Commercial Building to Childcare Facility

2299 Pacific Avenue, Long Beach, CA 90806

ERC PROJECT#: 07-79-07720

for

2299 PACIFIC AVENUE LLC

2600 INDUSTRY WAY, LYNWOOD, CA 90262-4008

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ADDENDUM 2
The following revisions, clarifications, deletions and/or additions shall be made to the Construction Drawings and Specifications. All other requirements of the contract Documents Shall remain the same.

Acknowledge receipt of this addendum by inserting the addendum number in the Bid Form.

MATERIALS INCLUDED IN THIS ADDENDUM:

A. Addendum Description---------- (06) Pages
B. Attachment 1: Additional Specification sections ----------(102) Pages
C. Attachment 2: Revision 1 Drawings: A702, E-2.1.1B ----------(02) Pages

Total ---------- ---------- (110) Pages

1. Prebid questions deadline has been extended from 10:00 AM on February 1, 2024 to 10:00 AM on February 8, 2024.

Responses to Prebid Questions (PRFIs):

P**RFI #38:** Please provide specs for door type D3.

Answer: See specification section 102239 for requirement and the required submittal. Folding wall panel storage closet doors and associated hardware are part of the overall folding wall package by folding wall manufacturer. See note 19 on drawing sheet A701 and referenced detail on sheet A702.

P**RFI #39:** Sheet M2.1.1, duct insulation is only shown specifically for areas with concealed ceiling. Open ceiling areas does not show duct insulation. Table 4 on spec section 230700-10

specifies that exposed interior supply ductwork should have double-wall duct construction with 1" thick insulation. Advise on exposed to view interior ductwork.

Answer: Yes, provide per specification section 230700 Part 2 for Table 4 for exposed interior duct shall have insulation type DW-1 per note B.1 below the Table 4.

P**RFI #40:** Please provide spec for building signage.

Answer: See specification section 101400 for signage.

P**RFI #41:** Please confirm security is OFOI and not included in this bid.

Answer: Contractor to provide access control system per specification section 281000 for door D02. See revision 1 of drawing sheet E-2.1.1B for additional requirement. Security alarm and monitoring are not included in this bid.

P**RFI #42:** Are metal studs or wood studs required? A & S drawings conflict.

Answer: Use wood studs per structural plans in place of metal studs on architectural plan. Metal studs may be used per architectural plan for non-structural walls such as interior nonbearing partition walls.

P**RFI #43:** Please provide model of flush valve per irrigation legend on sheet L-201.

Answer: Flush Valve Assembly - PVC 1/2" SxS Ball Valve (SCH. 40) - 461 series from LASCO or equal Tubing is GPVCAR050IRR from GPH or approved equal. See Detail 6/L-203.

P**RFI #44:** Detail 11/L-202 shows 2 times diameter of the pipe for mainline & lateral line sleeve. However, technical specification section 328413/3.02.D shows two pipe sizes larger than the pressure piping. Please clarify.

Answer: Install sleeves per detail with 2 times diameter of the pipe for main line and lateral line sleeves.

P**RFI #45:** Detail 10 & 11/L-202 do not show sand for mainline, lateral line, & sleeves. However, technical specifications section 328413/3.02A shows below grade piping shall be installed on a firm sand bed for its entire length. Please confirm there no sand layer under mainline, lateral line, or sleeve, if sand bedding is required for the mainline, lateral line, or sleeve, please provide the depth of bedding.

Answer: 2" deep clean backfill (Firm Sand Bed per specs) See detail 10, Legend #5 for depth and extents.

P**RFI #46:** Detail 1/L-102 shows lodgepole pine stake for tree. However, technical specifications section 329000/2.01-K shows 9 feet R2 stake for 24" box size trees or smaller. Please clarify.

Answer: Use 2" x 10' Lodgepoles for tree staking with Cinch-Tie flexible vinyl Tree ties per Detail.

P**RFI #47:** Please confirm detail 1/L-102 standard tree – 36" box shall be applied to 24" box tree.

Answer: Yes, install new 24" Box trees per Detail 1, Standard Tree - 36" Box on Sheet L-102.

P**RFI #48:** Please provide the depth and material of decomposed granite base & class II aggregate base per detail 3/L-102.

Answer: Depth of DG or Quarry Fines is 1/4"-1" deep. Depth of Class II Aggregate Base is 3"-4" deep. See Manufacturers Recommendations/Guides.

P**RFI #49:** Please provide material of mulch for bidding purpose.

Answer: Organic Mulch - Gorilla Hair by EWSA or equal Cobble Mulch - Santa Fe Cobble by Southwest Boulder and Stone or equal.

P**RFI #50:** Specifications section 329000-10/3.02/F.1 shows 3 cubic yards of nitrogen fortified wood compost per 1,000 SF of planting area for soil preparation. However, planting note on sheet L-101 shows amending soil at a rate of a minimum of 4 CY per 1,000 SF of planting area. Please clarify.

Answer: Rates shown in Specifications are for bidding purposes only. Soils Report / Testing per Sheet L-101 Notes with agronomic soils lab recommendations will determine application rates and types of amendments for the sites existing soil. For bidding purposes, use the following rates:

1. Mechanically install following amount of fertilizer or soil conditioning materials at a uniform rate per 1,000 square feet of planting area to a 6-inch depth:

a. Four cubic yards of nitrogen fortified wood compost.

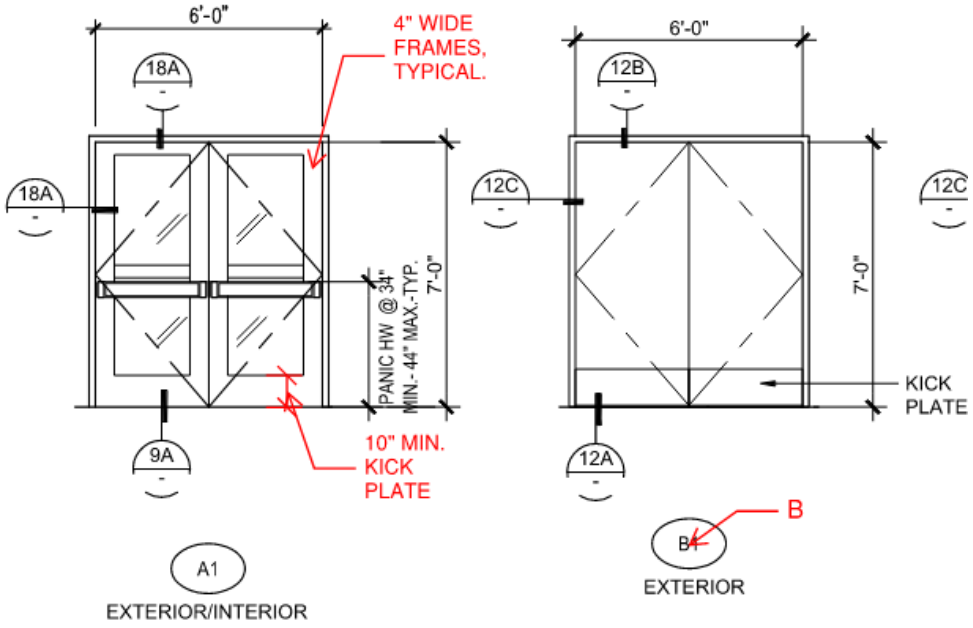
b. Two cubic yards of organic fertilizer.

c. One hundred pounds. of agricultural gypsum.

d. Thirty pounds of commercial fertilizer (14-14-14).

P**RFI #51:** Sheet A701 – Door schedule & Legend – The door legend calls out B1 twice; however, there is no legend for a Door B, which is listed on the door schedule. Please clarify.

Answer: Revise first door legend B1 to B for door legend B1 next to A1, see below.

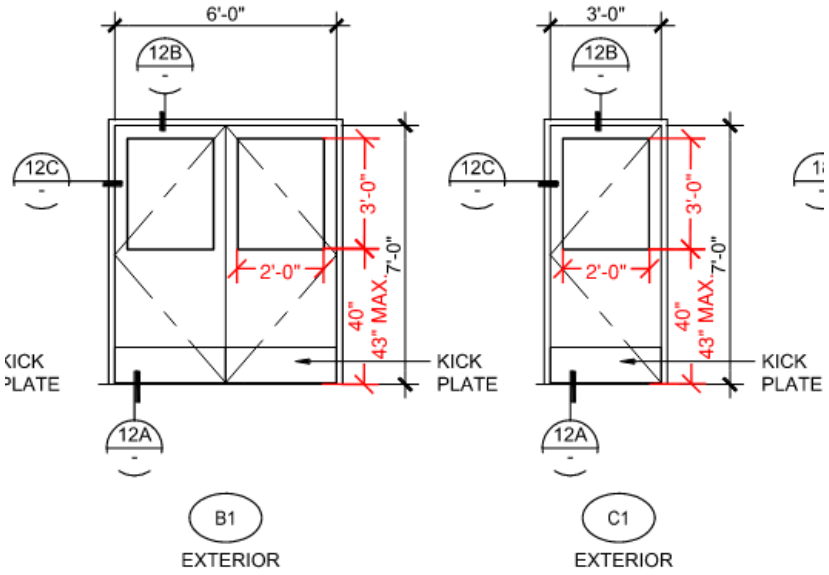


P**RFI #52:** Sheet A701 – Door Schedule – Door type D3, which houses the folding partitions, has a door dimension of 3'-0W x 7'-0"H shown on the door schedule; however, the D3 legend calls out the dimensions of the doors as 5'-0"W x Fabrication Height. Please clarify which door size is correct.

Answer: Provide per manufacturer requirement, see specification section 102239 for requirement and the required submittal. Folding wall panels and storage closet are to be per folding wall manufacturer. See note 19 on drawing sheet A701 and details on sheet A702.

P**RFI #53:** Sheet A701 – Please provide dimensions of the glass at doors A1, B1, and C1..

Answer: See diagram on RFI #51 and below.



P**RFI #54:** Specification Section 088053 and Security Glazing and Section 088716 Anti-Graffiti Control Film – In section 088053, para. 2.04, film thickness is 7 mils thick; however, Section 088716 calls out thickness to be 4 mils. Please clarify what is the thickness of the anti-graffiti film?

Answer: Use 7 mil thick Anti-Graffiti Control film per specification 088053 subsection 2.04.

P**RFI #55:** Section 088053 Security Glazing – Please identify which windows are to receive Security Glazing.

Answer: Glazing at door D02 and all exterior glazing to receive security glazing.

P**RFI #56:** Sheet A704 – Rooms 14 & 15 are to receive epoxy coating over concrete floor and references specifications for manufacturer information; however, there are no specifications for the epoxy coating. Please provide.

Answer: Use F5 inplace of F4 expoxy coating for floor finish at Room 14 & 15.

P**RFI #57:** Sheet A704 Finish Schedule calls for flooring Type F1 High Performance Tile 12" x 12" x 20 Mil thk. By Trident Industry or Equal; however, there are no specifications for High

Performance Tile, but there is a Specification Section 096523 for Luxury Vinyl Tile. These are two different types of tile. Please clarify which product is to be used on this project. .

Answer: Use LVT (F6) inplace of Hight Performance Tile (F1) for floor finish, see specification 096523 for LVT.

P**RFI #58:** Sheet A201, Keynote 4 calls for a (N) 12'-0"H Modernfold Partition; however, on Sheet A701 Door Legend D5, the partitions are shown to have a height of 10'-0". Please clarify the height of the partitions..

Answer: Provide 12'-0" high per keynote 4 on A201.

P**RFI #59:** Sheet A101, Keynote 1 calls for new 8'-0"H CMU wall; however, there are no specifications for masonry. Please provide.

Answer: See attachment 1 for specification 04 2200, and see structural detail 11/S-3.2.

P**RFI #60:** Sheet A101, Keynote 13 – calls for new fabric sail structure; however, there are no specifications for this product. Please provide.

Answer: Contractor to provide sail shade structure design and submit for approval. See note B & C under Permits & Deferred Submittal on sheet T001.

P**RFI #61:** The Table of Contents 000110-3 lists Division 21 Fire Suppression, Specification Section 211313 Fire Suppression Sprinkler System; however there are no specifications, nor are there any drawings for this work. Please clarify if building is to be fitted with sprinkler system.

Answer: Not required. Delete reference to specification section 211313 from Table of Contents.

P**RFI #62:** Table of Contents 000110-3 lists Division 14, Section 142426 – Modular Hydraulic Passenger Elevators. Plans do not show elevator. Please confirm, Specification is not part of this work.

Answer: Not required. Delete reference to specification section 142426 from Table of Contents.

P**RFI #63:** Sheet A101 shows new chain link fence around basketball court. Please provide specifications for this work.

Answer: See attachment 1 for specifications 323113 and 323114.

P**RFI #64:** Per Sheet A302 note 11 and sheet A303 note 12 we are to install new building signage. Please advise on wording, size, material and all required details for these signs.

Answer: Delete note 11 on A302 and note 12 on A303.

P**RFI #65:** Door (D08) as shown on A201 has the hinge jamb side connecting to the infill wood stud exterior wall. However on A303 there appears to be existing CMU wall in between the infill and the new door location. Which agrees with 10/S3.1. Should we account for drill and epoxy on the door side of the infill?

Answer: Yes, see attachment 3 for new detail 14 & 15 on drawing A702 revision 1.

P**RFI #66:** Plywood grade of the flat roof is stated clearly. Is it acceptable to use T&G CDX 5/8 for sheeting the crickets?

Answer: No, plywood at roof cricket must have exterior grade of Exposure I stamp.

P**RFI #67:** The finish schedule mentions a Trident LVT material but it's not very clear as to which style. The spec document doesn't help much. Will it be a 20 mil glue down or 20 mil click? Please advise.

Answer: See specification 096523, subsection 2.02.A for product requirement, and installation per subsection 3.06.

P**RFI #68:** Per conversation at the job walk, we want to verify the main switch gear will be replaced by others before the start of this project. Please confirm that's still the case..

Answer: Yes, the electrical gear in the main electrical room will be replaced/completed before construction starting date.

P**RFI #69:** Specification Sections 096513, 233113, 233713 are included in the Specifications, but are not listed on the Table of Contents. Are these sections part of this project? Please confirm.

Answer: Yes, these specification sections are required and are part of the work for this project. Add these specification sections 096513, 233113, 233713 to Table of Contents.

P**RFI #70:** Specification Sections 017417, 142426, 230529, 281000, 312000, 3207117, 321216, and 321236 are listed on the Table of Contents, however, there are no specifications for this work. Are these sections part of the work for this project? .

Answer: Specification sections 230529, 281000, 312000, 320117, 321216 are required and are part of the work for this project. See attachment 1 for specification sections 230529, 281000, 320117 added.

Specification sections 017417, 142426 are not required. Delete reference to specification sections 017417, 142426 from Table of Contents.

P**RFI #71:** Other questions for this project can you please confirm if this will be a DIR(Public work) Prevailing wage rate or will be the Davis -Bacon Act Prevailing wage rate. Please advise.

Answer: Contractor to comply with Davis-Bacon Act as noted throughout the bid documents. See addendum 1 for answer to PRFI #24 & #34.

End of Addendum #2

SECTION 04 2200

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Reinforcing steel.
3. Mortar, grout and grouting.
4. Bolts, anchors, hardware, metal frames, and other insert items.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 01 4523 - Testing and Inspection.
3. Section 03 1000 - Concrete Forming and Accessories.
4. Section 03 2000 - Concrete Reinforcing.
5. Section 03 3000 - Cast-In-Place Concrete.
6. Section 05 1000 - Structural Steel Framing.
7. Section 08 1113 - Hollow Metal Doors and Frames.

1.02 REFERENCES

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

1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
2. ASTM C90 - Standard Specification for Load Bearing Concrete Masonry Units.
3. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

4. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

5. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

6. ASTM C150 - Standard Specification for Portland Cement.

7. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

8. ASTM C270 - Standard Specification for Mortar for Unit Masonry.

9. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.

10. ASTM C426 - Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.

11. ASTM C476 - Standard Specification for Grout for Masonry.

12. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

13. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.

14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.

15. ASTM C1586 – Standard Guide for Quality Assurance of Mortars.

B. Masonry Standards Joint Committee (MSJC), the Masonry Society (TMS), American Concrete Institute (ACI) and American Society of Civil Engineers (ASCE).

1. TMS 602/ACI 530.1/ASCE 6 – Specification for Masonry Structures.

2. TMS 402/ACI 530/ASCE 5 – Building Code Requirements for Masonry Structures.

1.03 SUBMITTALS

A. Mix Design: Submit grout and mortar mix designs. Mix designs shall be signed and sealed by a Civil or Structural Engineer registered in the State of California.

B. Product Data: Submit manufacturer's Product Data for assembly components, materials, and accessories. Submit certificates and data assuring that the proposed materials meet the specified ASTM standards.

C. Samples: Submit Samples for each type of required masonry unit, including reinforcement and accessories.

D. Shop Drawings: Indicate wall reinforcement, splice locations and bending diagrams.

E. Admixtures: Additives and admixtures to mortar and grout shall not be used unless approved by the enforcing agency. Submit product data for any proposed admixture.

1.04 REGULATORY REQUIREMENTS

A. Perform the Work in accordance with CBC, Chapter 21A.

B. Comply with requirements of TMS 602.

1.05 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 4523 - Testing and Inspection.

B. Concrete Masonry Units:

1. Notify the testing laboratory a minimum of 45 days in advance of installing concrete unit masonry, to allow for preconstruction testing of the units.

a. Units will be sampled and tested in accordance with ASTM C140 for compressive strength, absorption and moisture content.

b. Units will be sampled and tested in accordance with ASTM C426 for linear drying shrinkage.

2. The material testing laboratory shall receive concrete masonry unit specimens for testing from masonry unit manufacturer. Number of specimens shall be as indicated in referenced ASTM standard tests. Testing laboratory will perform and send test results to the ARCHITECT and Project Inspector.

C. Portland Cement: Submit certification from the cement manufacturer that the cement proposed for use on the project has been manufactured in accordance with ASTM C150. Certification shall include test results made on cement samples during production.

D. Mortar and Grout Tests: Prior to the beginning of masonry work, mortar and grout will be tested, unless prism tests will be performed as indicated below.

