional: Plus 1′ (300mm) barbed wire overhang.	3′(0.9m) – 8′(2.4m) overall fabric height. Optional: Plus 1′ (300mm) barbed wire overhang.
Fabric:	Chain link, 2″(50mm) mesh x 9 gauge(3.4mm) to desired height. Manufactured from the highest quality galvanized wire, or vinyl coated. In accordance with ASTM-A392-81-Class 1.	Chain link, 2″(50mm) mesh x 9 gauge(3.4mm) or 11 gauge(2.75mm) to desired height. Manufactured from the highest quality galvanized wire, or vinyl coated. In accordance with ASTM-A392-81-Class 1.
Line Posts:	2 3/8″(60.3mm) O.D. galvanized pipe complete with post tops with or without barbed wire overhang arms.	1 7/8″(48.3mm) O.D. galvanized pipe complete with post tops with or without barbed wire overhang arms.
Top Rail:	1 5/8″(42.2mm) O.D. galvanized pipe coupled with slip on rail sleeves for every standard length generally 21′(6.4m) in length.	1 3/8″(33.4mm) O.D. galvanized pipe coupled with slip on rail sleeves for every standard length generally 21′(6.4m) in length.
Terminal Posts:	End, corner and gate posts: 3 ½″(88.9mm) O.D. galvanized pipe, furnished complete with all necessary bracing, fittings, etc. Gate posts for single gate panels over 12′(3.65m) wide and double panels over 24′(7.3m) wide use 4 ½″(114.3mm) O.D. pipe. Gate posts for single gate panels over 16′(4.88m) wide and double panels over 32′(9.75m) wide use 6 5/8″(168.3mm) O.D. pipe. Note: All single gate panels over 10′(3.0m) wide and double panels over 20′(6.1m) wide require ASTM A-120 Schedule 40 pipe.	End, corner and gate posts: 2 7/8″(73.0mm) O.D. galvanized pipe, furnished complete with all necessary bracing, fittings, etc. Gate posts for single gate panels over 8′(2.4m) wide and double panels over 16′(4.88m) wide use 3 ½″(88.9mm) O.D. pipe. Gate posts for single gate panels over 12′(3.65m) wide and double panels over 24′(7.3m) wide use 4 ½″(114.3mm) O.D. pipe. Gate posts for single gate panels over 16′(4.88m) wide and double panels over 32′(9.75m) wide use 6 5/8″(168.3mm) O.D. pipe. Note: All single gate panels over 10′(3.0m) wide and double panels over 20′(6.1m) wide require ASTM A-120 Schedule 40 pipe.
Gates:	Gate frames 1 5/8″(42.2mm) O.D. galvanized pipe, welded construction to match fence. Complete with industrial steel hinges, drop pin latch and one foot bolt on double panels. Hinges to permit opening 180° one way.	
Fittings:	All fittings are made from first grade malleable iron, pressed steel or aluminum. Tie wire to be 9 gauge(3.4mm) aluminum.	
Bottom Wire:	9 gauge(3.4mm) galvanized steel.	
Barbed Wire:	12 ½ gauge(2.4mm) two strand with 4 point barbs spaced at 6″(150mm), galvanized.	
Post Spacings:	Line posts are spaced in line fence, maximum 10′(3.0m) apart.	
Post Footings:	All line and terminal posts shall be set in concrete footings of the proper diameter and shape to ensure adequate support. See installation specifications.	

Pipe Weights (wall thicknesses) for Posts and Rails

Standard Commercial:	Terminal posts to 3 ½″ - .125″ wall thickness Line posts and top rail - .083″ wall thickness
Heavy Commercial:	Terminal posts – ASTM-A120 Schedule 40 heavy wall Line posts and top rail – ASTM-A120 Schedule 40 heavy wall

Note: 4 ½″ O.D. and 6 5/8″ O.D. posts are always Schedule 40 heavy wall.

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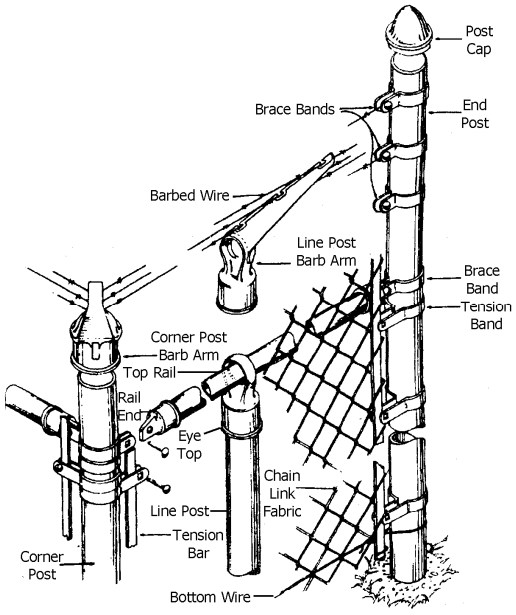
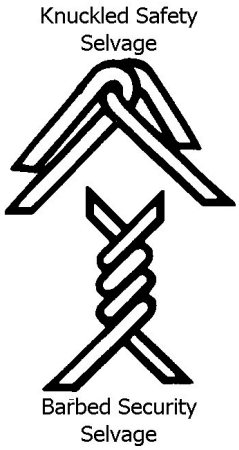
WEBSITE: www.phoenixfence.ca

