CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
CIP NO. 24006 & 24007

ADDENDUM 3
DATED: February 27, 2025

This addendum forms part of the Contract Documents and modifies the original Plans and Specifications. **Bidders shall acknowledge receipt of this Addendum by signing the attached acknowledgement and including the Acknowledgement in their bid proposal.** Failure to include the Acknowledgement with their bid may subject the bidder to disqualification.

GENERAL:

The following changes, deletions, and additions shall be made to the following documents, as noted, and shall take precedence over the original Contract Documents. All other requirements remain the same.

Item	Drawing/Specification	Description
3.01	Specifications Section 00700 – Standard General Conditions of the Construction Contract	*Revised specifications Section 00700 Standard General Conditions of the Construction Contract:* • Replace "(15%)" with "(5%)" in Section 12.01.C.2.b.

3.02	Specification Section 17100 – Control System Requirements	*Revised specifications Section 17100 – Control System Requirements:*
		
		• Delete FIT-07-052 in entirety in Paragraph 2.11, A., 9.
		• Change items "13." and "14." in Paragraph 2.13, A. as follows:
		  o 13. PIT-07-061: Polymer Skid 1 Inlet Pressure Transmitter.
		  o 14. PIT-07-062: Polymer Skid 1 Outlet Pressure Transmitter.
		• Add the following items in Paragraph 2.13, A.:
		  o 15. PIT-07-063: Polymer Skid 2 Inlet Pressure Transmitter.
		  o 16. PIT-07-064: Polymer Skid 2 Outlet Pressure Transmitter.
		  o 17. PIT-07-065: Polymer Skid 3 Inlet Pressure Transmitter.
		  o 18. PIT-07-066: Polymer Skid 3 Outlet Pressure Transmitter.
		  o 19. PIT-07-702: Centrifuge Feed Pump 3 Discharge Pressure Transmitter.

Item	Drawing/Specification	Description
3.03 Specifications (Replacement)		*Revised specifications with the following specification section replacement (Attachment 1):* *Delete the following specification sections:* • 11227 – LARGE BUBBLE MIXING SYSTEM • 11372C – ROTARY SCREW AIR COMPRESSOR SYSTEM • 13122 – CANOPY BUILDING SYSTEMS • 15052 – COMMON WORK RESULTS FOR GENERAL PIPING *Replace with:* • 11227 – LARGE BUBBLE MIXING SYSTEM • 11372C – ROTARY SCREW AIR COMPRESSOR SYSTEM • 13122 – CANOPY BUILDING SYSTEMS • 15052 – COMMON WORK RESULTS FOR GENERAL PIPING
3.04 Drawings (Replacement & Addition)		*Revised drawing plan sheets with the following plan sheet replacement and addition (Attachment 2):* *Delete the following plan sheets:* • 00G002 – DRAWING INDEX 1 • 00C002 – YARD PIPING PLAN – NORTH • 07M101 – SLUDGE BLEND TANKS PLAN • 00TC001 – CIVIL TYPICAL DETAILS 1 • 00TC002 – CIVIL TYPICAL DETAILS 2 • 00TC003 – CIVIL TYPICAL DETAILS 3 • 00TH001 – HVAC TYPICAL DETAILS 1 • 00TM001 – MECHANICAL TYPICAL DETAILS 1 • 00TM007 – MECHANICAL TYPICAL DETAILS 7 • 00E022 – EXISTING MCC-12-01 SINGLE LINE DIAGRAM – MODIFICATIONS 2 • 00E023 – EXISTING MCC-15-01 FRONT ELEVATION – MODIFICATIONS • 00E039 – CONTROL SCHEMATICS 9 • 00E045 – CONTROL SCHEMATICS 15 • 00E047 – CONTROL SCHEMATICS 17 • 00E052 – CIRCUIT SHCEDULES 2 • 00E053 – CIRCUIT SCHEDULES 3 • 00E054 – CIRCUIT SCHEDULES 4 • 07E401 – DEWATERING FACILITY POWER AND CONTROL PLAN • 07N071 – P&ID: CENTRIFUGE 3