1. Mortar: Shall conform to ASTM C270 Table 2 for Type S mortar.

a. Provide qualifications of mortar as meeting ASTM C270 at the beginning of the job and whenever mix design is changed.

b. Mortars will be evaluated during preconstruction and tested during construction for proportioning or compressive strength in accordance to ASTM C780.

2. Grout: Shall conform to ASTM C476, and will be tested in accordance with ASTM C1019. Compressive strength shall equal or exceed specified compressive strength (*f'm*) at 28 days, but not less than 2,000 psi.

a. Ready-Mix Grout: Grout manufacturer shall furnish batch ticket information in accordance to ASTM C94.

E. Prism Test: The compressive strength of concrete masonry will be determined by the prism test method prior to the start of construction and during construction.

F. Masonry Core Testing: Core testing will be performed in accordance with CBC, Section 2105A.4.

G. Inspection During Installation: A special inspector will continuously observe the installation of reinforced masonry. The Project Inspector shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.

H. OWNER will be responsible for the costs of original tests and inspection.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store units above grade on level platforms or pallets, in a dry location.

B. Store cementitious materials and aggregates in such a manner as to prevent deterioration or intrusion of foreign matter or moisture.

C. Handle units on pallets or flat bed barrows. Free discharge from conveyor units or transportation in mortar trays is not permitted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Unit Masonry: Modular **normal** weight conforming to ASTM C90, hollow load-bearing concrete unit masonry. Masonry units shall meet the minimum compressive strength requirements of ASTM C90, or as indicated on project drawings, whichever is greater.

1. Concrete masonry unit sizes shall be as indicated on the drawings.

2. Provide open-end units at walls to be fully grouted.

3. Provide closed-end units at walls and at openings where ends will be exposed in finish Work; provide bond beam blocks where horizontal reinforcement is indicated.

4. Provide special shapes and accessory units at locations indicated on Drawings.

5. Provide units in colors and textures as indicated in the drawings.

6. Masonry unit shall have been cured for a minimum of 28 days.

7. Masonry unit shall have maximum liner shrinkage of 0.065 percent from saturated to oven dry.

B. Portland Cement: ASTM C150, Type II, from one source.

C. Hydrated Lime: ASTM C207, Type S.

D. Aggregates: ASTM C144 for mortar and ASTM C404 for grout.

E. Mortar: ASTM C270, Type S, conforming to the property specifications of CBC Table 2103A.8 (2).

F. Grout: ASTM C476.

G. Admixture for Grout: Grout Aid, as manufactured by Sika Chemical Corp., or equal.

H. Water: Clean, potable, free from substances deleterious to mortar, grout or reinforcement.

I. Reinforcing Steel: Provide and install reinforcing steel in accordance with Section 03 2000 - Concrete Reinforcing.

J. Cleaning Materials: Sure Klean No. 600 detergent by ProSoCo.

K. Miscellaneous Materials: As required to complete the Work.

L. Anchor Bolts: Shall be hex headed bolts conforming to ASTM A307 Grade A with the dimensions of the hex head conforming to ANSI/ASME B18.2.1.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Discard units with cracks or other defects not complying with requirements of ASTM C 90.

3.02 CONSTRUCTION

A. Construct per applicable provisions of CBC and TMS 602.

B. Conform to TMS 602 for hot and cold weather masonry construction.

3.03 MORTAR AND GROUT MIXING

A. Mortar: Shall provide a minimum strength of 1,800 psi.

B. Grout: Shall provide a minimum strength of 2,000 psi or as indicated in the drawings, whichever is higher. Grout space requirements for coarse and fine grouts shall be per Table 7 of TMS 602. Add Sika Chemical Corp. Grout Aid per manufacturer's instructions.

C. Measurements: Measure in calibrated devices that can be checked at any time.

1. Add water for workable consistency.

2. Shovel measurements are not permitted.

D. Mixing: Mix in accordance to TMS 602.

1. Mortar: Mix cementitious materials and aggregates between three and five minutes in a mechanically operated mixer. Mix dry ingredients with a sufficient amount of water to provide a workable mix. Batches of less than one sack of cement, and fractional sack batches are not permitted.

2. Factory Blended Mortar: Mix in accordance with manufacturer's recommendations.

3. Grout: Add sufficient water for a workable mix that will flow into all voids of the masonry without separation or segregation. Grout slump shall be between 8 and 11 inches.

E. Re-tempering Time Limit: Use mortar within 2 ½ hours after mixing. Discard any mortar that has been mixed longer or that has begun to set. If necessary re-temper within this time limit, by replacing only water lost due to evaporation and by thoroughly remixing.

3.04 INSTALLATION OF MASONRY UNITS

A. Workmanship: Install masonry plumb and true to line with straight level joints of uniform thickness. Comply with TMS 602 tolerances. Maintain masonry clean during and after installation.

1. Lay-out and incorporate embedded hardware items.

2. Assist other trades with built-in items, which require cutting and fitting of masonry.

3. Cut block units with a diamond saw or carborundum wheel. Trowel or chisel cutting is not permitted.

4. Keep cavities clear of droppings and debris. Remove droppings prior to grouting.

B. Reinforcing Steel: Install as indicated on Drawings. Except as otherwise indicated, install reinforcement in accordance with standards of Concrete Reinforcing Steel Institute and to requirements specified in Section 03 2000 - Concrete Reinforcing. Do not splice vertical reinforcement except where indicated on the Drawings.

C. Shoring: Provide temporary shoring for lintels with sufficient strength to carry load without deflecting. Remove temporary shoring not less than 28 days after masonry has been installed.

D. Block Installation: Clean dirt and dust from surfaces before installation. Do not wet masonry units.

1. Foundation preparation: Clean top surface of concrete foundation of dirt, projections and laitance before starting masonry construction. Wet saw cutting of units immediately prior to laying is permitted.

2. Install masonry with mortar to required joint thickness. Install blocks with 3/8-inch mortar bed. Fill head joints solid, install tightly to adjoining units. Provide 3/8-inch joint thickness.

a. Hold racking to a minimum.

b. No toothing is permitted.

c. If it becomes necessary to move a unit after it has been installed, remove the unit, discard the mortar, and install the unit in fresh mortar.

3. Anchor Bolts: Provide 1/2-inch minimum grout space between bolts and masonry.

4. Bond: Unless otherwise indicated, install units in common running bond.

5. Finish Joint Treatment: Unless otherwise indicated, cut both interior and exterior joints flush, and tool slightly concave to a dense, uniform surface.

6. Grouting: Unless noted otherwise on Drawings, completely fill cells with grout.

E. Steel Door Frames:

1. Locate door frames accurately, install plumb, Set frames to floor with powder driven or expansion anchors to floor surface and brace in position before start of masonry installation.

a. Frames are specified to be furnished with adjustable anchors.

b. Fill interior of frames solid with mortar or grout as walls are constructed.

2. Provide temporary wood spreaders from jamb to jamb and from head to floor to ensure that jambs do not bow-in, distort from a straight line, or deflect from superimposed loads during construction.

3.05 GROUTING

A. Prior to grouting all cells shall be cleaned so that all spaces to be filled with grout do not contain mortar projections greater than 1/4 inch, loose mortar or foreign material.

B. Grout materials and water contents shall be controlled to provide adequate fluidity for placement without segregation of the constituents, and shall be mixed thoroughly. Reinforcement shall be properly positioned and solidly embedded in the grout.

C. The grouting of any section of wall shall be completed in one day with no interruptions greater than one hour.

D. Between grout pours, a horizontal control joint shall be formed by stopping all wythes at the same elevation and with the grout stopping at 1 ½ inches below a mortar joint, except at the top of the wall. Where bond beams occur, the grout pour shall be stopped a minimum of ½ inch below the top of the masonry.

3.06 LOW-LIFT GROUTING FOR HOLLOW MASONRY UNITS

A. Grouting shall meet the requirements of CBC Section 2104A.1.3.

B. After mortar joints have set, cells are cleaned of mortar and debris, and reinforcement is installed and inspected, grout cells in 4-foot maximum lifts.

Horizontal and vertical reinforcement shall be held in place within permitted tolerances by suitable devices.

C. Grout may be installed by pump, tremie or bucket, using hoppers to avoid spilling on exposed surfaces.

D. All grout shall be consolidated and reconsolidated with a mechanical vibrator after placing so as to completely fill all voids and to consolidate the grout. Grouted walls shall be solid and without voids.

3.07 HIGH-LIFT GROUTING OPTION FOR HOLLOW MASONRY UNITS

A. Grouting shall meet the requirements of CBC Section 2104A.1.3 and DSA IR 21-2.

B. High-lift grouting shall apply only to cell sizes available with 8 inch and wider block units. This method is subject to approval of the Division of the State Architect (DSA).

C. Provide bond beam units, inverted for start course, and omit alternate blocks or remove entire face shell of every other unit to allow access to all cells on bottom course for cleanouts.

D. Plug each cleanout by setting a face shell in mortar into opening and securely bracing it in place to prevent displacement. If masonry is not exposed in finish Work, cleanouts may be formed.

E. Grouting: Grouting shall be done in a continuous pour in lifts not exceeding 5-foot in height. The grouting of any section of a wall between control barriers shall be completed in one day, with no interruptions greater than one hour.

F. Consolidating: Grout shall be consolidated by mechanical vibration only, and shall be reconsolidated after excess moisture has been absorbed, but before plasticity is lost. Vibrating of reinforcing steel is not permitted.

3.08 CURING

A. Remove efflorescence, stains, debris, excess grout, and foreign matter.

B. During curing, or for any other purpose, do not saturate masonry with water.

3.09 PARGE COAT

A. Apply parge coat to the earth side of surfaces that are to receive waterproofing.

B. A Portland cement and sand mix (1:3.5 by volume) or Type S mortar may be used for the parge coat.

C. Parging should be applied to damp (not saturated) concrete masonry in two 1/4 inch thick layers. The first coat should be roughened when partially set, hardened for 24 hours, and then moistened before second coat is applied. The second coat should be trowelled to a smooth, dense surface.

D. The parge coat should be beveled at the top to form a wash, and thickened at the bottom to form a cove between the base of the wall and the top of footing.

3.10 CLEANING

A. At completion of masonry Work, remove misplaced mortar, grout or other foreign substances, and clean surfaces which will be exposed in finish Work with specified cleaner, or with clean water and stiff fiber brushes.

B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 6723

RESINOUS FLOORING

FLOWRESIN AND FLOWCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Resinous flooring system as shown on the drawings and in schedules.

B. Related sections include the following:

1. Section 03 3000 – Cast-In Place Concrete.

1.3 SYSTEM DESCRIPTION

A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy primer, high build epoxy coating seamless flooring system.

B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 30 mils. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

C. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted

1.4 SUBMITTALS

A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.

B. Manufacturer’s Material Safety Data Sheet (MSDS) for each product being used.

C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.5 QUALITY ASSURANCE

A. The Manufacturer shall have a minimum of 7 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified system and have a minimum of 5 years relevant experience..

C. No requests for substitutions shall be considered that would change the generic type of the specified System.

D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

E. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.

F. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping

1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product name and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 50o F and 90o F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 50o F and 90o F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.

2. The relative humidity in the specific location of the application shall be less than 90 % and the surface temperature shall be at least 50F above the dew point.

3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with cementitious urethane material.

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of 14 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.

2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary or desirable).

3. Sealers and curing agents should not to be used.

4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. The Owner shall be responsible for the removal of foodstuffs from the work area.

2. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

A. Flowcrete North America, Inc. warrants that its products are free from defects. Flowcrete North America, Inc. shall provide a materials warranty to the Owner for a period of one year from date of manufacture. Liability, if any, is limited to product replacement.

B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART 2 – PRODUCTS

2.1 FLOORING

A. Flowcrete North America, Inc, Flowcoat SF41 seamless flooring system.

1. System Materials:
   a. Primer: Flowcrete North America, Inc, High Performance Base A and Flowprime Hardener B.
   b. b. Coating: Flowcrete North America, Inc. High Performance Base A, Flowcoat SF41 Hardener B and Flowcrete Universal Quartz Color Pack.
2. Patch Materials
   a. Shallow Fill and Patching: Use Flowcrete North America, Inc. Flowprime scratchcoat produced by adding clean dry sand to Flowprime (up to ¼ inch).
   b. Deep Fill and Sloping Material (over ¼ inch): Use Flowcrete North America, Inc. Flowtex.

2.2 MANUFACTURER

A. Flowcrete North America, Inc., 11133 I-45 S, Suite K, Conroe, TX 77302. Phone (936) 359-6700

B. Manufacturer of Approved System shall be single source and made in the USA

2.3 PRODUCT REQUIREMENTS

A. Primer

		Flowprime
1.	Percent Solids	100 %
2.	VOC	<50 g/L
3.	Bond Strength to Concrete ASTM D 4541	> 400 psi, failure in substrate
4.	Compressive Strength, ASTM C 579	9,000 psi
5.	Tensile Strength, ASTM C 307	1,700 psi
6.	Flexural Strength, ASTM C 580	4,000 psi

B. Topping

		Flowcoat SF41
1.	Percent Solids	100 %
2.	VOC	<50 g/L
3.	Compressive Strength, ASTM C 579	> 11,600 psi
4.	Tensile Strength, ASTM C 307	> 2,175 psi
5.	Flexural Strength, ASTM C 580	> 8,700 psi

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.

1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General

1. All concrete surfaces shall be free of laitance, oil, grease, curing compounds, loose particles, friable matter, dirt, bituminous products and all other contaminants.
2. Moisture Testing Perform moisture vapor emission (calcium chloride) test in accordance with ASTM F 1869-10.
    a. Perform three tests for the first 1,000 sq ft and then one test per subsequent 1,000 sq ft.
    b. Application will proceed only when the vapor/moisture emission rates from the slab does not exceed 3 lbs/1,000 sq ft/24 hrs.
    c. If the vapor drive exceeds 3 lbs/1,000 sq ft/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
3. Mechanical surface preparation
    a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3 as described by the International Concrete Repair Institute.
    b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
    c. Cracks and joints (non-moving) greater than 1/16”wide are to be chiseled or chipped-out and repaired per manufacturer’s recommendations.
4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in three distinct steps as listed below:
    a. Substrate preparation
    b. Primer application (if required)
    c. Coating application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.

3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the applicator.

B. Primer – for porous substrates only
1. The primer shall be mixed and applied per manufacturer recommended procedure.
2. The primer shall be comprised of 2 components, Base A and Hardener B as supplied by the manufacturer.
3. The primer will be applied at the rate of 175 sq ft per gallon.
4. Allow material to cure.

C. Coating
1. The coating shall be mixed and applied per manufacturer recommended procedure
2. The coating shall be comprised of three components, Base A, Hardener B and Flowcrete Universal Color Pack as supplied by the Manufacturer.
3. The Color Pack shall be added to the Base and thoroughly dispersed then the Hardener shall be added to the Base and Color Pack and be thoroughly mixed by suitably approved mechanical means. The coating shall be applied over horizontal surfaces using a rubber squeegee, then back-rolled consistently. Late or inconsistent back rolling can lead to inconsistent color.
4. Allow to cure, then mix and apply a second coat as above.
5. Slip Resistance: Resistant to slipping appropriate to the installed conditions of use, as required by the 2022 California Building Code. Anti-slip texture can be created by broadcasting quartz into the first coat of Flowcoat SF41.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection
1. The following tests shall be conducted by the Applicator:
a. Temperature
1) Air, substrate temperatures and, if applicable, dew point.
b. Coverage Rates
1) Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION

SECTION 22 1113

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes piping and specialties for potable water service outside the building.

B. This Section does not include tapping of utility company water main.

C. Related Sections include the following:

1. “Earth Moving” Section for trench excavation and backfill.

2. Division 22 Section “Common Work Results for Plumbing” Section for potable piping inside the building.

1.03 DEFINITIONS

A. The following are industry abbreviations for plastic and rubber materials:

1. PE: Polyethylene plastic.

2. PVC: Polyvinyl chloride plastic.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:

1. Potable Water Service: 160 psig (1100 kPa).

1.05 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.

B. Product Data: For the following:

1. Backflow preventers.

2. Pipe and fittings.

3. Valves.

C. Coordination Drawings: For piping and specialties including relation to other services in same area. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

D. Record Drawings: At Project closeout of installed water-service piping according to Division 01 Section "Closeout Procedures".

E. Test Reports: As specified in "Field Quality Control" Article in Part 3.

F. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

G. Operation and Maintenance Data: For specialties to include in the maintenance manuals specified in Division 01. Include data for the following:

1. Backflow preventers.

2. Valves.

1.06 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to "Substitution Procedures" Section.

B. Comply with requirements of utility supplying water. Include tapping of water mains and backflow prevention.

C. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.

D. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.

E. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.

F. Provide listing, approval stamp, label, or other marking on piping and specialties made to specified standards.

G. Listing and Labeling: Provide electrically operated specialties and devices specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.

2. Protect valves against damage to threaded ends and flange faces.

3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves according to the following:

1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.

2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.08 PROJECT CONDITIONS

A. Perform site survey, research public utility records and/or pothole as necessary to verify existing utility locations. Contact utility locating service for area where Project is located.

B. Verify that it is possible to install water service piping to comply with original design and referenced standards.

C. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings. Owner assumes no responsibility for interpretations or conclusions drawn from this information.

D. Interruption of Existing Water-Distribution Service: Do not interrupt service facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.

2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.09 SEQUENCING AND SCHEDULING

A. Coordinate connection to water main with utility company.

B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building water distribution piping.

C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Tapping Sleeves and Valves:

a. American Cast Iron Pipe Co.; Waterous Co.

b. Mueller Co.; Water Products Div.

c. McWane, Inc.; Kennedy Valve Div.

d. United States Pipe & Foundry Co.

2. Gate Valves:

a. American AVK Co.

b. American Cast Iron Pipe Co.; Waterous Co.

c. Mueller Co.; Water Products Div.

d. McWane, Inc.; Kennedy Valve Div.

e. Milwaukee Valve Co., Inc.

f. Nibco, Inc.

3. Backflow Preventers:

a. Ames Co., Inc.

b. CMB Industries; Febco Div.

c. Conbraco Industries, Inc.

d. Watts Industries, Inc.; Water Products Div.

e. Zurn Industries, Inc.; Wilkins Div.

2.02 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated, with cement-mortar lining and seal coat according to AWWA C104.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Gaskets: AWWA C111, rubber.

C. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated, with cement-mortar lining and seal coat according to AWWA C104.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

D. PVC Plastic Pipe: ASTM D 1785, with marking "NSF-pw" according to NSF 14, Schedule 40.

E. PVC Plastic Pipe: ASTM D 1785, with marking "NSF-pw" according to NSF 14, Schedule 80.

F. Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type A) seamless water tube, annealed temper.

2.03 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and rubber compression gaskets according to AWWA C111.

C. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

D. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.

E. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, unless otherwise indicated.

F. PVC Plastic, Socket Fittings: ASTM D 2466, Schedule 40.

G. PVC Plastic, Socket Fittings: ASTM D 2467, Schedule 80.

H. PVC Plastic Fittings: UL 1285 and AWWA C907, Class 150. Include elastomeric seals according to ASTM F 477.

I. Ductile-Iron Fittings for PVC Pipe: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type; push-on- or mechanical-joint type. Include dimensions matching PVC pipe, cement-mortar lining and seal coat according to AWWA C104, and rubber compression gaskets according to AWWA C111.

J. Copper Fittings:

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, Wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

2. Copper, Pressure-Seal Fittings

a. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.

b. NPS 2-1/2 to NPS 4: Bronze fitting with stainless steel grip ring and EPDM O-Ring seal in each end.

2.04 JOINING MATERIALS

A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

B. Ductile-Iron Piping: The following materials apply:

1. Push-on Joints: AWWA C111 rubber gaskets and lubricant.

2. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.

3. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel bolts and nuts.

a. Gaskets: Rubber, flat face, 1/8 inch (3 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Primers for PVC Piping Solvent-Cement Joints: ASTM F 656.

D. Solvent Cement for PVC Piping Solvent-Cement Joints: ASTM D 2564.

E. Copper Pipe: The following materials apply:

1. Solder Filler Metal: ASTM B 32 Alloy Sn95, Alloy Sn94, or Alloy E, with 0.10 percent maximum lead content.

2. Brazing Filler Metal: AWS A5.8 BCuP Series.

F. Pipe Couplings: Iron-body sleeve assembly, fabricated to match OD of pipes to be joined.

1. Sleeve: ASTM A 126, Class B, gray iron.

2. Followers: ASTM A 47 (ASTM A 47M), malleable iron; or ASTM A 536, ductile iron.

3. Gaskets: Rubber.

4. Bolts and Nuts: AWWA C111.

5. Finish: Enamel paint.

G. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.05 PIPING SPECIALTIES

A. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, or plain weld-neck end types and matching piping system materials.

2. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.

3. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum pressure to suit system pressures.

4. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure to suit system pressures.

5. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

6. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C).

2.06 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for underground metal piping

1. Standards: ASTM A 674 or AWWA C105.

2. Form: Sheet or tube.

3. Material: LLDPE film of 0.008-inch (0.20-mm) minimum thickness, or high density, cross laminate PE film of 0.004-inch (0.10-mm) minimum thickness.

4. Color: Black or Natural.

2.07 GATE VALVES

A. Non-rising-Stem, Resilient-Seated Gate Valves, 3-Inch NPS (DN80) and Larger: AWWA C509, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 200-psig (1380-kPa) minimum working-pressure design, interior coating according to AWWA C550, mechanical-joint ends.

B. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches (125 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.

1. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut. After installation of valve box cover and after installation of adjacent paving, if any, covers shall be sandblasted or wirebrushed as necessary and painted with bituminous black paint, unless another color is required by the Architect.

C. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

1. Tapping Sleeve: Cast- or ductile-iron, 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical-joint ends with rubber gaskets or sealing rings in sleeve body. Include sleeve matching size and type of pipe material being tapped and of outlet flange required for branch connection.

2.08 BACKFLOW PREVENTERS

A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.

B. Working Pressure: 150 psig (1035 kPa) minimum, unless otherwise indicated.

C. 2-1/2-Inch NPS (DN65) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.

D. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.

E. Interior Components: Corrosion-resistant materials.

F. Strainer on inlet if strainer is indicated.

G. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.

H. Reduced-Pressure-Principle Backflow Preventer: ASSE 1013, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves for continuous-pressure application.

1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.

I. Reduced-Pressure-Principle Backflow Preventer: AWWA C511, with OS gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves for continuous-pressure application.

1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.

J. Double-Check Backflow Prevention Assemblies: ASSE 1015, with valves on inlet and outlet and strainer on inlet. Include test cocks with 2 positive-seating check valves for continuous-pressure application.

1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

K. Double-Check-Valve Assembly: AWWA C510, with OS&Y gate valves on inlet and outlet, and strainer on inlet.

1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

L. Double-Check-Valve Assembly: UL 312, FM approved. Assembly has two UL 312, FM-approved, iron-body, 175-psig (1200-kPa) working-pressure, flanged-end check valves, with two UL 262, FM-approved, iron-body, OS&Y, flanged, 175-psig (1200-kPa) working-pressure gate valves.

1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

M. Antisiphon, Pressure-Type Vacuum Breakers: ASSE 1020, with valves, spring-loaded check valve, and spring-loaded floating disc. Include test cocks and atmospheric vent for continuous-pressure application.

1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

N. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves, test cocks, and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer, for continuous-pressure application.

1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.

O. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include 2 positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous-pressure application.

1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

2.09 ANCHORAGES

A. Clamps, Straps, and Washers: ASTM A 506, steel.

B. Rods: ASTM A 575, steel.

C. Rod Couplings: ASTM A 197 (ASTM A 197M), malleable iron.

D. Bolts: ASTM A 307, steel.

E. Cast-Iron Washers: ASTM A 126, gray iron.

F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psig (20.7 MPa).

1. Cement: ASTM C 150, Type I.

2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

2.10 IDENTIFICATION

A. Refer to "Earth Moving" Section for underground warning tape materials.

B. Arrange for warning tapes made of solid blue film with continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

C. Arrange for detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

D. Nonmetallic Piping Label: Engraved, plastic-laminate label at least 1 by 3 inches (25 by 75 mm), with caption "CAUTION--THIS STRUCTURE HAS NONMETALLIC WATER-SERVICE PIPING," for installation on main electrical meter panel.

PART 3 - EXECUTION

3.01 RELATED SECTIONS

A. Refer to "Earth Moving" Section for excavation, trenching, and backfilling.

B. Refer to "Asphalt Paving" Section for cutting and patching of existing paving.

C. Refer to "Concrete Paving" Section for cutting and patching of paving.

3.02 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

1. Potable Water-Service Piping: Use the following:

a. 1/4- to 3-1/2-Inch NPS (DN65 to DN90): PVC plastic, ASTM D 1785 Schedule 40 pipe; PVC plastic, Schedule 40, socket fittings; and solvent-cemented joints.

b. 1/4- to 3-1/2-Inch NPS (DN65 to DN90): PVC plastic, ASTM D 1785 Schedule 80 pipe; PVC plastic, Schedule 80, socket fittings; and solvent-cemented joints.

c. 4- to 8-Inch NPS (DN100 to DN200): PVC plastic, AWWA C900 Class 150, fire-service pipe; PVC plastic fittings; and elastomeric seal joints.

d. 1/4- to 4-Inch NPS (DN20 to D100): Copper tube, Type K (Type A).

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

3.03 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, 3-Inch NPS 3 (DN80) and larger: AWWA, cast-iron, gate valves, non-rising stem, with valve box.

3.04 JOINT CONSTRUCTION

A. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.

B. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

C. PVC Piping, Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

D. PVC Piping Solvent-Cement Joints: According to ASTM D 2672 and ASTM D 2855. Handle cleaner, primer, and solvent cement according to ASTM F 402.

E. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

3.05 PIPING SYSTEMS - COMMON REQUIREMENTS

A. See Division 22 Section “Common Work Results for Plumbing” for piping-system common requirements.

3.06 SERVICE ENTRANCE PIPING

A. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

B. Sleeves and mechanical sleeve seals are specified in "Mechanical" Section.

C. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

D. Anchor service-entry piping to building wall.

3.07 PIPING INSTALLATION

A. Water-Main Connection: Arrange for tap in water main, of size and in location indicated, from water utility.

B. Water-Main Connection: Tap water main with size and in location as indicated according to requirements of water utility.

C. Make connections larger than 2-inch NPS 2 (DN50) with tapping machine according to the following:

1. Install tapping sleeve and tapping valve according to manufacturer's written instructions.

2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.

3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.

4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.

D. Install ductile-iron piping according to AWWA C600.

1. Encase piping with PE film according to ASTM A 674 or AWWA C105.

2. Install encasement per manufacturer's written instructions. Close seams and overlaps in the polyethylene tubes with polyethylene compatible

adhesive tape. The tape shall be approximately two inches wide and shall have the ability to bond securely to a metal surface and the polyethylene material. Repair all rips, tears and other damage with suitable adhesive tape.

E. Install AWWA PVC plastic pipe according to AWWA M23 and ASTM F645.

F. Bury piping with depth of cover over top at least 30 inches (750 mm) and according to the following:

1. Under Driveways: With at least 36 inches (900 mm) cover over top.

2. Under Railroad Tracks: With at least 48 inches (1200 mm) cover over top.

3. In Loose Gravelly Soil and Rock: With at least 12 inches (300 mm) additional cover.

4. If trenching before rough grading is completed would result in a lesser depth of cover than specified above, then trenching for water piping installation shall not be done until the specified minimum cover depth can be effected. If construction traffic will be allowed to pass over completed water piping installations prior to finish paving, then a protective pavement blanket at least equivalent to the final pavement and base thickness shall be constructed within the vehicle access area for a minimum distance of three feet on either side of the pipe. As an alternative to the temporary pavement blanket, the water pipe shall be installed at a minimum of two (2) feet deeper than specified within construction traffic areas.

5. See Paragraph 3.12.F of the "Earth Moving" Section for concrete encasement where depth of cover will be less than 2.5 feet for existing or finish grade, whichever is lower.

G. Install piping under streets and other obstructions that cannot be disturbed by tunneling, jacking, or combination of both.

3.08 PIPING INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.

2. Gasketed-Joint, PVC Potable-Water Piping: According to AWWA M23.

B. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.09 VALVE INSTALLATION

A. General Application: Use mechanical-joint-end valves for 3-inch NPS (DN80) and larger underground installation.

B. AWWA-Type Gate Valves: Comply with AWWA C600 and AWWA M44. Install underground valves with stem pointing up and with cast-iron valve box.

3.10 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.

B. Do not install reduced-pressure-principle type in pit.

C. Do not install bypass around backflow preventer.

D. Support backflow preventers, valves, and piping on brick or concrete piers.

3.11 IDENTIFICATION INSTALLATION

A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 6 to 8 inches (150 to 200 mm) below finished grade, directly over piping.

B. Attach nonmetallic piping label permanently to main electrical meter panel.

3.12 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.

1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

C. Prepare reports for testing activities.

3.13 CLEANING

A. Clean and disinfect water distribution piping as follows:

1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651 or as described below:

a. Comply with NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.

1) Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine. Isolate system or part thereof and allow to stand for 24 hours.

2) Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

3) Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.

4) Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports for purging and disinfecting activities.

C. Perform disinfection as directed in the procedures of San Gabriel Valley Water Company.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe hangers and supports.

2. Trapeze pipe hangers.

3. Thermal-hanger shield inserts.

4. Fastener systems.

5. Equipment supports.

6. Metal framing systems.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Steel pipe hangers and supports

2. Thermal-hanger shield inserts.

B. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 “Hangers and Support Applications” Article for where to use specific hanger and support types.

C. Available Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.
15. Or equal.

D. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.

2. ERICO/Michigan Hanger Co.; ERISTRUT Div.

3. GS Metals Corp.

4. Thomas & Betts Corporation.

5. Tolco Inc.

6. Unistrut Corp.; Tyco International, Ltd.

7. Or equal.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. Carpenter & Paterson, Inc.

2. ERICO/Michigan Hanger Co.

3. PHS Industries, Inc.

4. Pipe Shields, Inc.

5. Rilco Manufacturing Company, Inc.

6. Value Engineered Products, Inc.

7. Or equal.

C. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

G. Mechanical-Expansion Anchors: Insert-wedge-type [zinc-coated] [stainless] steel, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.

b. Empire Industries, Inc.

c. Hilti, Inc.

d. ITW Ramset/Red Head.

e. MKT Fastening, LLC.

f. Or equal.

2.5 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.

2. Design Mix: 5000-psi, 28-day compressive strength

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricates from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and

strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

   b. NPS 4: 12 inches long and 0.06 inch thick.

   c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

   d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.

   e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.

6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 28 1000

ACCESS CONTROL SYSTEMS (ACS)

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Access Control System monitoring, badging and field hardware that includes cards/fobs, card readers, door contacts, request-to-exit devices, input boards, output boards, field controllers and supporting power, cabling and network infrastructure.

B. Access Control System shall be integrated with LAUSD's Security Management System (SMS).

1.02 RELATED SECTIONS

A. Applicable Division 1 sections.

B. Section 00 70 00: General Conditions.

C. Section 01 77 00: Contract Closeout.

D. Section 21 23 23: Excavating, Backfilling and Compacting for Utilities.

E. Section 06 10 00: Rough Carpentry.

F. Section 26 05 00: Common Works Results for Electrical.

G. Section 26 05 13: Basic Electrical Materials and Methods.

H. Section 26 05 26: Grounding and Bonding.

I. Section 26 05 33: Raceways and Boxes Fittings and Supports.

J. Section 26 24 16: Panelboards and Signal Terminal Cabinets.

K. Section 26 52 00: Emergency Power Systems.

L. Section 27 05 36: Cable Trays for Communications.

M. Section 08 00 00: Door Hardware.

N. Section 14 00 00: General Elevator Requirements.

O. Section 28 23 00: Video Surveillance.

1.03 REFERENCES

A. IEC/EN/UL 60950-1: – Information Technology Equipment - Safety - Part 1: General Requirements.

B. IEC/EN/UL 60950-22: Technology Equipment Safety – Part 22: Equipment to be Installed Outdoors.

C. IEEE 802.3at (Power over Ethernet Plus) – Power over Ethernet Plus.

D. IEEE 802.1X (Authentication) – Standard for Local and metropolitan area .networks-Port-Based Network Access Control (Authentication).

E. IPv4 (RFC 791) – Internet Protocol Version 4.

F. IPv6 (RFC 2460) – Internet Protocol Version 6.

G. QoS – DiffServ (RFC 2475) – Scalable End-to-End Quality of Service Model.

H. IEC/EN 60529 IP66 (Ingress protection) – Degrees of Protection Provided by Enclosures (IP Code).

I. NEMA 250 Type 4X – Enclosures for Electrical Equipment.

J. IEC/EN 62262 IK10 – Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).

1.04 SUBMITTALS

A. List of Materials: Submit a complete list of proposed materials.

B. Shop Drawings: Provide detailed and dimensioned Shop Drawings indicating kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of parts or modules, sizes, and complete details of method of fitting suspension and fastening luminaires in place. Provide wiring and cabling diagrams. Drawings shall contain sufficient information to assemble and install equipment at the Project site without further instructions.

C. Installation Instructions: Submit manufacturer's written installation instructions for luminaires and accessories.

1.05 SUBSTITUTIONS

A. Equipment and materials that deviate from these requirements shall not be accepted without written approval from OWNER'S Information Technology project manager. When deviating or proposing material substitutions the following information shall be submitted:

1. Substitution request form substantiating reasons and benefits to OWNER, and all necessary documents to validate the claims made in the substitution form.
2. Submittals must comply with contract general provisions.
3. The CONTRACTOR assumes all responsibility for additional costs, directly or indirectly, associated with proposing and installing an approved substitution products. All substituted products must meet the intent of form and function identified in the specification.

1.06 QUALITY ASSURANCE

A. The CONTRACTOR or security sub-CONTRACTOR shall be a licensed security CONTRACTOR with a minimum of five (5) years' experience installing and servicing systems of similar scope and complexity, and evidence that CONTRACTOR has completed at least three (3) projects of similar scope, and is currently engaged in the installation and maintenance of systems herein described.

B. All installation, configuration, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.

C. The CONTRACTOR or designated sub-CONTRACTOR shall submit installer's third party verified credentials of completion of manufacturer certification. The CONTRACTOR system programmer shall have attended manufacturer training and obtained the highest level certifications in Integrated Security Management System (ISMS) that supports the ACS and VMS.

D. The CONTRACTOR shall provide four (4) current references from clients with systems of similar scope and complexity that became operational in the past three (3) years. At least three (3) of the references shall be utilizing the same system components, in a similar configuration as the proposed system.

E. The access control system shall be in compliance with applicable industry standards listed under article 1.04-References.

1.07 WARRANTY

A. All Access Control system components and labor furnished by the CONTRACTOR including wiring, software, and hardware and custom parts shall be fully warranted for parts, materials, and labor and travel expenses for a minimum of three (3) years from date of the final acceptance of the Access Control System.

B. The manufacturer shall provide warranty and optional extended warranty for the hardware for a total period of five years. If enacted as part of the contract, the CONTRACTOR will repair or replace parts and/or labor per the warranty for the length of this warranty at no cost to the client.

C. The media on which the Software Product resides will be free from defects in materials and workmanship. Software defects shall be covered through Service Releases and Cumulative Updates, which shall be provided for a period of 1 year from the date of the software purchase.

D. The MANUFACTURER and CONTRACTOR shall provide a Software Service Agreement for the warranty period above and optional extended warranty period as selected by the client. If enacted as part of the contract, the CONTRACTOR will patch, update and upgrade software necessary to maintain a current version system.

PART 2 – PRODUCTS

2.01 SYSTEM GENERAL REQUIREMENTS

A. The ACS shall be an enterprise class IP access control software solution. It shall be fully embedded within a unified security platform (USP) as part of the Integrated Security Management System (ISMS). This platform shall allow the seamless unification of the ACS with an IP video management system (VMS).

B. The ACS shall be scalable to support configurations consisting of estimated 10,000 doors with facilities spanning multiple geographic areas.

C. The ACS shall support an unrestricted number of logs and historical transactions (events and alarms) with the maximum allowed being limited by the amount of hard disk space available.

D. The ACS shall support a variety of access control functionalities, including but not limited to:

1. Controller management, door management, elevator management, and area management.
2. Cardholder and cardholder group management, credential management, and access rule management.
3. Badge printing and template creation.
4. People counting, area presence tracking, and mustering.
5. Offering a framework for third party hardware integration such as card and signature scanner.