Commercial Chain Link Fence Specifications and Standards

Concrete:	20.0 mpa at 28 days
Terminal Posts:	End, gate and corner posts to be set in specified concrete footings and shall be horizontally braced to the nearest line post on fences exceeding 6'(1.83m) in height. Terminal posts to be 3' longer than the fence height for fences without barbed wire. For fences with barbed wire, end and gate posts to be 4' longer than the height of the fabric to accommodate barbed wire, corner posts to be 3' longer than the fence height and topped with a corner barbed wire arm.
Line Posts:	Line posts spaced at maximum 10'(3.0m) apart. All line posts are to be 2' (600mm) longer than the height of the fabric. All posts shall be set to proper height to allow fabric to be positioned approximately 2"(50mm) above finished ground elevation and plumbed to give a correct alignment.
Top Rail:	The top rail shall follow the general contour of the finished grade and shall be free from frequent changes in slope. Where the ground is irregular, low areas under fence to be regraded by others. Top rail is attached to terminal posts with brace bands and rail ends.
Bottom Wire:	Bottom tension wire shall be stretched tight between terminal posts along the bottom edge of the fabric and tastened to fabric with hog rings 24"(600mm) apart.
Fabric:	The fabric shall be stretched taut approximately 2" (50mm) above finished ground elevation, and securely fastened to fence line and terminal posts. Fastening to terminal posts shall be with tension bars and tension bands spaced at 12"(300mm) intervals. Fastening to lineposts shall be with post ties spaced at 12"(300mm) intervals. Fastening to top rail shall be with rail ties spaced at 18"(450mm) intervals. Fabric shall be knuckled selvage on the bottom and either barbed or knuckled selvage on the top as illustrated. Note: 6' high 11 gauge or vinyl mesh is knuckled both top and bottom.
Barbed Wire (if required):	Three strands of barbed wire shall be stretched tight between terminal posts. It is to be vertical at the gate and end posts and is to be at a 45° angle in the line and at the corners.
Installation:	Gate, corner and line posts to be set in concrete. Gate posts to be set to opening of gate required measuring from the inside face of the posts. After concrete is sufficiently set, fittings shall be placed on posts in order indicated above and fabric stretched on. Note: Bracing for end, corner and gate posts is not required for fences with fabric 6'(1.83m) or under.