Item	Drawing/Specification	Description
		• 07N072 – P&ID: POLYMER DILUTION UNIT 3 *Replace with:* • 00G002 – DRAWING INDEX 1 • 00C002 – YARD PIPING PLAN – NORTH • 07M101 – SLUDGE BLEND TANKS PLAN • 00TC001 – CIVIL TYPICAL DETAILS 1 • 00TC002 – CIVIL TYPICAL DETAILS 2 • 00TC003 – CIVIL TYPICAL DETAILS 3 • 00TH001 – HVAC TYPICAL DETAILS 1 • 00TM001 – MECHANICAL TYPICAL DETAILS 1 • 00TM007 – MECHANICAL TYPICAL DETAILS 7 • 00E022 – EXISTING MCC-12-01 SINGLE LINE DIAGRAM – MODIFICATIONS 2 • 00E023 – EXISTING MCC-15-01 FRONT ELEVATION – MODIFICATIONS • 00E039 – CONTROL SCHEMATICS 9 • 00E045 – CONTROL SCHEMATICS 15 • 00E047 – CONTROL SCHEMATICS 17 • 00E052 – CIRCUIT SHCEDULES 2 • 00E053 – CIRCUIT SCHEDULES 3 • 00E054 – CIRCUIT SCHEDULES 4 • 07E401 – DEWATERING FACILITY POWER AND CONTROL PLAN • 07N071 – P&ID: CENTRIFUGE 3 • 07N072 – P&ID: POLYMER DILUTION UNIT 3 *Revised drawing plans to include the following plan sheets:* • 003S101 – BIOTOWER PUMP STATION AND EFFLUENT CHANNEL PLAN AND SECTIONS

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
CIP NO. 24006 & 24007

ADDENDUM 3
DATED: February 27, 2025

I acknowledge receipt of Addendum No. 3.

Company _____

By: _____

Title: _____

Address: _____

Date: _____

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
CIP NO. 24006 & 24007

ADDENDUM 3
DATED: February 27, 2025

ATTACHMENT 1

Specifications (Replacement)

- 11227 – LARGE BUBBLE MIXING SYSTEM
- 11372C – ROTARY SCREW AIR COMPRESSOR SYSTEM
- 13122 – CANOPY BUILDING SYSTEMS
- 15052 – COMMON WORK RESULTS FOR GENERAL PIPING

Replace Section in its Entirety

SECTION 11227[AD3]

LARGE BUBBLE MIXING SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Large bubble mixing systems for installation in sludge blend tanks.
      a. Air receiver tank shall be provided by the large bubble mixing system manufacturer.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application.
   2. A276 - Standard Specification for Stainless Steel Bars and Shapes.
   3. A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
   4. A380 - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment and Systems.

B. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1,000 V Maximum).

C. Underwriters Laboratories, Inc. (UL):
   1. 508 - Standard for Industrial Control Equipment.
   2. 508A - Standard for Industrial Control Panels.
   3. 698A - Standard for Industrial Control Panels Relating to Hazardous (Classified) Locations.
   4. 1283 - Standard for Electromagnetic Interference Filters.
   5. 1449 - Surge Protective Devices.

1.03 TERMINOLOGY

A. The words and terms listed below are not defined terms that require initial capital letters, but, when used in this Section, have the indicated meaning.
   1. Header supply pipe: Piping between a valve panel and respective nozzle headers.
   2. MLSS: Mixed liquor suspended solids concentration, in milligrams per liter.
   3. Nozzle: Floor-anchored, large bubble-emitting device.
   4. Nozzle header: Continuous horizontal piping with nozzle offsets, with single inlet connection to header supply pipe and outlet offset connections to nozzles.
   5. Nozzle offset: Piping branching off nozzle header trunk piping, which connects to nozzles.

6. Vendor valve control panel (VVCP): Control panel that controls the firing of integral solenoid valves, which intermittently emit compressed air bursts to the respective header supply pipes.