E. Certifications. The ACS shall have the following certifications:

1. UL-294.
2. ULC-S319.
3. EN-60839-11-1.

2.02 ACS ACCESS MANAGEMENT

A. The ACS shall be based on an open architecture able to support multiple access control hardware manufacturers. The ACS shall be able to integrate with multiple non-proprietary interface modules and controllers, access readers, and other third party applications.

B. The ACS shall be an IP enabled solution. All communication between the ACS and hardware controllers shall be based on standard TCP/IP protocol.

C. Access Manager Role

1. The Access Manager Role shall be the server that synchronizes all access control hardware units under its control, such as door controllers and IO modules. It shall also be able to validate and log all access activities and events when the door controllers and IO modules are online.
2. The Access Manager Role shall maintain the communication link with the hardware controllers under its control. It shall also continuously monitor whether the controllers are online or offline.
3. Synchronization of hardware units shall be automated and transparent to users and shall occur in the background. It shall also be possible to manually synchronize units or to synchronize units on a schedule.
4. The Access Manager Role shall support doors and controllers located within one or more facilities. The Access Server shall support a minimum of 200 readers and up to 1024 readers per computer.

D. The Access Server shall store all access events associated with the doors, areas, hardware zones (hardware input points), elevators, and controllers under its direct control.

2.03 ACS GLOBAL CARDHOLDER MANAGEMENT

A. The ACS shall support global cardholder management and synchronization between a central independent site and remote independent sites, all of which can have their own Directory and databases.

B. It shall be possible to synchronize the following entities and their configuration data:

1. Cardholders (incl. custom fields).
2. Cardholder groups.
3. Credentials.
4. Badge templates.

C. Cardholders and other synchronized entities can be added centrally and synchronized to remote sites for central cardholder management.

D. Cardholders and other synchronized entities can be added at remote sites and synchronized to the central site and other remote sites.

E. The ACS shall support the assignment of a single card per cardholder across all of an organization’s sites.

F. Manual and scheduled synchronization shall be supported.

2.04 ACS HARDWARE COMPATIBILITY LIST

A. The ACS shall have an open architecture that supports the integration of third party IP-based door controllers and IO modules. The ACS shall simultaneously support mixed configurations of access control hardware from multiple vendors.

B. The ACS shall support multiple types of hardware devices: single-reader controllers, 2-reader controllers, 1- to 64-reader controllers, integrated readers and door controllers, and Power-over-Ethernet (PoE) enabled door controllers.

C. The ACS shall support most industry standard card readers that output card data using the Wiegand protocol and Clock-and-Data.

D. The ACS shall support the IP-enabled controllers.

2.05 SEAMLESS UNIFICATION WITH VMS

A. Through the USP, the ACS shall support integration with an IP Video Surveillance System (VSS). Integration with an IP video surveillance system shall permit the user to view live and recorded video.

B. Users shall be able to associate one or more video cameras to the following entity types: doors, elevator, and hardware zone (input points) and more.

C. The Monitoring UI shall present a true Unified Security Interface for access control and video surveillance. Advanced live video viewing and playback of archived video shall be available through the Monitoring UI.

D. It shall be possible to view video associated with access control events when viewing a report.

2.06 ACS CONTROLLER (UNIT) MANAGEMENT

A. The ACS shall support the discovery, configuration, and management of IP enabled controllers and IO modules (hardware units). A user shall be permitted to add, delete, or modify a controller if he or she has the appropriate privileges.

B. The ACS shall support automatic unit discovery. The user shall establish the settings for discovery ports and for the types of unit discovery and the ACS shall automatically detect all connected devices.

C. The ACS shall support a unit swap utility for swapping out an existing controller with a new controller. The unit swap utility shall avoid the reprogramming of the system whenever a unit is replaced. All logs and events from the old unit shall be maintained.

D. The ACS shall support pre-configuration of the system prior to the physical hardware installation.

2.07 ACS CARD HOLDER AND CARDHOLDER GROUP MANAGEMENT

A. The ACS shall support the configuration and management of cardholders and cardholder groups. A user shall be able to add, delete, or modify a cardholder or cardholder group if he or she has the appropriate privileges.

B. Custom fields shall be supported for both cardholders and cardholder groups.

C. The ACS shall permit the following activation/expiration options for a cardholder's profile: delayed activation of a cardholder's profile, expiration based on the date of first use of credentials, or expiration on a user-defined date.

D. It shall be possible to associate a picture to a cardholder's profile. The picture shall be imported from a file, captured with a digital camera, or captured from a video surveillance camera. When a cardholder event occurs, the picture of the cardholder shall be displayed in the Monitoring UI. The ACS shall support multiple standard picture formats.

E. Cardholder groups shall enable the grouping of cardholders to facilitate mass changes to system settings. It shall be possible to assign cardholder groups to access rules, thus avoiding the assignment of one cardholder at a time.

F. It shall be possible to search by picture association, custom fields, names and credential codes.

G. It shall be possible to select multiple cardholders for immediate deactivation or reactivation.

H. The ACS shall support the synchronization of cardholders and cardholders group through Active Directory including the credentials and pictures of the cardholders. (Specifier, Active Directory integration requires a license and available in Professional and up).

2.08 ACS CREDENTIAL MANAGEMENT

A. The ACS shall support the configuration and management of credentials, e.g. access cards and keypad PIN numbers. A user shall be able to add, delete, or modify a credential if the user has the appropriate privileges.

B. Users shall be able to add Custom Fields (user-defined fields) to credentials. Creating a new credential shall be accomplished either manually or automatically.

C. Automatic creation shall allow the user to create a credential entity by presenting a credential to a selected reader. The ACS shall read the card data and associate it to the credential entity. It shall be possible to automatically enroll any card format (128 bits or less).

D. The ACS shall support multiple credentials per cardholder without necessitating duplicate cardholder information. The ACS shall automatically detect and prevent attempts to register an already-registered credential.

E. Batch enrollment of credentials shall be supported.

F. The ACS shall provide a workflow for badge issuance and card requests.

2.09 ACS CUSTOM CARD FORMAT

A. A custom card format feature shall allow the administrator to add additional custom card formats.

2.10 ACS BADGE DESIGNER

A. A The badge designer shall allow the creation of badge templates that define the content and presentation format of a cardholder badge to be printed.

B. Badge production shall consist of selecting the credential, the badge template, and clicking print.

C. Batch printing of cards shall be available.

D. The contents of a badge template can include: cardholder’s first and last name, picture, custom fields, bitmap graphics, lines, ovals, rectangles, dynamic text labels linked to custom fields and static text labels, and barcodes (Interleaved 2 of 5, Extended Code 39).

E. Copy and paste of badge template objects shall be available.

F. It shall be possible to set the border thickness, and color, the fill color of badge objects (content), and the color of text labels.

G. Settings, such as object transparency, text orientation, and auto-sizing of text shall be available or transparent to the user.

H. Dual-sided badges shall be supported.

2.11 ACS DOOR MANAGEMENT

A. The ACS shall support the configuration and management of doors. A user shall be able to add, delete, or modify a door if he or she has the appropriate privileges.

B. The ACS shall permit multiple access rules to be associated to a door.

C. The ACS shall support the following forms of authentication: Card Only, Card or Keypad (PIN), or Card and Keypad (PIN). It shall be possible to define a schedule for when Card Only or Card and Keypad authentication modes shall be required.

D. It shall be possible to set an extended grant time on a per-door basis (in addition to the standard grant time). Cardholder properties shall include the option of using the extended grant time. When flagged cardholders are granted access, the door shall be unlocked for the duration of the extended grant time instead of the standard grant time.

E. The ACS shall allow the configuration of the relocking mode on doors such as on door open, after a definite time, or on door close.

F. The ACS shall support the ability to enable access rules for other cardholders once a supervisor has accessed an area.

G. The ACS shall support the ability to enable unlocking schedule on a door once an employee has entered the facility.

H. Readerless doors.

1. The ACS shall support doors configured solely with a lock, a REX, and a door contact but without readers.

2. The implementation of a readerless door shall be possible with the use of standard access hardware IO modules. External hardware such as timers, shall not be required.

3. Unlocking schedules shall be programmable for readerless doors.

4. Standard door activity reports shall also be possible with readerless doors.

I. Unlocking schedules and exceptions to unlocking schedules shall be associated with a door. An unlocking schedule shall determine when a door should be automatically unlocked. The ACS shall also support the use of a specific offline unlocking schedule. Exceptions to unlocking schedules shall be used to define time periods during which unlocking schedules shall not be applied, such as during statutory holidays.

J. The ACS shall support one or more cameras per door. Video shall then be associated to door access events, such as access grant or access denied.

2.12 ACS ELEVATOR MANAGEMENT

A. The ACS shall support the configuration and management of elevators. A user shall be able to add, delete, or modify an elevator if he or she has the appropriate privileges.

B. The ACS shall be able to control access to specific floors using a reader within the elevator cab. Control shall be available through the use of a controller with an interface to a reader and to multiple output modules with relays.

C. Elevator floor selections shall be tracked using a controller with an interface to multiple input modules. Floor tracking shall be available within an elevator activity report.

D. The elevator control module shall continue to function in offline mode should communication between the ACS and the controller fail.

E. The ACS shall support one or more cameras per elevator cab. Video shall then be associated to elevator access events, such as access grant or access denied.

2.13 ACS PEOPLE COUNTING AND AREA PRECENSE TRACKING (MUSTERING)

A. The ACS shall support people counting (or area presence tracking). The ACS shall be able to monitor and report the number of cardholders in an area in real-time and for all areas. Monitoring shall be based on the entire access control infrastructure, for both local areas and those in remote geographic locations. People counting can also be used to perform mustering.

B. Active presence count without exit card reads is not acceptable.

C. The ACS shall be able to generate an area presence report listing the cardholders located in one or more areas, accessible through the Application UI. It shall be possible to filter the report by area and time period. The report shall also include activity from sub-areas (nested areas).

D. The ACS shall be able to determine the entry of a cardholder based on a dedicated sensor.

2.14 ACS CUSTOM FIELDS (USER-DEFINED FIELDS)

A. The ACS shall permit the creation of custom fields. Custom fields shall be supported for the following entities: cardholders, cardholder groups, credentials, and visitors.

B. Supported custom fields shall include: text, integers, decimal numbers, dates, Users shall be able to define a default value for a custom field.

C. The creation of new custom field types shall be possible. New custom field types shall be based on the standard custom fields supported. They shall support user-defined values from which an operator must make a selection.

D. Administrators have the ability to define which users can view and modify specific custom fields. This shall limit the access to custom field data to users with pre-defined privileges. The ACS shall support querying and report generation using custom fields.

E. Custom fields can be grouped and ordered within these groups as defined by the user.

2.15 ACS IMPORT TOOLS

A. The ACS shall support an integrated Import Tool to facilitate the import of existing cardholder and credential data. The import of data shall be through the use the CSV file format. The tool shall be available from the Configuration UI.

B. The Import Tool shall also support the ability to manually import data that has been exported from a third party database if it is in CSV format.

C. The import tool shall permit the import of the following data:

1. Cardholder name, descriptions, email, and status.
2. Cardholder group information.
3. Credential name, status, format, and card number (including credentials with custom formats).
4. Custom fields.

D. Full flexibility in selecting the fields to be imported during an import session shall be available.

E. The option to use a custom and unique cardholder key shall be specified during the import process to ensure that cardholders with duplicate names will not have their data overwritten. Cardholder key generation shall be automated. The end user shall have the option to select which fields will be used to create this unique key, e.g. credential number, custom fields, cardholder name.

F. The ACS shall also support re-importing a CSV file containing new information to update existing information in the ACS database. Re-importing shall enable bulk amendments to existing access control data.

2.16 GENERAL CLIENT SOFTWARE REQUIREMENTS

A. The Applications configuration and monitoring over any network and be accessible locally or from a remote connection.

B. The CSA shall consist of the Configuration UI for system configuration and the application UI for monitoring. The CSA shall be Windows-based and provide an easy-to-use graphical user interface (UI).

C. The CSA shall seamlessly merge access control, license plate recognition (ALPR) event integration, and video functionalities within the same user application.

D. All applications shall provide an authentication mechanism, which verifies the validity of the user. As such, the administrator (who has all rights and privileges) can define specific access rights and privileges for each user in the system.

E. Logging on to a CSA shall be done either through locally stored USP user accounts and passwords or using the operators Windows credentials when Active Directory integration is enabled.

F. To enhance usability and operator efficiency, the Application UI shall support many of the latest UI such as:

1. Consolidated and consistent workflows for video, ALPR event capture, and access control.

2. Single click functionality for reporting and tracking. The Application UI shall support both single-click reporting for access control, ALPR, and video, as well as single-click tracking of areas, cameras, doors, zones, cardholders, elevators, ALPR entities, and more. Single-click reporting or tracking shall create a new task with the selected entities to report on or track.

2.17 CONFIGURATION USER INTERFACE

A. General

1. The Configuration UI application for ACS shall allow the administrator or users with appropriate privileges to change the system configuration from anywhere on the IP network.

2. The ACS Configuration UI shall include a variety of tools such as troubleshooting utilities, import tools, and a unit discover tool, amongst many more.

3. The ACS Configuration UI shall include a static reporting interface to:

a) View historical events based on entity activity. The user shall be able to perform such actions as printing a report and troubleshooting a specific access event from the reporting view.

b) View audit trails that show a history of user/administrator changes to an entity.

4. Common entities such as users, schedules, alarms and many more, can be reused by all integrated systems (VMS, and ALPR).

2.18 ACS CLIENT USER INTERFACE

A. The Application UI shall fulfill the role of a Unified Security Interface that is able to monitor video, ALPR events, and access control events and alarms, as well as view live and recorded video.

B. The Application UI shall provide a graphical user interface to control and monitor over any IP network. It shall allow administrators and operators with appropriate privileges to monitor their unified security platform, run reports, and manage alarms.

C. The Application UI shall support multiple event lists and display maps, including:

1. Event/alarm list layout only

2. Display map onlyDalarm/event list combination

3. alarm/event list combination

D. User workspace customization

1. Event or alarm lists shall span anywhere from a portion of the screen up to the entire screen and shall be resizable by the user. The length of event or alarm lists shall be user-defined. Scroll bars shall enable the user to navigate through lengthy lists of events and alarms.

2. The Application UI shall support multiple display tile patterns either natively, or in concert with VCS video wall capability (e.g. 1 display tile (1x1 matrix), 25 tiles (5x5 matrix), and multiple additional variations).

3. The Application UI shall support as many monitors as the PC video adapters and Windows Operating System are capable of accepting.

E. The Application UI shall provide an interface to support the following tasks and activities common to access control, ALPR, and video:

1. Monitoring the events from a live security system (ACS and/or VMS and/or ALPR).

2. Generating reports, including custom reports.

3. Monitoring and acknowledging alarms.

4. Displaying graphical maps and floor plans as well as executing actions from graphical maps and floor plans.

5. Management and execution of hot actions and macros.

F. The Application UI shall be able to monitor the activity of the following entities in real-time: areas, ALPR entities, doors, elevators, cameras, cardholders, cardholder groups, zones (input points), and more. The Application UI shall provide an interface to support the following access control tasks and capabilities:

1. Monitoring and management of access events and alarms.

2. Viewing of cardholder picture or badge IDs.

3. Visitor management event viewing

4. Mustering reports

5. Door control, including remotely unlocking doors, overriding a door's unlocking schedules, and enabling door maintenance mode.

6. Generation of ACS configuration and activity reports.

7. Viewing of alarm instructions.

G. Entity Monitoring

1. The Application UI shall provide the option to filter which events shall be displayed in the display tile layout and/or event list layout.

2. It shall be possible to lock a Application UI display tile so that it only tracks the activity of a specific entity (e.g. specific door or camera).

3. Event, alarm, monitoring/tracking, and report lists shall contain cardholder pictures where possible.

2.19 ACS CLIENT USER INTERFACE SERVER ADMINISTRATOR USER INTERFACE REQUIREMENTS

A. The Server Administrator to apply the license, and more.

B. The Server Administrator shall be a web-based applicationAccess to the Server Administrator shall be protected via login name, password, and encrypted communications.

C. The Server Administrator shall allow the administrator (user) to perform the following functions:

1. Manage the system license.

2. Manually back up and/or restore the server database(s), as well as configure scheduled backups of the databases.

3. Configure the network communications hardware, including connection addresses and ports.

2.20 HEALTH MONITOR (OPTIONAL)

A. Propose an application framework to monitor the health of the system, log health-related events, and calculate statistics.

B. Develop with customer, relevant features for tracking services, roles, agents, units, and client apps will trigger health events.

C. Track health events related to roles, services, and client apps.

D. A dedicated role, the Health Monitoring Role, shall perform the following actions:

1. Monitor the health of the entire system and log events.

2. Calculate statistics within a specified time frame (hours, days, months).

3. Calculates availability for clients, servers and video/access/ALPR units.

E. A Health Monitoring task and Health History reporting task shall be available for live and historical reporting.

F. A web-based, centralized health dashboard shall be available to remotely view unit and role health events.

2.21 PSIM GENERAL REQUIREMENTS

A. The PSIM shall be an enterprise class IP-enabled security and safety software solution.

B. The PSIM shall support the seamless unification of IP access control system (ACS), IP video management system (VMS), and IP automatic license plate recognition system (ALPR) under a single platform. The PSIM user interface (UI) applications

shall present a unified security interface for, monitoring, and reporting of integrated ACS, VMS, and ALPR systems and associated edge devices.

C. Functionalities available with the USP shall include:

1. Integration of integrated systems, such as ACS, ALPR, and VMS systems.
2. Live event monitoring.
3. Live video monitoring and playback of archived video.
4. Alarm management.
5. Reporting, including creating custom report templates and incident reports.
6. Capability for monitoring, reporting, and alarm management of multiple remote and independent ACS and/or VMS systems spread across multiple facilities and geographic areas.
7. Intrusion device and panel integration (live monitoring, reporting, and arming/disarming).
8. Dynamic graphical map viewing.

D. Licensing

1. A single central license shall be applied centrally on the configuration server for the PSIM application.
2. There shall be no requirement to apply a license at every server computer or client workstation.
3. Based on selected options, one or more integrated systems shall be enabled or disabled.