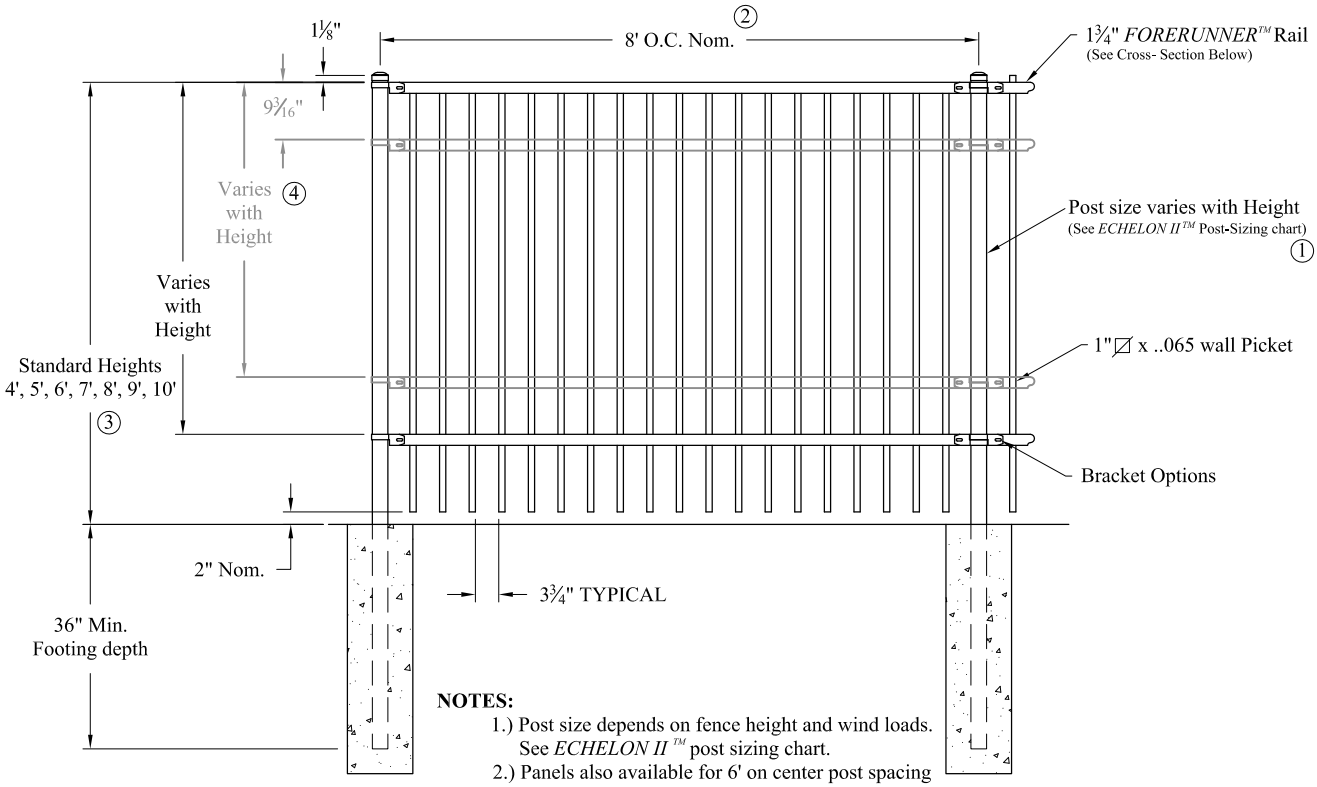


Selvages



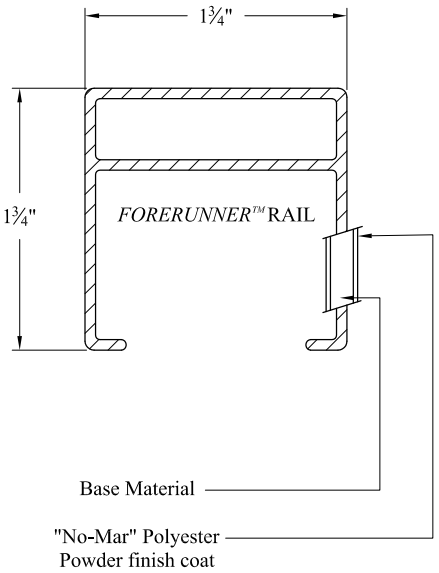
Minimum Depth and Diameter of Post Holes in Normal Soil

Fabric Height	End and Corner Posts		Line Posts		Gate Posts Same as End/Corners Posts
	Diameter	Depth	Diameter	Depth	
3' to 5' (0.9m – 1.5m)	9" (225mm)	3' 6" (1070mm)	9" (225mm)	3' 0" (900mm)	For Single Gates greater than 2.4m (8') or Double Gates greater than 4.8m (16')
6' to 8' (1.8m – 2.4m)	9" (225mm)	3' 6" (1070mm)	9" (225mm)	3' 0" (900mm)	300 mm by 1070 mm (12" by 3'6")
10' to 12' (3.0m –3.6m)	12" (300mm)	4' 0" (1200mm)	9" (225mm)	3' 6" (1070mm)	



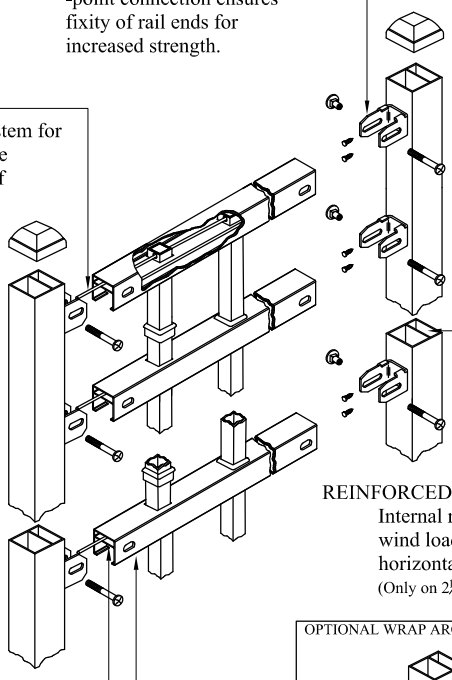
NOTES:

1.) Post size depends on fence height and wind loads. See *ECHELON II* ™ post sizing chart.
2.) Panels also available for 6' on center post spacing
3.) Additional heights available on request. Some heights noted require a third and/or fourth rail.
4.) Third and Fourth rail optional.



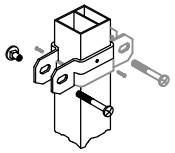
PANEL BRACKET
Specially designed two -point connection ensures fixity of rail ends for increased strength.

INTERNAL RETAINING ROD
Variable pitch connection system for ease of installation, high angle bias ability and elimination of unsightly external fasteners.



REINFORCED POST
Internal rib increases against wind loading as well as other horizontally applied forces
(Only on 2½" aluminum posts).

OPTIONAL WRAP AROUND BRACKET



INTERIOR GUIDE CHANNEL
Channel forms lower limit of raceway for retaining rod and allows for high angle bias ability.

FORERUNNER™ RAIL
"U"-Channel specially formed high strength architectural shape.

Values shown are nominal and not to be used for installation purposes. See product specification for installation requirements.

INDUSTRIAL STRENGTH ALUMINUM

2AMISO

Title:
ECHELON II MAJESTIC 2/3/4-RAIL

DR: NJB	SH . 1of 1	SCALE: DO NOT SCALE	
CK: BS	Date 2-07-12		REV: e

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