1.04 DELEGATED DESIGN

A. As specified in Section 01357 - Delegated Design Procedures.

B. Anchoring and bracing.

1.05 SUBMITTALS

A. Furnish Submittals as specified in Section 01300 - Submittals and Section 01600 - Product Requirements.

B. Product data:
   1. Descriptive literature and dimensional drawings for equipment proposed, including views of the nozzle headers and nozzle offset assemblies indicating materials of construction, material product specification for components, and number, location, and spacing of nozzles, and size and layout of air piping.
   2. Pipe support layout describing methods for supporting and preventing uncontrolled movement of the nozzle headers and nozzle offset grid pipes resulting from flotation dynamic forces, fluid forces developed by firing compressed air for mixing, and other external forces. Methods for supporting and preventing uncontrolled movement of the nozzle headers and nozzle offset grid pipes during filling and draining of the sludge blend tanks shall also be provided as indicated on the Drawings.
   3. Methods for draining the air distribution systems.
   4. Nozzle and nozzle assemblies:
      a. Number of large bubble mixing nozzles.
      b. Complete materials list, material specifications, dimensions, and tolerances of parts of the nozzle assemblies.
   5. Nozzle header pipes:
      a. Complete materials list and specifications, dimensions, critical tolerances of piping, fittings, and accessories.
      b. Layout of header piping, nozzle offsets, nozzles, and pipe supports.
      c. Indicate nozzle-free areas required for ladder access.
   6. Pipe supports:
      a. Complete design criteria, material list, material specifications, and dimensions of parts of the pipe supports.
      b. Include drawings showing proposed support design, including anchor locations and details.
   7. VVCPs:
      a. Product data for control panel enclosures and components.
      b. Shop Drawings of wiring schematics and control panel layouts:
         1) Scaled exterior front and side elevations with dimensional information.
         2) Scaled interior panel layout showing components coordinated with the bill of materials.
         3) Bill of materials with detailed description of components.
         4) Wiring schematics, including wire numbers and terminal numbers.
         5) Single-line diagram of power distribution.

6) Control wiring, control logic, and instrumentation.

C. Delegated Design Submittals:
   1. Anchoring and bracing: Provide project-specific calculations based on support conditions and requirements to resist loads specified in Section 01850 - Design Criteria.

D. Calculations:
   1. Verifying uniform mixing under specified conditions.
   2. Verify the minimal oxygen transfer under specified conditions.
   3. Thermal management calculations for each control panel containing a programmable logic controller (PLC).

E. Full-scale test results from a minimum of 5 U.S. installations demonstrating that the large bubble mixing system achieved homogenous mixing as substantiated through statistical analysis of total suspended solids (TSS) samplings yielding a coefficient of variation (CV) of 10 percent or less.

F. Installation reference list, including a minimum of 5 similar installations for which the manufacturer furnished and integrated the complete system.
   1. Include, at a minimum, nozzles, in-basin piping, valve panels, and air compressor(s).
   2. Facility name/location, design average daily flow, contact name/telephone number, and start-up date for each installation are to be provided.

G. Installation instructions:
   1. Detail the complete installation of the equipment, including rigging, moving, and setting into place.
   2. Provide manufacturer’s installation instructions.

H. Quality Control Submittals:
   1. Manufacturer’s representative qualifications.
   2. Manufacturer’s Certificate of Source Testing as specified in Section 01660 - Equipment and System Performance and Operational Testing.
   3. Manufacturer’s Certificate of Installation Verification as specified in Section 01660 - Equipment and System Performance and Operational Testing.
   4. Manufacturer’s Certificate of Functional Compliance as specified in Section 01660 - Equipment and System Performance and Operational Testing.

I. Owner Training Submittals:
   1. As specified in Section 01660 - Equipment and System Performance and Operational Testing.

J. Operation and maintenance manuals:
   1. As specified in Section 01670 - Operations, Maintenance, and Training Requirements.

K. Closeout Submittals:
    1. As-built set of large bubble mixing system drawings:
        a. A maximum of 30 days following the successful completion of the field mixing performance test, provide an as-built set of drawings showing the installed nozzle configuration with pertinent details, including:
            1) Installed number and location of nozzles, nozzle offsets.
            2) Installed configuration of the nozzle header piping, including valves and fittings.
            3) Installed VVCP layouts.
            4) Installed process and instrumentation diagram.
    2. PLC programming.
        a. Programming shall be fully documented.

1.06 ADMINISTRATIVE REQUIREMENTS

A. Programming requirements:
    1. As specified in Section 17101A - Specific Control Strategies.

B. Programming coordination:
    1. Coordinate requirements for data transfer with plant control system (PCS):
        a. Include data registers, data types, and engineering units, etc.
    2. Coordinate with the instrumentation and controls subcontractor (ICSC) and programmer for factory testing.
        a. Vendor shall supply PLC and LOI programming file prior to the testing.
    3. Coordinate data transfer to and from the PCS with the ICSC and programmer at programming meetings as specified in Section 17100 - Control System Requirements.

1.07 QUALITY ASSURANCE

A. Large bubble mixing system, and components (vendor control panels (VCPs), air receiver tank, air distribution piping from the valve control panels to the air nozzles and nozzle assemblies, fasteners and hardware, and piping supports) shall be provided by one manufacturer.

B. System shall be furnished by a single manufacturer who is experienced, reputable, and qualified in the manufacture of the equipment to be furnished.