E. Hardware and Software Requirements

1. The PSIM and integrated systems (video, license plate recognition, and access control) shall be designed to run on a standard PC-based platform loaded with a Windows operating system. The preferred operating system shall be coordinated with the Owner following the manufacturer supported operating systems.
2. The PSIM shall be compatible with virtual environments, including but not limited to VMware and/or Microsoft Hyper-V.

2.22 PSIM ARCHITECTURE

A. The PSIM shall be an IP enabled solution. All communication shall be based on standard TCP/IP protocol

B. The PSIM shall support the feature whereby multiple independent ACS and VMS installations can be merged into a single large virtual system for centralized monitoring, reporting, and alarm management.

C. The PSIM shall support an unrestricted number of logs and historical transactions (events and alarms) with the maximum allowed being limited by the amount of hard disk space available.

D. Roles-Based Architecture

1. The PSIM shall consist of a role-based architectureEach role shall execute a specific set of tasks related to either core system, automatic license plate recognition (ALPR), video (VMS), or access control (ACS) functionalities, among many others. Installation shall be streamlined through the ability of the PSIM to allow administrators to:

   a) Activate and deactivate roles as needed.

   b) Centralize role configuration and management.

   c) Support remote configuration.

2. Directory Role

   a) Support the integration of the following components common to the ACS, ALPR, and VMS sub-systems:

      1) Security Partitions, users and user groups.

      2) Areas.

      3) Zones, input/output (IO) linking rules, and custom output behavior.

      4) Alarms. Schedules, and scheduled tasks.

      5) Custom events.

      6) Macros or custom scripts.

   b) support the integration of the following components specific to VMS:

      1) Video servers and their peripherals

      2) PTZ.

      3) Camera sequences.

      4) Recording and archiving schedules.

   c) support the integration of the following components specific to ACS:

      1) Door controllers, and input and output (IO) modules.

      2) Doors, Elevators, and Access rules.

      3) Cardholders and cardholder groups, credentials, and badge templates.

   d) support the integration of the following components specific to ALPR:

1) ALPR units and cameras.

2) Hotlists, permit lists, and overtime rules.

2.23 VIDEO AND ACCESS CONTROL UNIFICATION

A. The ACS UI shall present a Interface for live monitoring and reporting of the ACS and VMS. Advanced live video viewing and playback of archived video shall be available through the UI.

B. The user shall be able to associate one or more video cameras to the following entity types: areas, doors, elevators, zones, alarms, intrusion panels, and more.

C. It shall be possible to view video associated to access control events when viewing a report.

D. It shall be possible to view video associated to intrusion panel events when viewing a report.

2.24 PSIM ALARM MANAGEMENT

A. The PSIM shall support the following Alarm Management functionality:

1. Create and modify user-defined alarms. An unrestricted number of user-defined alarms shall be supported.

2. Assign a time schedule or a coverage period to an alarm. An alarm shall be triggered only if it is a valid alarm for the current time period.

3. Set the priority level of an alarm and its reactivation threshold.

4. Define whether to display live or recorded video once the alarm is triggered.

5. Provide the ability to display live and recorded video

6. Provide the ability to group alarms by source and by type.

7. Define the time period after which the alarm is automatically acknowledged.

8. Define the recipients of an alarm. Alarm notifications shall be routed to one or more recipients. Recipients shall be assigned a priority level that prioritizes the order of reception of an alarm.

9. Define the alarm broadcast mode. Alarm notifications shall be sent using either a sequential or an all-at-once broadcast mode.

10. Define whether to display the source of the alarm, one or more entities, or an HTML page.

11. Specify whether an incident report is mandatory during acknowledgment.

B. The workflows to create, modify, add instructions and procedures, and acknowledge an alarm shall be consistent for access control, ALPR, and video alarms.

C. The PSIM shall also support alarm notification to an email address or any device using the SMTP protocol.

D. The ability to create alarm-related instructions can be supported through the display of one or more HTML pages following an alarm event. The HTML pages shall be user-defined and can be interlinked.

E. The user shall have the ability to acknowledge alarms, create an incident upon alarm acknowledgement, and put an alarm to snooze.

F. The user shall be able to spontaneously trigger alarms based on something he or she sees in the system.

G. An alarm shall be configured in such a way that it remains visible until the source condition has been acknowledged.

H. The user shall be able to investigate an alarm without acknowledging it.

2.25 PSIM THREAT LEVELS.

A. The PSIM shall support Threat Levels to dynamically change the system behavior to respond to critical events.

B. Threat Levels shall be activated and deactivated by an operator with the right privilege.

C. Threat Levels shall be set on an area or on the entire system.

D. Threat Levels shall affect the system behavior by executing any action available in the PSIM such as: trigger output, start recording, block camera, override recording quality, arm zone, set a door in maintenance mode, and more.

E. The following specific actions shall be available with Threat Level:

1. Set minimum security clearance to restrict or permit access to cardholders on specific areas on top of the restrictions imposed by the access rules.

2. Set minimum user level to automatically log out user from the PSIM.

3. Set reader mode to change how the doors are accessed (e.g. card and PIN, or card or PIN).

F. A visible notification shall be displayed for all PSIM operators when a Threat Level is activated.

2.26 PSIM ADVANCED TASK MANAGEMENT

A. PSIM shall support an infrastructure for managing Application UI tasks used for live monitoring, day to day activities, and reporting.

B. Administrators shall be able to assign tasks and lock the operator`s workspace. The user management of their workspace shall be limited by their assigned privileges.

C. Operators shall be able save their tasks as either Public Tasks or Private Tasks and in a specific partition. Public tasks shall be available to all users. Private tasks shall only be available to the owner of the task.

D. Operators shall be able to share their tasks by sending them to one or more online users. Recipients shall have the option to accept the sent task.

2.27 PSIM REPORTING

A. The PSIM shall support report generation (database reporting) for access control, ALPR, video, and intrusion.

B. Each and every report in the system shall be a PSIM task, each associated with its own privilege. A user shall have access to a specific report task if he or she has the appropriate privilege.

C. The workflows to create, modify, and run a report shall be consistent for access control, ALPR, and video reports.

D. Reports shall be federated, allowing global consolidated reporting across multiple independent USP, ACS, and VMS systems.

E. Access control and ALPR reports shall support cardholder pictures and license plate pictures, respectively.

F. The PSIM shall support the following types of reports:

1. Alarm reports.
2. Video-specific reports (archive, bookmark, motion, and more).
3. Configuration reports (cardholders, credentials, units, access rules, readers/inputs/outputs, and more).
4. Activity reports (cardholder, cardholder group, visitor, credential, door, unit, area, zone, elevator, and more).
5. ALPR-specific reports (mobile ALPR playback, hits, plate reads, reads/hits per day, reads/hits per ALPR zone, and more).
6. Health activity and health statistics reports.
7. Other types of reports, including visitor reports, audit trail reports, incident reports, and time and attendance reports.

G. Generic Reports, Custom Reports and Report Templates

1. The user shall the option of generating generic reports from an existing list, generating reports from a list of user-defined templates, or creating a new report or report template.
2. The user shall be able to customize the predefined reports and save them as new report templates. There shall be no need for an external reporting tool to create custom reports and report templates. Customization options shall include setting filters, report lengths, and timeout period. The user shall also be able to set which columns shall be visible in a report. The sorting of reported data shall be available by clicking on the appropriate column and selecting a sort order (ascending or descending).

3. These templates can be used to generate reports on a schedule in PDF or Excel formats.

4. An unrestricted number of custom reports and templates shall be supported.

H. The PSIM shall support comprehensive data filtering for most reports based on entity type, event type, event timestamp, custom fields, and more.

I. The PSIM shall support the following actions on a report: print report, export report to a PDF/Microsoft Excel/CSV file, and automatically email a report based on a schedule and a list of one or more recipients.

2.28 PSIM EVENT/ACTION MANAGEMENT

A. The PSIM shall support the configuration and correlation of events for video and ALPR. A user shall be able to add, delete, or modify an action tied to an event if he has the appropriate privileges.

B. The PSIM shall receive all incoming events from one or more ACS and/or VMS. The PSIM shall take the appropriate actions based on user-define event/action relationships.

C. The PSIM shall receive and log the following events:

1. System-wide events.

2. Application events (clients and servers).

3. Area, camera, door, elevator, and ALPR events (reads and hits).

4. Cardholder and credential events.

5. Unit events.

6. Zone events.

7. Alarm events.

8. First Person In and Last Person Out events and antipassback events.

9. Intrusion events.

10. Asset management events.

D. The PSIM shall allow the creation of custom events.

E. The PSIM shall have the capability to execute an action in response to an access control, video, and ALPR event.

F. The PSIM shall allow a schedule to be associated with an action. The action shall be executed only if it is an appropriate action for the current time period.

2.29 PSIM SCHEDULES AND SCHEDULED TASKS

A. Schedules

1. The PSIM shall support the configuration and management of complex schedules. A user shall be able to add, delete, or modify a schedule if he or she has the appropriate privileges.

2. The USP shall provide full flexibility and granularity in creating a schedule. The user shall be able to define a schedule in 1-minute or 15-minute increments.

3. Daily, weekly, ordinal, and specific schedules shall be supported.

B. Scheduled Tasks

1. The PSIM shall support scheduled tasks for access control, video, and ALPR.

2. Scheduled tasks shall be executed on a user-defined schedule at a specific day and time. Recurring or periodic scheduled tasks shall also be supported.

3. Scheduled tasks shall support all standard actions available within the USP, such as sending an email or emailing a report.

2.30 PSIM MACROS AND CUSTOM SCRIPTS

A. The PSIM shall enable users to automate and extend the functionalities of the system through the use of macros or custom scripts for access control, video, and ALPR.

B. Custom macros creation optinos shall be available.

C. A macro shall be executed either automatically or manually.

2.31 PSIM DYNAMIC GRAPHICAL MAPS (DGM)

A. PSIM USP shall support mapping functionality for access control, video surveillance, intrusion detection, ALPR, and external applications.

B. The PSIM shall provide a map centric interface with the ability to command and control all capabilities from a full screen map interface.

C. It shall be possible to span the map over all screens of the PSIM client station.

D. The DGM shall support one or more of the following file formats and protocols for importing map background:

1. PDF

2. JPG

3. PNG

4. Web Map Service (WMS) defined by the Open Geospatial Consortium (OGC)

5. BeNomad

E. The DGM shall provide one or more of the following online map providers for use as map background and provide the ability to manage their service license if they require one:

1. Google Map, aerial, terrain (Licensed)

2. Bing Map, aerial, satellite, hybrid (Licensed)

3. OpenStreet Map aerial
4. OVI hybrid

F. The DGM shall provide the ability to display all native entities of the PSIM including:

1. Cameras, fix, and PTZ
2. Doors
3. Camera sequences
4. Areas
5. Intrusion areas
6. Intrusion zones
7. License Plate Recognition cameras
8. Digital inputs
9. Digital outputs
10. Intercoms
11. Alarms

G. The DGM shall provide the ability to draw and display information over the map in the form of:

1. Vectoriel shapes: line, rectangles, polygones, ellipse
2. Pictures
3. Text

H. The DGM shall provide the ability to display layer of information

I. The DGM shall provide the ability to the operator to manage layers of entities displayed over the map, being able to turn them on and off and changing the superposition order.

J. The DGM shall offer built-in map data backup and restore for both map background and layers of entities.

K. The DGM shall offer failover capabilities.

L. The DGM shall scale up to several thousands of entities on a single map and hundreds of maps.

M. The DGM shall offer a user friendly graphical map designer to configure the maps.

N. The DGM shall provide a user friendly and intuitive navigation that includes:

1. The ability to create hierarchies of maps to facilitate navigation within and between various sites and buildings.
2. The possibility to create links between maps. The map links shall allow the link from one map to multiple maps representing the floors of a building.

3. A history log of positions.

O. It shall be possible to monitor the state of entities on the map. It shall be possible to customize the icons of any entities represented on the map.

P. The DGM shall offer the ability to optionally set a graphical display notification of the motion detection.

Q. It shall be possible to access live and playback video from the map.

R. It shall be possible to monitor from the DGM all entities event notifications. Users shall be able to turn notifications on and off per entity.

S. The DGM shall offer the ability to fully operate alarm monitoring. It shall be possible to:

1. Center the map on entities related to the alarm.

2. Visualize the Alarm notifications on the map, and access the related videos from the map.

3. Trigger and receive alarms.

4. Act on the alarm from the DGM, including acknowledgements, forwarding, and investigation.

5. Visualize that an alarm occurred in an underlying linked map.

T. The DGM shall provide the following search capabilities:

1. Search and center by entity name.

U. Any update of map content by an administrator shall be immediately and dynamically pushed to all DGM users.

V. The DGM shall support the use of GIS maps or private maps or a combination of both for map background.

W. The DGM shall be compatible with any GIS compliant maps with the OGC and supporting WMS. This includes, but is not limited to, ESRI maps.

X. The DGM shall provide an intuitive built-in map designer for entity positioning on the map using drag and drop. Any configuration shall be graphic.

Y. Various actions shall be available within maps for execution through simple and intuitive double-click, right-click, or drag-and-drop functionality. Examples of actions available through maps shall include unlocking a door and acknowledging an alarm.

Z. Through the following functionality, the DGM shall allow the management of PSIM alarms from the map:

1. Locate on the map entities related to the alarm.

2. Display entities of the alarm with a specific icon, color, transparency level, and blinking rate.

3. List, select, and locate alarms.

4. Auto center the map on the highest priority alarm.

5. Handle the alarm from the map, including acknowledgement, forwarding and investigation.

6. All map containers, such as hotspots or map links shall reflect the alarm status of the contained entities.

AA. TThe DGM shall provide the following search capabilities:

1. Search within the map by entity name, street name, or point of interest.

2. Drag and drop entities from the USP to the map to center their location.

BB. The DGM shall allow overlay map information for both GIS and private maps. Movable objects shall be supported.

CC. Any updating of map content by an administrator shall be immediately and dynamically pushed to all operators displaying the map.

2.32 PSIM AUDIT AND USER ACTIVITY TRAILS (LOG)

A. The PSIM shall support the generation of audit trails. Audit trails shall consist of logs of operator/administrator additions, deletions, and modifications.

B. Audit trails shall be generated as reports. They shall be able to track changes made within specific time periods. Querying on specific users, changes, affected entities, and time periods shall also be possible.

C. For entity configuration changes, the audit trail report shall include detailed information of the value before and after the changes.

D. The PSIM shall support the generation of user activity trails. User activity trails shall consist of logs of operator activity on the USP such as login, camera viewed, badge printing, video export, and more.

2.33 PSIM INCIDENT REPORTS

A. Incident reports shall allow the security operator to create reports on incidents that occurred during a shift. Both video-related and access control-related incident reports shall be supported.

B. The operator shall be able to create standalone incident reports or incident reports tied to alarms.

C. The operator shall be able to link multiple video sequences to an incident, access them in an incident report, and change the date or time of the sequences later on.

D. It shall be possible to create a list of Incident categories, tag a category to an incident, and filter the search with the category as a parameter.

E. Incident reports shall allow the creation of a custom form on which to input information on an incident.

F. Incident reports shall allow entities, events, and alarms to be added to support at the report’s conclusions.

2.34 PSIM THIRD PARTY INTEGRATION

A. Microsoft Active Directory Integration

1. The PSIM shall support a direct connection to one or multiple Microsoft Active Directory server via the Active Directory Role(s).

B. Intrusion Detection Integration.

1. The PSIM shall integrate with third party intrusion panels and devices over an IP network.

2. Integration with intrusion panels shall be possible outside the release cycle of the PSIM. It shall be possible to add new integrations at any point in time.

3. Functionality available via the integration of intrusion devices with the PSIM shall include the following (where supported by the intrusion panel):

a) Arm and disarm intrusion devices (manually, on schedule, or following a PSIM event).

b) Activate or trigger intrusion device outputs.

c) View intrusion events and alarms.

d) Monitor the status, including arming status, of the intrusion devices.

e) Video verification of intrusion events and alarms with video panels.

f) Create PSIM zones using intrusion device inputs.

2.35 CONTROL PANEL

A. Primary Power: twelve to twenty-four volts of direct current (12-24VDC) +/- 10%.

B. Communication Ports:

1. Host Port 0: 10/100 Ethernet; and/or

2. Adapters-485 port

C. Tamper detection

D. Temperature: zero to sixty degrees Centigrade (0 to 60° C) operational,

E. Humidity: ten to ninety-five percent (10 to 95%) relative humidity, non-condensing (RHNC)

F. Standards:

1. UL294 Recognized, , UL1076

2. FCC Part 15 Class A.

G. Technical Features:

1. Connectivity Primary Port: 10/100 Ethernet

2. Access Control:

a) 132,000 Cardholder capacity

b) 20,000 event T buffer.

2.36 INPUT BOARDS

A. Primary Power, in expansion module, from main control panel, or standalone:

1. 12-24Vdc ±10%, 350mA maximum.

2. 12Vdc at 300mA nominal.

3. 24Vdc at 220mA nominal.

B. Inputs: Eight (8) or sixteen (16) general purpose programmable type Outputs: two (2) relays – Form-C, 5 Amp, 28Vdc via expansion board (8 relays).

C. Temperature: 0 to 60 degrees Centigrade operational, Humidity: 10 to 95 percent RHNC.

2.37 OUTPUT BOARDS

A. Primary Power, in expansion module, from main control panel, or standalone:

1. 12-24Vdc ±10%, 1100 mA maximum

2. 12Vdc at 850mA nominal

3. 24Vdc at 450mA nominal

B. Outputs: eight (8) per expansion module, with option to add multiples per controller board. Or, standalone: sixteen (16) relays – Form-C, 5 Amp at 28Vdc.

C. Temperature: 0 to 55 degrees Centigrade operationalHumidity: 10 to 95 percent RHNC.

2.38 DOOR CONTROLLER

A. Primary Power:

1. PoE+ power.

2. 12-48VDC UL-listed power supply

B. Communication:

1. Primary Port: Ethernet 10/100/1000.

2. 2-wire RS-485, 4,000 feet using Belden 9841.

3. Reader Interface: two reader ports2. LED: one-wire bi-color LED support or two-wire.

4. Buzzer: one-wire LED mode.

C. Keypad support Reader Power:

1. Pass through or 12Vdc regulated power

2. Two alarm inputs

3. One door relay, One auxiliary output relay supporting optional wet power setting

4. Temperature: 0 to 60 degrees Centigrade operationalHumidity: 10-95 percent RHNC

D. Standards: UL 294 and UL 1076 recognized.

2.39 GATE ACCESS CONTROLLER

A. System General Requirements, standards and interoperability:

1. Video stream (ONVIF) Profile S.

2. The system shall be capable of communicating under the following protocols: TCP/IP, IPv4, IPv6, SIP, HTTP/HTTPS, DHCP or static IP address assignment, DNS, RTP/RTSP, SMTP, NTP.

3. Network communications: IEEE 802.3 Ethernet 10/100BaseT with support 802.3af/at support.

1. Audio/Video encoding and compression format:

a. Audio encoder: G.711

b. Video compression format: H.264

B. Calling Station

1. Door Control/Release Requirements:

a. Minimum of two (2) independent outputs for door control.

b. Programmable dry contact.

c. Cabling shall be in compliance with LAUSD Guide Specification 27 1013 Premises Wiring, or 2-wire (18 to 24AWG) ranging distance from 325 to 1,500 feet with IEEE 802.3af/at (PoE/PoE+).

2. Audio/Video Requirements:

a. 720p Video quality.

b. Night vision.

c. Local flash memory recording.

3. Enclosure Requirements:

a. ADA compliant (e.g. braille engraving, TTY/TDD).

b. Vandal and weather resistance minimum rating: IP65, IK07.

4. Security and Protocols:

a. IEEE 802.1X authentication

b. Shall be able to rename manufacturer default username and password.

5. Manageability:

a. Ability to provide central management station of field deployed device operational status.

b. Ability to upgrade software/firmware from central management station.

C. Dedicated Master Receiving Station:

1. Touch screen with brightness control.

2. SIP integration with District's existing VoIP infrastructure.

3. Full Video/Audio communication from/to Calling Station shall be able to initiate.

4. Network Communication: IEEE 802.3 10/100BaseT or 802.11n interface.

5. Power sources: IEEE 802.3af/at (PoE/PoE+) or local power.

D. Dedicated Software Application Master (Receiving) Station

1. Provide equivalent functionalities of a manufacturer Dedicated Master Receiving Station.

2. Option of hand-free operations.

3. Simplex Push-to-Talk (PTT) capability.

4. Provide equivalent functionalities of a manufacturer Dedicate Master Receiving Station.

E. SIP Master Receiving Station

1. Shall be able to integrate fully with District's existing SIP infrastructure (e.g. video, VoIP).

2. Shall be able to provide full Video/Audio communication from/to Calling Station the equivalent functionalities of a manufacturer Dedicated Master Receiving Station.

3. Shall provide full door control functionalities equivalent to the Dedicated Master Receiving Station.

4. Network Communication: IEEE 802.3 10/100BaseT.

F. Central Management System

1. Ability to access field deployed equipment over existing IP infrastructure for problem determination/resolution purposes including but not limited to Master Receiving Stations, Calling Stations.

2. Ability to push software/firmware upgrade to field deployed equipment (e.g. Calling Stations, Master Station) over existing IP infrastructure.

3. Ability to receive equipment alarms/alerts from field deployed equipment.

PART 3 – EXECUTION

3.01 INSTALLATION

A. The CONTRACTOR shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a complete, reliable, and easy-to-operate system.

B. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

C. All firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the integrator of the ACS system.

D. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

3.02 TESTING

A. The ACS system shall be tested in accordance with the following:

1. Conduct a complete inspection and test of all installed access control system componants. This includes testing and verifying connection to equipment of other divisions.
2. Provide staff to test all devices and all operational features of the system.
3. Correct deficiencies until satisfactory results are obtained.
4. Submit written copies of test results.

B. Provide a complete checklist for all equipment and components tested.

3.03 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.04 OWNER ORIENTATION TRAINING

A. Before contract closeout provide the following training and orientation:

1. Provide a minimum 48 hours training for LAUSD designated representatives. The content of the training is advanced instruction on the use, programming, maintenance and troubleshooting of the access control system, devices and components.
2. Materials shall include training manuals and hands-on lab exercises.
3. The training shall be provided at the equipment manufacturer’s authorized training facility located in Los Angeles County.
4. Training shall consist of classroom instruction including intensive course work covering the following topics:
    a) Product Features and Technical Specifications.

b) Implementation and Design as–built documentation, including familiarization with drawing sets, symbols and notation as well as other record documents.

c) Complete understanding of the system architecture and design of implemented solution.

d) Complete function and feature analysis on implemented solution including programming, operation, trouble shooting, error messages, etc.

3.05 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 3113

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Galvanized-steel chain link fabric.

2. Aluminum-coated steel chain link fabric.

3. Zinc-aluminum-mischmetal alloy-coated steel chain link fabric.

4. Polyvinyl chloride (PVC)-coated steel chain link fabric.

5. Aluminum chain link fabric.

6. Galvanized-steel framework.

7. Polymer-coated steel framework.

8. Aluminum framework.

9. Privacy slats.

10. Gate operator.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. "Earthwork Moving" for filling and grading work.

2. "Concrete Paving" for concrete for post footings.

3. Sections for electric power for electric gate operators.

1.03 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, gate operators, and accessories.

C. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

D. Wiring diagrams from manufacturer for electrically operated gates.

E. Samples for initial selection of PVC color in form of manufacturer's color charts or 6-inch lengths of actual fabric wire showing colors available.

F. Samples for verification of PVC color in form of 6-inch lengths of actual fabric wire to be used in color selected.

1. Include similar samples of polymer coating applied on posts, rails, and accessories in color selected.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has at least three years' experience and has completed at least five chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.

B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.05 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

1.06 MANUFACTURERS – Pre-Fabricated Type II Cantilever Gate shall be per the following manufacturers or approved equal.

A. Master Halco, Company

B. A-1 Fencing Company

C. Straight Gate Fence Company

D. Hoover Fence Company

E. California Fence Company

F. Tymetal Corporation

G. Or Approved Equal

PART 2 - PRODUCTS

2.01 FABRIC

A. Selvage: Knuckled on both selvages for 2-inch and 2-1/8-inch mesh sizes with heights of 60 inches and less.

B. Selvage: Knuckled at one selvage and twisted at the other for 2-inch and 2-1/8-inch mesh sizes and heights above 60 inches.

C. Selvage: Knuckled on both selvages for mesh sizes less than 2 inches.

D. Selvage: Knuckled on both selvages.

E. Selvage: As indicated.

F. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:

1. Mesh and Wire Size: 2-inch mesh, 0.192-inch diameter (6 gage).

2. Mesh and Wire Size: (Permafused Coated)1-inch mesh, 0.148-inch diameter (9 gage).

3. Mesh and Wire Size: 2-inch mesh, 0.120-inch diameter (11 gage).

4. Mesh and Wire Size: 1-3/4-inch mesh, 0.120-inch diameter (11 gage).

5. Mesh and Wire Size: 2-1/8-inch mesh, 0.113-inch diameter (11-1/2 gage).

6. Mesh and Wire Size: 3/8-inch mesh, 0.120-inch diameter (11 gage).

7. Mesh and Wire Size: As indicated.

8. Coating: ASTM A 817, Type 1, aluminized.

9. Coating: ASTM A 817, Type 2, Class 1, zinc-coated (galvanized) applied after weaving.

10. Coating: ASTM A 817, Type 2, Class 2, zinc-coated (galvanized).

11. Coating: ASTM A 817, Type 3, Class 1, zinc-aluminum-mischmetal.

12. Coating: ASTM A 817, Type 3, Class 2, zinc-aluminum-mischmetal.

13. Coating: ASTM F 668, Class 1, PVC.

14. Coating: ASTM F 668, Class 2a, PVC.

15. Coating: ASTM F 668, Class 2b, PVC.

16. Coating: As indicated.

17. PVC Coating Color: As selected by OAR from manufacturers' standard colors of green, olive green, brown, or black complying with ASTM F 934.

G. Aluminum Alloy Fabric: ASTM F 1183, with mill finish.

1. Mesh and Wire Size: 2-inch mesh, 0.192-inch diameter (6 gage).

2. Mesh and Wire Size: 2-inch mesh, 0.148-inch diameter (9 gage).

3. Mesh and Wire Size: 1-3/4-inch mesh, 0.148-inch diameter (9 gage).

4. Mesh and Wire Size: 1-inch mesh, 0.148-inch diameter (9 gage).

H. Where modifications to existing fencing and gates are called for on the plans, replacement materials shall be at least the same size as the existing; if existing materials are of a lesser standard or smaller size than specified herein, or are in poor condition, then new materials pursuant this Specification shall be used.

2.02 FRAMING

A. Round member sizes are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches. The following indicates these equivalents all measured in inches:

Actual OD	NPS Size	Trade Size
1.315	1	1-3/8
1.660	1-1/4	1-5/8
1.900	1-1/2	2
2.375	2	2-1/2
2.875	2-1/2	3

3.500	3	3-1/2
4.000	3-1/2	4
6.625	6	6-5/8
8.625	8	8-5/8

B. Type I Round Posts: Fused Bounded Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

Actual OD	Weight (lb/ft)	NPS Size
1.315	1.68	1
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2
3.500	7.58	3
4.000	9.11	3-1/2
6.625	8.97	6
8.625	28.55	8

C. Type II Round Posts: Cold-formed, electric-welded steel pipe conforming to heavy industrial requirements of ASTM F 669, Group IC, with minimum yield strength of 50,000 psi, either protective coating system below according to ASTM F 1234, and weights per foot as follows:

1. Coatings: Type B outside with a minimum of 0.9 oz. of zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat. Type B inside with a minimum of 0.9 oz. of zinc per sq. ft. or Type D inside with a minimum 0.3-mil-thick, 81-percent zinc-pigmented nominal coating.

2. Coatings: Type C inside and outside with not less than 0.9 oz. of zinc-5 percent aluminum-mischmetal alloy per sq. ft.

Actual OD	Weight (lb/ft)	NPS Size
1.315	1.35	1
1.660	1.84	1-1/4
1.900	2.28	1-1/2
2.375	3.12	2

2.875	4.64	2-1/2
3.500	5.71	3
4.000	6.56	3-1/2

D. Roll-Formed Steel: Rolled form steel shapes (e.g., C section) produced from structural-quality steel conforming to ASTM A 570, grade 45, or ASTM A 446, grade D, galvanized, conforming to heavy industrial requirements of ASTM F 669, Group II, with a minimum yield strength of 45,000 psi. Protective coating system according to ASTM F 1234, Type A, hot-dip galvanized with a minimum of 2.0 oz. of zinc per sq. ft. according to ASTM A 123, 4.0 oz. of zinc per sq. ft. according to ASTM A 525; or Type C, a minimum of 1.0 oz. of zinc-5 percent aluminum-mischmetal alloy per sq. ft. according to ASTM A 875.

E. Roll-Formed Steel: Hot-rolled steel shape H section with a minimum yield strength of 45,000 psi conforming to ASTM F 669, group III. Protective coating system according to ASTM F 1234, Type A, hot-dip galvanized with a minimum of 2.0 oz. of zinc per sq. ft. of according to ASTM A 123, or 4.0 oz. of zinc per sq. ft. according to ASTM A 525.

F. Square Tubing: Cold-formed steel structural tubing conforming to ASTM A 500, Grade B with minimum yield strength of 42,000 psi and not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90.

G. Supplemental Color Coating: In addition to above metallic coatings, provide posts and rails with manufacturer's standard polymer coating according to ASTM F 1234, 10-mil minimum polyvinyl chloride (PVC) or 3-mil minimum polyester plastic resin finish applied to exterior surfaces and, except for tubular shapes, to exposed interior surfaces. Color to match chain link fabric.

H. Aluminum Framework: Round members, alloy 6063-T6, mill-finished aluminum conforming to ASTM B 429, schedule 40 aluminum pipe. Other members, alloy 6061-T6, mill-finished aluminum conforming to ASTM B 221. Weights per foot for pipe as follows:

Actual OD	Weight (lb/ft)	NPS Size
1.315	0.581	1
1.660	0.786	1-1/4
1.900	0.940	1-1/2
2.375	1.264	2
2.875	2.004	2-1/2
3.500	2.621	3
4.000	3.151	3-1/2

6.625	6.564	6
8.625	9.878	8

I. Top Rail: Manufacturer's longest lengths (17 to 21 feet) with swedged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull, and end post.

1. Round Steel: 1.660-inch OD Type I or II steel pipe.

2. Roll-Formed Steel: 1-1/4-by-1-5/8-inch C section weighing a minimum of 1.40 lb per linear ft.

3. Round Aluminum: 1.660-inch OD aluminum pipe.

4. Square Aluminum: 1-1/2-inch-square aluminum tubing with 0.125-inch minimum walls.

J. Steel posts for fabric heights up to 6 feet:

1. Round Line or Intermediate Posts: 1.90-inch OD Type I or II steel pipe.

2. Round End, Corner, and Pull Posts: 2.375-inch OD Type I or II steel pipe.

3. Roll-Formed Line or Intermediate Posts: 1.875-by-1.625-inch C section weighing a minimum of 2.28 lb per linear ft.

4. Square-End, Corner, and Pull Posts: 2-inch-square galvanized-steel tubing weighing a minimum of 2.60 lb per linear ft.

K. Steel posts for fabric heights over 6 feet:

1. Round Line or Intermediate Posts: 2.375-inch OD Type I or II steel pipe.

2. Round End, Corner, and Pull Posts: 2.875-inch OD Type I or II steel pipe.

3. Roll-Formed Line or Intermediate Posts: 2.25-by-1.70-inch C section weighing a minimum of 2.70 lb per linear ft.

4. Hot-Formed Line or Intermediate Posts: 2.25-by-1.70-inch galvanized-steel H section weighing a minimum of 3.26 lb per linear ft.

5. Square End, Corner, and Pull Posts: 2-1/2-inch-square galvanized-steel tubing weighing a minimum of 5.00 lb per linear ft.

6. Roll-Formed End, Corner, and Pull Posts: 3-1/2-by-1-1/2-inch roll-formed galvanized-steel sections weighing a minimum of 5.10 lb per linear ft.

L. Aluminum posts for fabric heights up to 6 feet:

1. Round Line or Intermediate Posts: 1.900-inch OD aluminum pipe.

2. Round End, Corner, and Pull Posts: 2.375-inch OD aluminum pipe.

3. Square Line or Intermediate Posts: 2-inch-square aluminum tubing with 0.250-inch minimum walls.

4. Square End, Corner, and Pull Posts: 2-inch-square aluminum tubing with 0.250-inch minimum walls.

M. Aluminum posts for fabric heights over 6 feet:

1. Round Line or Intermediate Posts: 2.375-inch OD aluminum pipe.

2. Round End, Corner, and Pull Posts: 2.875-inch OD aluminum pipe.

3. Shape and Material: Square aluminum.

4. Square Line or Intermediate Posts: 2-inch-square aluminum tubing with 0.250-inch minimum walls.

5. H-Section Line or Intermediate Posts: 2-1/4-by-2-inch aluminum H section weighing a minimum of 1.22 lb per linear ft.

6. Square-End, Corner, and Pull Posts: 2-1/2-inch-square aluminum tubing with 0.250-inch minimum walls.

N. Horizontal Slide Gate Posts: Provide steel pipe gate posts sized as follows, according to ASTM F 1184, for Type I, overhead slide gates:

1. Overhead Clearance: Up to 14 feet with opening width:

a. Not More Than 10 Feet: 2.875-inch OD pipe weighing not less than 4.64 lb per ft.

2. Overhead Clearance: Up to 22 feet with opening width:

a. Between 10 and 24 Feet: 6 5/8”-inch OD pipe weighing not less than 6.56 lb per ft.

b. Between 22 and 40 Feet: Two sets of 4.000-inch OD pipe weighing not less than 6.56 lb per ft.

c. Between 22 and 40 Feet: 6.625-inch OD pipe weighing not less than 18.97 lb per ft.

O. Horizontal Slide Gate Posts: Provide steel pipe gate posts sized as follows, according to ASTM F 1184, for Type II, cantilever slide gates:

P. Opening Width Up to 12 feet: 2.875-inch OD pipe weighing not less than 4.64 lb per ft.

Q. Opening Width Over 12 feet: 6 5/8”-inch OD pipe weighing not less than 6.56 lb per ft.

2.03 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F 626. Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards.

1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.

2. Aluminum: Die cast conforming to ASTM B 26, aluminum-alloy 360 or sand cast conforming to ASTM B 85, aluminum-alloy 365, ZG61A, or Tenzalloy.

3. Supplemental Color Coating: In addition to above metallic coatings, provide a 10-mil minimum polyvinyl chloride (PVC) plastic resin finish applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces. Color to match chain link fabric.

B. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

C. Post Brace Assembly: Manufacturer's standard adjustable brace. Use material specified below for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.

1. Round Steel: 1.660-inch OD Type I or II steel pipe.

2. Roll-Formed Steel: 1-1/4-by-1-5/8-inch C section weighing a minimum of 1.40 lb per linear ft.

3. Round Aluminum: 1.660-inch OD aluminum pipe.

4. Square Aluminum: 1-1/2-inch-square aluminum tubing with 0.125-inch minimum walls.

D. Bottom and Center Rail: Same material as top rail. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.

E. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.

F. Tension and Brace Bands: 3/4-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.

1. Tension Bands: 0.074 inch thick (14 gage) minimum.

2. Brace Bands: 0.105 inch thick (12 gage) minimum.

G. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.

1. Coating Type I aluminum with a minimum coating weight of 0.40 oz. per sq. ft. as determined by ASTM A 428.

2. Coating Type II zinc in the following class as determined by ASTM A 90.

a. Class 1, with a minimum coating weight of 0.80 oz. per sq. ft. of uncoated wire surface.

b. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

c. Class 3, with a minimum coating weight of 2.00 oz. per sq. ft. of uncoated wire surface.

H. Tension Wire: 0.192-inch-diameter (6-gage) mill-finished aluminum wires, ASTM B 211, alloy 6061-T94 with 50,000-psi minimum tensile strength.

I. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3 or 0.148-inch-diameter (9-gage) aluminum wire alloy 1350-H19 or equal, to match fabric wire.