C. Obtain nozzles, nozzle headers, header supply piping and couplings, panels, and appurtenances from the mixing system manufacturer, as a complete and integrated package to ensure proper coordination and compatibility and operation of the system.

1.08 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 01600 - Product Requirements and the manufacturer’s instructions.

1.09 PROJECT OR SITE CONDITIONS

A. As specified in Section 01850 - Design Criteria.

1.10 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

1.11 MAINTENANCE

A. As specified in Section 01600 - Product Requirements.

B. Provide spare parts that are identical to and interchangeable with installed parts.
   1. Air control valve rebuild kits: 2.
   2. ~~Pressure regulator rebuild kit: 1.~~[AD3]
   3. ~~3.~~2. Pilot air filter assembly: 1.
   4. ~~4.~~3. Solenoid: 1.
   5. ~~5.~~4. Valve plug and cable assembly: 1.
   6. ~~6.~~5. Relay and circuit breaker: 1.
   7. ~~7.~~6. 5-micron pilot air filter: 1.
   8. ~~8.~~7. Any other standard parts recommended by the manufacturer.[AD3]

C. List of recommended spare parts.

PART 2 PRODUCTS

2.01 GENERAL

A. Large bubble mixing system includes, but is not limited to:
   1. Air distribution piping (from the valve control panels to air nozzles, including droplegs and nozzle headers).
   2. Piping supports.
   3. Air nozzle and nozzle assembly.
   4. Fasteners and hardware.
   5. Vendor valve control panels.
   6. Air receiver tank.
   7. All items noted above shall be provided by the large bubble mixing system manufacturer.

2.02 MANUFACTURERS

A. One of the following or approved equal as determined by the City Engineer:
   1. EnviroMix, Inc.

2.03 DESIGN AND PERFORMANCE CRITERIA

A. System configuration:
   1. Two sludge blend tanks with layouts and dimensions as indicated on the Drawings and specified.
   2. Nominal basin dimensions, including side water depths (SWD) in units of feet of water for each zone at different operating conditions, are indicated below:

	Length (ft' in")	Width (ft' in")	Minimum SWD (ft' in")	Peak SWD(1) (ft' in")
Sludge Blend Tank 1 and 2	46'-0"	12'-0"	0'-0"	9'-9"

Notes:

(1) SWD in tank varies as indicated on the Drawings. Listed peak SWD is measured from tank floor low point at the west end of the tank.

B. Design requirements:
   1. General:
      a. Large bubble mixing system shall intermittently and sequentially inject compressed air through fixed nozzles located on the basin floor to create large bubbles, which effectively mix the basin contents with negligible oxygen transfer to prevent settlement of solids.
         1) MLSS concentrations in the sludge are expected to range between 1,000 and 30,000 milligrams per liter.
      b. Airflow will be supplied by rotary screw compressors as specified in Section 11372C - Rotary Screw Air Compressor System and the airflow varied independently to maintain the desired firing flow rate and duration in each mixing zone. An air flow rate of at least 22 SCFM @ 100 psig will be available for the large bubble mixing system.AD3
      c. Header supply pipe, nozzle headers, nozzle offset pipe, and nozzles shall be capable of handling a mixture of primary sludge and waste activated sludge.
      d. Mixing shall be uniform throughout the tank with effective mixing confirmed through Functional Testing as specified.
      e. Air distribution and balancing shall be sufficient to maintain suspended solids in a state of suspension over the depth of the basins.
      f. Firing flow rate shall be manually adjustable via a throttling valve. Air mixing system equipment and piping shall be sized to thoroughly mix the contents of the basin for which the systems are designed.
   2. Process air requirements for operations:
      a. Free-standing air receiver shall be sized such that there is sufficient air volume and pressure to operate the large bubble mixing system as designed.

C. Nozzle layout:
   1. Provide nozzle quantities and necessary appurtenances to meet minimum performance requirements specified. A minimum of 12 nozzles shall be provided in each tank. Designs with less nozzles are not acceptable.
   2. Provide additional pipe supports and anchorage where indicated on the Drawings. Additional pipe supports and anchorage are to be installed on nozzle headers, nozzle offsets, and nozzles to maintain pipe stability during filling and draining operations in the sludge blend tanks.
   3. Layout is subject to the approval of the Engineer. Engineer shall determine compliance with the stated requirements.
   4. Design the nozzle layout to satisfy the following minimum requirements.
      a. Minimum clearance of 18 inches from any wall, wall fillet, or wall support to the edge of the nozzle.

b. Make provisions for ladder placement to allow entry into each basin from the top of the basin.
    1) A minimum of 36 inches between the ladder face and large bubble mixing nozzles, nozzle offsets, nozzle headers, and header supply pipe shall be provided.
    2) A minimum clearance of 12 inches shall also be provided on each side of the ladder.