2.04 CONCRETE

A. Concrete: Provide concrete consisting of portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

B. Packaged Concrete Mix: Mix dry-packaged normal-weight concrete conforming to ASTM C 387 with clean water to obtain a 2 to 3-inch slump.

2.05 GATES

A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.

1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.

2. Bracing: Install diagonal cross-bracing consisting of 5/16-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.

B. Sliding Gates: Comply with ASTM F 1184.

1. Type I, Overhead Slide: Manufacturer's standard heavy-duty gate with inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.ADD OTHER SPECIALTY HARDWARE IF REQUIRED.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

1. Apply fabric to outside of framework. Install fencing on boundary lines inside of property line established by survey as required by Division 1.

B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.

2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated. All line posts shall form a straight line where the fence is not intended to be curved or change in direction. Where fence is curved, place line posts on the arc of the curve. Use surveyor's instrument to align and place posts.

1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

    a. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

    b. Where concrete foundation is located on new or existing asphalt paving, set top of foundation 2 inches below finished grade. Fill the top with asphalt concrete, level and finish to match new or existing paving texture and grade.

    c. Where concrete foundation is located on new or existing concrete paving, set top of foundation level with concrete and finish to match new or existing concrete in grade, color and texture.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Center Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.

F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.

H. Top Tension Wire: Install tension wire through post cap loops before stretching fabric. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.

I. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires.

Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

K. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.

1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.

M. Privacy Slats: Install slats in direction indicated, securely locked in place.

1. Vertically.

2. Horizontally.

3. Diagonally.

N. Barbed Wire: Pull wire taut and install securely to extension arms and secure to end post or terminal arms according to manufacturer's instructions.

O. Barbed Tape: Install barbed tape in configurations indicated according to manufacturer's recommendations and fasten securely to prevent movement or displacement.

3.02 GATE INSTALLATION

A. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.

END OF SECTION

SECTION 32 3114

CHAIN LINK FENCES
(PVC COATED CHAIN LINK FABRIC ON
PVC COLOR COATED GALVANIZED FRAMEWORK)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Poly Vinyl Chloride (PVC) coated chain link fabric with PVC color coated galvanized steel framework and accessories for commercial or industrial applications.

1.02 RELATED SECTIONS

A. 01 3300 – Submittal Procedures

B. 01 7400 – Warranties

C. 32 1313 – Concrete Paving

1.03 REFERENCES

A. ASTM A36 Standard Specification for Carbon Structural Steel

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings

C. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, Wire Profiles and Tubes

D. ASTM F552 Standard Terminology Relating to Chain Link Fencing

E. ASTM F567 Standard Practice for Installation of Chain Link Fence

F. ASTM F626 Standard Specification for Fence Fittings

G. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric

H. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates

I. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials

J. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework

K. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

L. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates

M. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

N. WLG2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing

1.04 SUBMITTALS

A. Changes in specifications may not be made after the bid date.

B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: If requested, samples of materials (e.g., fabric, wires, color, and accessories).

1.05 QUALITY ASSURANCE

A. Manufacturer: Company having manufacturing facilities in the United States with 5 years experience specializing in manufacturing of chain link fence products.

B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.

C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

D. Substitutions: Alternate chain link products may be acceptable by the architect as equal if approved in writing ten days prior to bidding provided that the items submitted meet the specifications contained in this document.

E. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Master Halco, Company

B. A-1 Fencing Company

C. Straight Gate Fence Company

D. Hoover Fence Company

E. California Fence Company

F. Tymetal Corporation

G. Or Approved Equal

2.02 CHAIN LINK FENCE FABRIC

A. Poly Vinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class 2b Fused and adhered to metallic coated steel wire

B. Size and Height: Chain link fabric (1 in.) (25.4 mm) mesh, (9) gauge core, (8) gauge finish, diameter steel core wire.

C. Color of chain link fabric per ASTM F934: Black

2.03 PVC COLOR COATED STEEL FENCE FRAMEWORK: Black

A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface. Exterior of pipe to have F1043 PVC thermally fused color coating, minimum thickness 10 mils (0.254 mm).
Regular Grade: Minimum steel yield strength of 30,000 psi (205 MPa)
Intermediate Strength Grade: Minimum steel yield strength of 50,000 psi (344 MPa)
High Strength 83000 Grade: Minimum steel yield strength 83,000 psi (572 MPa)

B. Steel pipe Type II: Cold formed electric resistance welded steel pipe complying with ASTM F1043 Group IC having minimum steel yield strength of 50,000 psi

(344 MPa). External protective coating F1043 Type B, 0.9 oz/ft² (270 g/m²) minimum hot-dip zinc coating plus a chromate conversion and a clear polymer coating, plus a minimum 10 mil (0,254 mm) thermally fused PVC color coating in accordance with F1043. Internal coating F1043 Type D, 81% nominal zinc pigmented coating minimum 3 mils (0.0076 mm) thick or Type B, minimum 0.9 oz/ft² (275 g/m²) zinc.

C. Formed steel "C" sections: Roll formed steel shapes complying with ASTM F1043, Group II, 50,000 psi (344 MPa) minimum steel yield strength. External coating, ASTM F1043 Type A, minimum average zinc coating of 2.0 oz/ft² (610 g/m²) in accordance with ASTM A 123. The complete surface area of the rolled formed C post shall have a minimum 10 mil (0,254 mm) thermally fused PVC color coating in accordance with F1043.

2.04 FITTINGS

A. All fittings to be PVC thermally fused color coated having a minimum thickness of 0.006" (0.152 mm) per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.

B. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. "C" shaped line post without top rail do not require post caps. When top rail is specified provide line post loop tops to secure top rail.

C. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.

D. Top rail sleeves: 7" (178 mm) galvanized steel sleeve per ASTM F626.

E. Wire ties: 9 gauge (0.148") (3.76 mm) galvanized steel wire for attachment of fabric to line posts and rails. Pre-formed hog ring ties to be 9 gauge (0.148") (3.76 mm) galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings PVC coated and in compliance with ASTM F626. Color to match fabric color.

F. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105") (2.67mm) pressed steel by 3/4" (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16" (7.94 mm) galvanized carriage bolt and nut.

G. Tension (stretcher) galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.

H. Truss rod assembly: Galvanized steel minimum 5/16” (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626

I. Carriage bolts and nuts: Galvanized of commercial quality

2.05 TENSION WIRE

A. Tension wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664 7 gauge steel core wire, 0.177” (4.50 mm) PVC coating class and color to match chain link fabric

2.06 CHAIN LINK SWING GATES

A. Swing gates double leaf & single leaf (per drawings) opening by (per drawings) high. Fabricate chain link swing gates in accordance with ASTM F900. Gate frame to be of welded construction. Weld areas to be protected with zinc-rich paint per ASTM A780 then over coated with liquid PVC to match frame. The gate frame members are to be spaced no greater than 8’ 0” (2.44 m) apart horizontally or vertically. Exterior members to be 1.900” (48.3 mm) OD pipe, interior members when required shall be 1.660” (42.2 mm) OD pipe. PVC coated pipe to be ASTM F1083/ ASTM F1043 per section 2.03. Chain link fabric to match specification of fence system. Fabric to be stretched tightly and secured to vertical outer frame members using tension bar and tension bands spaced 12” (304.8 mm) on center and tied to the horizontal and interior members 12” (304.8 mm) on center using 9 gauge galvanized steel ties per section 2.04.

B. Hinges, hot dip galvanized pressed steel or malleable iron, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (3.14 rad)

C. Latch: Galvanized forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate.

D. Double gates: Provide galvanized drop rod with center gate stop pipe or receiver to secure inactive leaf in the closed position. Provide galvanized pressed steel locking latch, requiring one padlock for locking both gate leaves, accessible from either side.

E. Keeper to secure open leafs: Provide galvanized gate hold back keeper for each gate leaf over 5’ (1524 mm) wide. Gate keeper shall consist of mechanical device for securing free end of gate when in full open position.

F. Latch, hinges, moveable parts may be field coated with liquid PVC.

G. Gate posts: PVC color coated Grade 1 pipe ASTM F1083, Grade 2 pipe ASTM F1043 Group IC per section 2.03, see table below:

Gate fabric height up to and including 6 ft. (1.2m)

Gate leaf width	Outside Diameter
up to 4 ft. (1.2 m)	2.375 in. (60.3 mm)
over 4 ft. to 10 ft. (1.2 to 3.05 m)	2.875 in. (73.0 mm)
over 10 ft. to 18 ft. (3.05 to 5.5 m)	4.000 in. (101.6 mm)

Gate fabric height over 6 ft. to 12 ft. (1.2 to 2.4m)

Gate leaf width	Outside Diameter
up to 6 ft. (1.8 m)	2.875 in. (73.0 mm)
over 6 ft. to 12 ft. (1.8 to 3.7 m)	4.000 in. (101.6 mm)
over 12 ft. to 18 ft. (2.4 to 5.5 m)	6.625 in. (168.3 mm)
over 18 ft. to 24 ft. (5.5 to 7.3 m)	8.625 in. (219.1 mm)

2.07 POST SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,500 psi (24 MPa).

B. Drive Anchors: Galvanized ASTM A36 steel drive anchor angle blades, [1" x 1" (25 mm x 25 mm)] or [1.25" x1.25" (31.8 mm x 31.8 mm)] x 30 " (762 mm) long secured to post with a pressed steel galvanized shoe clamp. [drive anchors are limited to post size 2.785" (73.0 mm) OD or less]

2.08 ACCESSORIES

A. Privacy Slats: Slats to be manufactured from a combination of color pigments, quality high density virgin polyethylene and ultraviolet inhibitors, having a 25 year limited warranty against either color fading or breakage of slats and locking-channel used under normal climactic extremes experienced In North America and Hawaii. Color: Beige, Black, and Forest Green.

PART 3 EXECUTION

3.01 SITE EXAMINATION

A. Ensure property lines and legal boundaries of work are clearly established.

B. Survey of fence location to be provided by general contractor or fence contractor.

C. Verify areas to receive fencing are completed to final grade.

3.02 CHAIN LINK FRAMEWORK INSTALLATION

A. Install chain link fence system in accordance with ASTM F567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Unless otherwise noted in the drawings, space line posts uniformly maximum 10' (3048 mm) on center, as determined by wind load post selection calculations

D. Concrete set posts: Dig holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, 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 and slope to direct water away from posts.

E. Drive Anchor set line posts: With protective cap, drive post 36" (914 mm) into ground. Excavate a 6" (152.4 mm) diameter by 6" (152.4 mm) deep section around post to accommodate the drive anchor shoe clamp. Drive the 2 diagonal drive anchor angle blades into the soil and securely tighten the angle blades to the post using the shoe clamp, bury the shoe clamp.

F. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

G. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6' (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.

H. Tension wire: Install tension wires so that it will be located 4" (101.6 m) up from bottom the fabric. If top rail is not specified, install the tension wire so that it will be located 4" (101.6 mm) down from the top of the fabric. Stretch and Install tension wire before installing the chain link fabric and attach it to each post using wire ties.

I. Top rail: Install in lengths of 21' (6.400 m). Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.

J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.

K. Touch up any nicks or scratches of the PVC color coating with liquid PVC paint.

3.03 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15” (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2” (50 mm) +/- 1” (25 mm) above finish grade.

B. Secure fabric using wire ties to line posts at 15” (381 mm) on center and to rails and braces 24” (610 mm) on center, and to the tension wire using hog rings 24” (610 mm) on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.04 CHAIN LINK GATE INSTALLATION

A. Swing gates: Installation of swing gates and gate posts shall be per ASTM F567. Direction of swing shall be as shown on drawings. Gates shall be hung plumb in the closed position with minimal space from grade to bottom of gate leaf. Double gate drop bar receiver shall be set in a minimum concrete footing 6” (152 mm) diameter by 24” (610 mm) deep. Gate leaf holdbacks shall be installed on all double gates and all gate leafs greater than 5’ (1524 mm) in width.

3.05 ACCESSORIES

A. Privacy slats: Install and lock in privacy slats in the fabric in accordance with manufacturer’s instructions.

3.06 SITE CLEAN UP

A. Clean up area adjacent to fence line from debris and unused material created by fence installation.

END OF SECTION

SECTION 22 1313

FACILITY SANITARY SEWRES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes sewerage systems outside the building. Systems include the following:

1. Sanitary sewerage.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. "Cast-in-Place Concrete" Section for cast-in-place concrete structures.

2. "Sanitary Waste and Vent Piping" Section for building drains.

1.03 SYSTEM DESCRIPTION

A. Provide systems according to the materials, workmanship, and other applicable requirements of the standard specifications of the state or of authorities having jurisdiction.

1. Reference Specification: Perform all work in accordance with applicable provisions of "Standard Specifications for Public Works Construction", latest Edition. Unless otherwise noted, mention herein of section numbers refers to sections of the Reference Specification. Where Reference Specification refers to "Agency", substitute the word "Owner". Where Reference Specification refers to "Engineer", substitute the word "Architect". Where Reference Specification is in conflict with these Specifications, these Specifications shall govern.

2. Measurement and payment provisions and safety program submittals included in Reference Specifications do not apply to this Section.

1.04 DEFINITIONS

A. System of sewer pipe, fittings, and appurtenances for gravity flow of sanitary sewage.

1.05 PERFORMANCE REQUIREMENTS

A. Environmental Agency Compliance: Comply with regulations pertaining to sanitary sewerage and storm drainage systems.

B. Utility Compliance: Comply with regulations pertaining to sanitary sewerage and storm drainage systems. Include standards of water and other utilities where appropriate.

C. Product Options: Drawings indicate sizes, profiles, connections, and dimensional requirements of system components and are based on specific manufacturer types indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Section "Substitution Procedures."

1.06 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe or fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle precast concrete manholes and other structures according to manufacturer's rigging instructions.

1.07 PROJECT CONDITIONS

A. Perform site survey, research public utility records and/or pothole as necessary to verify existing utility locations. Contact utility locating service for area where Project is located.

B. Verify that it is possible to install water service piping to comply with original design and referenced standards.

C. Locate existing structures and piping to be closed and abandoned.

D. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.

1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without receiving Architect's written permission.

1.08 SEQUENCING AND SCHEDULING

A. Coordinate sanitary sewerage system connections to utility company's sanitary sewer.

B. Coordinate sanitary sewerage system connections to existing on-site sanitary sewer.

C. Coordinate with interior building drainage systems.

D. Coordinate with other utility work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cleanouts:

a. Josam Co.

b. Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.

c. Wade Div., Tyler Corp.

d. Zurn Specification Drainage Operation Div., Zurn Industries, Inc.,

2.02 PIPES AND FITTINGS

A. Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints.

1. Primer: ASTM F 656.

2. Solvent Cement: ASTM D 2564.

3. Gaskets: ASTM F 477, elastomeric seal.

B. Vitrified Clay Piping for Gravity Flow: ASTM C 700 bell-and-spigot piping with ASTM C 425 compression joints.

C. High Density Polyethylene Pipe (HDPE) for gravity flow, smooth interior and annular exterior corrugations. Gasketed integral bell–and-spigot joint meeting the requirements of ASTM F2736. Provide pipe per Paragraph 207-18 of the Reference specification.

2.03 SPECIAL PIPE COUPLINGS AND FITTINGS

A. Sleeve-Type Pipe Couplings: Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined, for nonpressure joints.

1. Sleeves for Plastic Pipe: ASTM F 477, elastomeric seal.

2. Sleeves for Dissimilar Pipes: Compatible with pipe materials being joined.

3. Bands: Stainless steel, at least one at each pipe insert.

B. Gasket-Type Pipe Couplings: Rubber or elastomeric compression gasket, made to match outside diameter of smaller pipe and inside diameter or hub of adjoining larger pipe, for non-pressure joints.

1. Gaskets for Plastic Pipe: ASTM F 477, elastomeric seal.

2. Gaskets for Dissimilar Pipes: Compatible with pipe materials being joined.

2.04 MANHOLES

A. Precast Concrete Manholes: Per SPPWC Standard Plan 200-3, precast, reinforced concrete, of depth indicated.

1. Steps: Omit steps for manholes less than 48 inches (1500 mm) deep.

B. Manhole Frames and Covers: Per SPPWC Standard Plan 210-3.

1. After installation of manhole and after installation of adjacent paving, if any, covers shall be sandblasted and painted with black bituminous paint.

2.05 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:

1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

B. Structures: Portland-cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cement ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.

2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.

C. Structure Channels and Benches: Factory or field formed from concrete. Portland-cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cement ratio.

1. Include channels and benches in manholes.

a. Manhole Channels: Concrete invert, formed to same width as connected piping, with height of the vertical sides to 3/4 of the pipe diameter. Form curved channels with smooth, uniform radius and slope. If channel invert slope is not indicated on the Drawings, slope as follows:

1) Invert Slope: 2.5 percent (1:40) through manhole.

b. Manhole Benches: Concrete, sloped to drain into channel.

1) Slope: 1 inch per foot (1:12).

2.06 CLEANOUTS

A. Description: Round, gray-iron housing with round, secured, scoriated, gray-iron cover as detailed on the Drawings. Include gray-iron ferrule with inside caulk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:

1. Light Duty: In earth or grass, foot-traffic areas.

2. Medium Duty: In paved, foot-traffic areas.

3. Heavy Duty: In vehicle-traffic service areas.

4. Extra Heavy Duty: In roads.

B. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, service class, cast-iron soil pipe and fittings.

C. After installation of cleanout cover and after installation of adjacent paving, if any, covers shall be sandblasted or wirebrushed as necessary and painted with bituminous black paint, unless another color is required by the Architect.

PART 3 - EXECUTION

3.01 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving".

3.02 IDENTIFICATION

A. Materials and their installation are specified in "Earth Moving" Section. Arrange for installation of green warning tapes directly over piping and at outside edges of underground structures.

1. Use warning tapes or detectable warning tape over ferrous piping.

2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.03 SEWERAGE PIPING APPLICATIONS

A. General: Include watertight joints.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to the following applications.

C. Pipe Sizes 4 to 15 Inches (100 to 375 mm): ASTM D 3034, polyvinyl chloride (PVC) sewer pipe and fittings; solvent-cemented joints; or with gaskets and gasketed joints.

D. Pipe Sizes 4 to12 inches (100 to 300 mm): ASTM C 700 vitrified clay piping (VCP) bell -and-spigot sewer pipe; compression joints.

E. Pipe Sizes 4 to12 inches (100 to 300 mm): ASTM F 2736 High-density polyethylene (HDPE) bell-and-spigot sewer pipe; gasketed joints.

3.04 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

A. Special Pipe Couplings: Use where indicated and where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

1. Use the following pipe couplings for non-pressure applications:

a. Straight-pattern, sleeve type to join piping, of same size, with small difference in outside diameters.

b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.

c. Gasket type to join piping of different sizes where annular space between smaller piping's outside diameter and larger piping's inside diameter permits installation.

d. Internal-expansion type to join piping with same inside diameter.

3.05 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of underground sewerage and drainage systems piping. Location and arrangement of piping layout take into account many design considerations. Install piping as indicated, to extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed. Verify existing elevations prior to extensive excavating and notify Architect of any discrepancies. Contractor shall be liable for any premature construction which must be modified due to unforeseen existing conditions.

C. Use fittings for branch connections, except where direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

E. Install gravity-flow-systems piping at constant slope between points and elevations indicated. Install straight piping runs at constant slope, not less than that specified, where slope is not indicated.

F. Extend sewerage piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.

G. Install sewerage piping pitched down in direction of flow, at minimum slope of 2 percent (1:50) and 36-inch (1000-mm) minimum cover, except where otherwise indicated.

3.06 PIPING PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to the following.

B. Polyvinyl Chloride (PVC) Plastic Pipe and Fittings: As follows:

1. Join pipe and gasketed fittings with elastomeric seals according to ASTM D 2321.

C. High-density polyethylene (HDPE) sewer pipe: Install in accordance with ASTM D2321.

D. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and fit both systems' materials and dimensions.

3.07 MANHOLE INSTALLATION

A. General: Install manholes, complete with accessories, as indicated.

B. Form continuous concrete channels and benches between inlets and outlet, where indicated.

C. Set tops of frames and covers flush with finished surface where manholes occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, except where otherwise indicated.

D. Place precast concrete manhole sections as indicated and install according to ASTM C 891.

1. Provide rubber joint gasket complying with ASTM C 443 (ASTM C 443M), at joints of sections.

3.08 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318, and as indicated.

3.09 CLEANOUT INSTALLATION

A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Set cleanout frames and covers in earth in a cast-in-place concrete block, 18 by 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25 mm) above surrounding earth grade.

C. Set cleanout frames and covers in concrete paving with tops flush with surface of paving.

3.10 CLOSING ABANDONED SEWERAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either of the following procedures:

1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Structures: Excavate around structure as required and use the following procedure:

1. Remove structure and close open ends of remaining piping.

2. Backfill to grade according to Division 31 Section "Earth Moving".

3.11 FIELD QUALITY CONTROL

A. Clean interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.

2. Place plug in end of incomplete piping at end of day and whenever work stops.

3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of the Project.

1. Submit separate reports for each system inspection.

2. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visual between structures.

b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.

c. Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.

4. Re-inspect and repeat procedure until results are satisfactory.

C. Test new piping systems and parts of existing systems that have been altered, extended, or repaired for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.

2. Test completed piping systems according to authorities having jurisdiction.

3. Schedule tests, and their inspections by authorities having jurisdiction, with at least 24 hours' advance notice.

4. Submit separate reports for each test.

5. Where authorities having jurisdiction do not have published procedures, perform tests as follows (Contractor may choose either method.):

a. Perform hydrostatic test.

1) Fill sewer piping with water. Test with pressure of at least 10-foot (3-m) head of water and maintain such pressure without leakage for at least 15 minutes.

2) Close openings in system and fill with water.

3) Purge air and refill with water.

4) Disconnect water supply.

5) Test and inspect joints for leaks.

b. Perform air test according to UNI-B-6.

6. Manholes: Perform hydraulic test according to ASTM C 969 (ASTM C 969M).

7. Leaks and loss in test pressure constitute defects that must be repaired.

8. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.

END OF SECTION

WINDOW NUMBER	ROOM NUMBER	ROOM NAME	WINDOW				WINDOW FRAME		DETAILS			REMARKS
			TYPE	WINDOW SIZE (W x H)	MATERIAL	FINISH	MATERIAL	FINISH	HEAD	JAMB	SILL	
01	01	READING AREA	TYPE - 1	SEE WINDOW TYPE	AL/GL/TG	1/4" MIN. GL. CLR ANOD. AL. - FACTORY FINISH	AL	ANOD.				
02	03A	GRADE 1-2	TYPE - 2									
03	03B	GRADE 3-4	TYPE - 3									
04	03C	GRADE 5-6	TYPE - 4									
05	03C	GRADE 5-6	TYPE - 5									
06	03D	GRADE 7-8	TYPE - 5									
07	12	LOUNGE	TYPE - 6									
08	02	STAFF	TYPE - 4									
09	02	STAFF	TYPE - 7									

LEGEND:

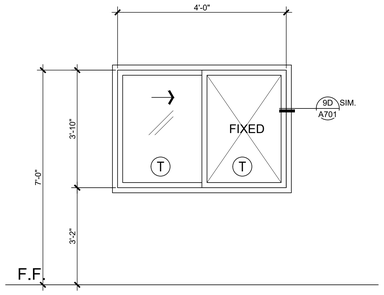
AL - ALUMINUM
ANOD - ANODIZED
CLR - CLEAR
GL - GLASS
HMF - HOLLOW METAL FRAME
HMD - HOLLOW METAL DOOR
PC - POWDER COATED
PH - PANIC HARDWARE
LH - LEVER HANDLE
TG - TEMPERED GLASS

NOTES:

ALL ALUMINUM FRAMES FOR WINDOWS AND DOORS SHALL BE FACTORY- APPLIED COLOR FINISH UNLESS NOTED OTHERWISE ON SCHEDULE.

SCALE: / FILE:

WINDOW SCHEDULE 4



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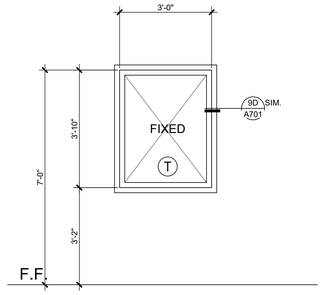

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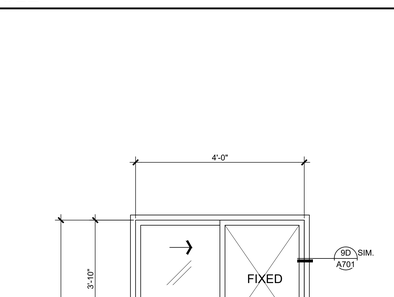

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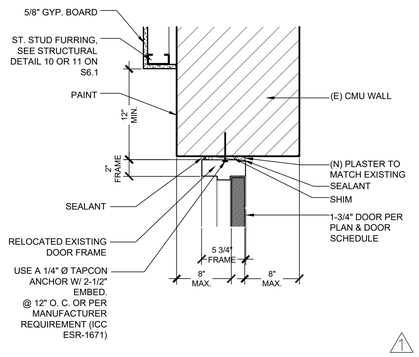
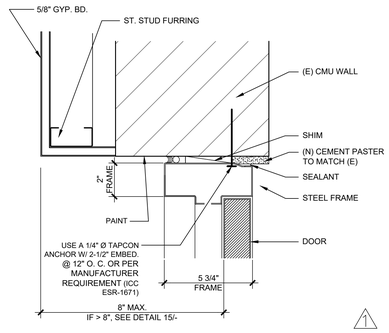


SCALE: / FILE:

H.M. DOOR HEADER & JAMB SCALE: 1 1/2" = 1'-0" FILE: - 15



SCALE: / FILE:

DOOR HEADER (JAMB, SIM.) SCALE: 3"=1'-0" FILE: - 14

- NEW EXTERIOR WALL WITH MIN. R-11 INSULATION
- NEW CURTAIN WALL / STOREFRONT: U=0.41, RSHGC=0.26, VT=0.46
- NEW GLASS DOOR: U=0.46, RSHGC=0.22, VT=0.32
- NEW ROOF FRAMING (REPLACING EXISTING FRAMING) WITH MIN R-14 INSULATION
- NEW ROOFING WITH STANDARD COOL ROOF.

SCALE: / FILE:

ENERGY ENVELOPE DESIGN 13

WINDOW TYPE SCALE: NTS FILE: 1

EDA PROJECT
#: 07-79-07720

CHILDCARE FACILITY

AT

2299 PACIFIC AVE,
LONG BEACH, CA,90806

FOR

2299 PACIFIC AVENUE LLC

2600 INDUSTRY WAY,
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310.537.4610

MSP ARCHITECTS
McDonald, Soutar & Paz, Inc.

3575 LONG BEACH BOULEVARD
LONG BEACH, CA 90807
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LICENSED ARCHITECT
MURREL L. SOUTAR
SIGNATURE
09/30/25
EXP. DATE
LIC. NO. C-11385
STATE OF CALIFORNIA

REV	BY	DESCRIPTION	DATE
1	LS	ADDENDUM 2	2/5/2024

MSP PROJECT NUMBER:	22-1293
DRAWN BY:	MSP
DATE:	10.24.23

DRAWING DESCRIPTION

WINDOW SCHEDULE

DRAWING NUMBER

A703

G:\ACAD\2022\22-1293 ERC 2299 Pacific\DRAWINGS\Sheets\A703 - Window Schedule.dwg

PRINTED DATE: 2/6/2024 10:39:51 AM

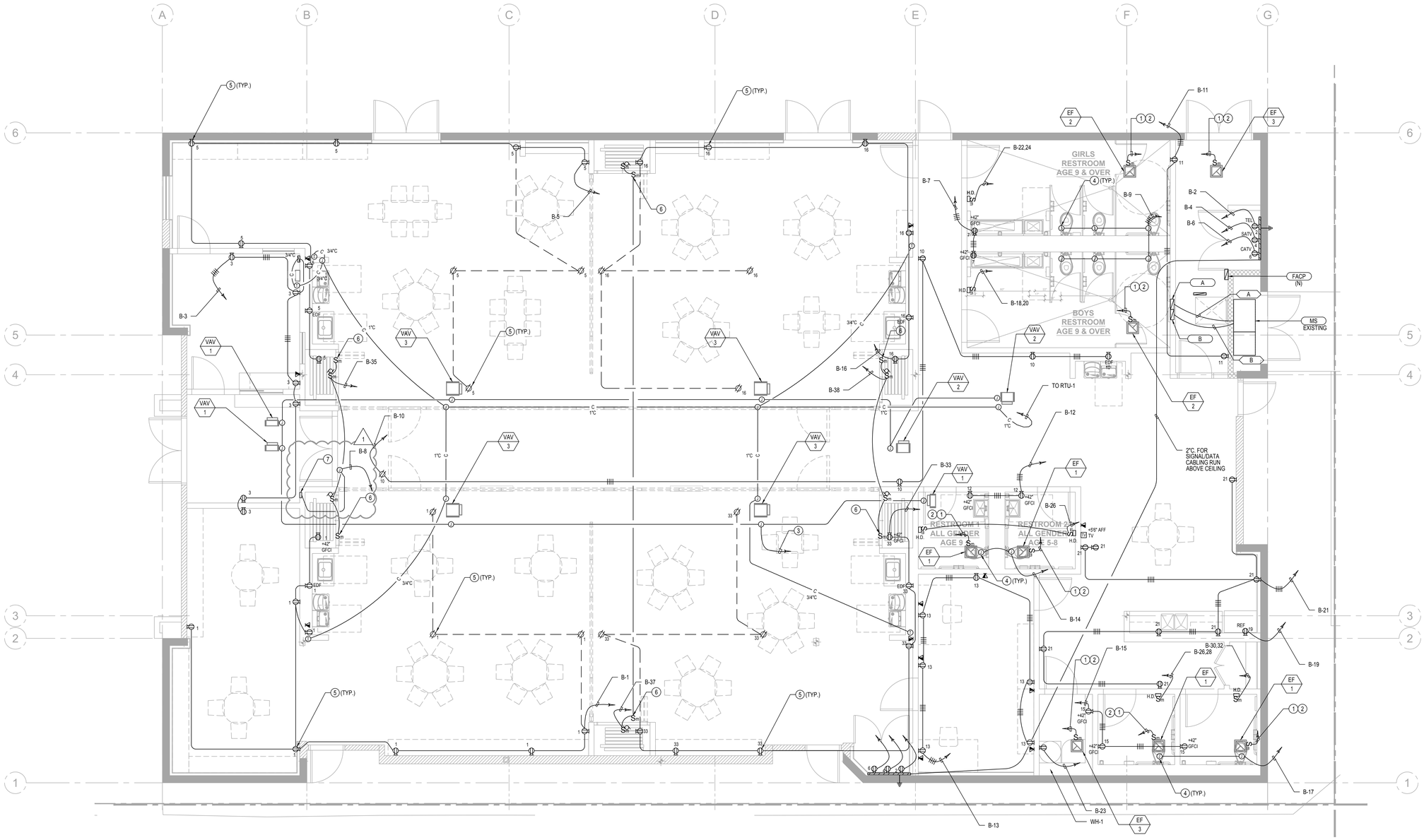
LEGEND	
SYMBOL	DESCRIPTION
T	THERMOSTAT OUTLET, +48" A.F.F.
	TOUCH SCREEN SYSTEM MANAGEMENT CONTROL STATION, +48"
—C—	HVAC SYSTEM CONROL WIRE PATHWAY

REFERENCE NOTES

1. PROVIDE MOTOR RATED TOGGLE TYPE DISCONNECT SWITCH AND CONNECT TO HVAC EQUIPMENT FOR AN OPERABLE HVAC SYSTEM.
2. CONNECT TO THE NEAREST LIGHTING CIRCUIT AND INTERLOCK WITH LIGHT SWITCH IN THE AREA. VERIFY AND COORDINATE INTERLOCKING REQUIREMENTS AND LOCATION WITH MECHANICAL DRAWINGS.
3. PROVIDE LOW VOLTAGE POWER FOR ZONE DAMPER. REFER TO MECHANICAL PLAN AND SCHEDULE FOR MORE INFORMATION.
4. PROVIDE J-BOX AND CONNECT PER MANUFACTURER'S RECOMMENDATION FOR AUTOMATED FLUSHOMETER, URINAL, AND WATER CLOSETS.
5. IN CHILDCARE FACILITIES, ALL NON-LOCKING TYPE, 125V, 15 AND 20-AMPERE RECEPTACLES SHALL BE LISTED TAMPER-RESISTANT RECEPTACLES. (406.12)
6. AT +48" PROVIDE MOTORIZED PARTITION WALL OPEN-CLOSED 3 POSITION MOMENTARY CONTROL SWITCH. SWITCH SHALL HAVE ENGRAVED NAMEPLATE IDENTIFYING SWITCH USE AND CONTROL FUNCTIONS (I.E. PARTITION WALL OPEN/CLOSE CONTROL).
7. KEY CARD AT +48". KEY CARD SHALL BE INSTALLED AND CONNECTED IN ACCORDANCE WITH MANUFACTURE RECOMMENDATION.
8. CONNECT TO DOOR MAGNETIC RELEASE.

GENERAL NOTES

1. ELECTRICAL EQUIPMENT SHALL BE LISTED BY A LOCAL CITY TO RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVAL BY THE DEPARTMENT OR BUILDING AND SAFETY.
2. NO PIPING DUCTS OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE LOCATED ABOVE THE ELECTRICAL EQUIPMENT.
3. EACH SERVICE DISCONNECT SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A SERVICE DISCONNECT.
4. ALL ELECTRICAL ROOM PERSONNEL DOORS SHALL OPEN IN THE DIRECTION OF EGRESS AND BE EQUIPPED WITH PANIC BARS. PRESSURE PLATES OR OTHER DEVICES THAT ARE NORMALLY LATCHED BUT OPEN UNDER SIMPLE PRESSURE.
5. MULTIWIRE BRANCH CIRCUITS SHALL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT POINT WHERE THE BRANCH CIRCUITS ORIGINATES BY THE BRANCH - CIRCUIT OVERCURRENT DEVICE.
6. ALL HOME RUNS SHOWN ON THE DRAWINGS SHALL NOT BE COMBINED WITH LARGER CONDUIT UNLESS SHOWN.
7. IN BATHROOMS, LAUNDRY ROOMS, AND UTILITY ROOMS, AT LEAST ONE LUMINAIRE IN EACH OF THESE SPACES SHALL BE CONTROLLED BY A VACANCY SENSOR.



CHILDCARE FACILITY

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FOR

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Tel (562) 427-5007 Fax (562) 427-3007

LICENSED ARCHITECT
WARREL L. SOUTAR
SIGNATURE
09/30/25
EXP. DATE
LIC. NO. C-11867
STATE OF CALIFORNIA

BREEN DESIGN GROUP
1983 WEST 190TH STREET
SUITE 200
TORRANCE, CA 90504
PH: 310 464 8404
WWW.BREENDESIGN.COM

REGISTERED PROFESSIONAL ENGINEER
DESMOND VATHORENA
NO. E20642
EXP. 03-21-24
ELECTRICAL

DRAWN BY	AA,RP,GD
DESIGNED BY	CVK,AA
CHECKED BY	CVK,AA
APPROVED BY	DM

BID SET

REV	BY	DESCRIPTION	DATE
1	CVK	ADDENDUM 2	2/5/2024

PROJECT NUMBER:	264-22-024
DRAWN BY:	SEE QA/QC STAMP
DATE:	07.06.23
SCALE:	1/4" = 1'-0"

DRAWING DESCRIPTION

ELECTRICAL REMODELED POWER & SIGNAL PLAN

DRAWING NUMBER

E-2.1.1B

PRINT DATE: February 6, 2024

PDF Created on: 2/6/24, at 9:19 AM by FITA TUTOE Filename: H:\PROJECTS\264 MSP ARCHITECTS\22-024 - 2299 PACIFIC AVENUE\01 - CAD\ELECTRICAL\E-2.1.1B ELECTRICAL REMODELED POWER PLAN.DWG
PLOTTED PAPER SIZE (DRAWING HAS BEEN SCALED IF DIFFERENT) ARCH FULL BLEED E1 (30.00 X 42.00 INCHES) PLOT STYLE: BREEN DESIGN GROUP.STB LAST SAVED BY: FTUTOE