2.04 AIR PIPING, NOZZLES, AND APPURTENANCES

A. Header supply piping:
1. Threaded pipe shall not be allowed between the VVCP and the nozzles.
2. Schedule 10S, stainless steel press fit joints as specified in Section 15286 - Stainless Steel Pipe and Tubing.
3. Maximum working pressure: 200 pounds per square inch.
4. Couplings and fittings: Press technology products formed of Type 316/316L stainless steel tubing, including a self-contained O-ring seal(s) molded of synthetic FKM rubber.
5. Pipe: ASTM A312, Type 316/316L stainless steel.

B. Nozzle headers:
1. Schedule 10S, Type 316/3016L stainless steel with Schedule 40S stainless steel nozzle offsets.
2. Nozzle couplings: NPT tapered threads, Type 316/316L stainless steel.
3. Delivered from the manufacturer pre-assembled to the extent practicable to minimize field assembly error and installation time.
4. Pipe: ASTM A312, Type 316/316L stainless steel.
5. Provide nozzle headers with removable end caps.

C. Nozzles:
1. Adequate strength to withstand vertical thrust of mixing air.
2. Threaded rod anchors:
    a. As specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.
    b. A minimum of 4~~2~~ rod anchors shall be installed per nozzle.[AD3]

D. Appurtenances:
1. Nuts, bolts, washers, threaded rod, and other non-welded parts shall be stainless steel, ASTM A240, Type 316.
2. Threaded assemblies shall be chemically treated or lubricated prior to assembling to prevent galling.

E. Fabrication:
1. Piping used for the air mixing system shall be Type 316/316L stainless steel, unless otherwise noted.
2. Shop fabricated welded metal parts and assemblies from stainless steel, ASTM A240, Type 316/316L, with a 2D finish.
3. Shop fabricate non-welded parts and pieces from sheets and plates of stainless steel, ASTM A240, Type 316, or from bars of stainless steel ASTM A276, Type 316, unless otherwise specified.

F. Welds and welding procedures:
   1. Shop weld with filler wire using MIG, TIG, or shield-arc, or plasma arc welding inert gas processes. Provide a cross-section equal to or greater than parent metal.
   2. Provide full penetration welds to interior surface with gas shielding to interior and exterior of joint.
   3. Provide smooth, evenly distributed interior weld beads with an interior projection not exceeding 1/16 inch beyond inner diameter of nozzle header or fittings.
   4. Clean welded stainless steel surfaces and welds after fabrication to remove weld splatter and finish clean exterior welds, carbon deposits, and contaminants in accordance with ASTM A380, Section 6.2.11.
   5. Field welding is not permitted.

2.05 AIR RECEIVERS

A. Materials: Steel, as permitted by ASME code.

B. Design:
   1. Pressure rating: 200 psig.
   2. Volume: Determined by large bubble mixing manufacturer, minimum 120 gallons.

C. Accessories:
   1. Pressure gauge: As specified in Section 17100 - Control System Requirements.
   2. Pressure relief valve: ASME stamped.
   3. Drain trap: Externally mounted automatic mechanical type.

D. Finishes:
   1. Factory prime, compatible with finish coat.
   2. Finish coat in field. As specified in Section 09960 - High-Performance Coatings.

2.06 VENDOR VALVE CONTROL PANELS

A. General:
   1. VVCP components and construction shall be as specified in Section 17100 - Control System Requirements.
   2. Provide components and equipment with UL 508 listing.
   3. Provide control panels with UL 508A labeled.
   4. Provide intrinsically safe circuits and equipment in accordance with UL 698A.
   5. VCP shall be fully functional, wired, and factory tested prior to shipment.
      a. Provide field wiring terminal strips for external connections.
   6. Provide surge protection on the incoming power feed.
      a. Provide UL 1449 rated SPD and UL 1283 rated EMI filter on 120 VAC panel power source.
   7. Provide necessary control hardware, software, and components as required for a fully functional and operational installation.
   8. Provide heating, cooling, and dehumidifying devices to maintain devices within their rated temperature range.

9. Power supply:
    a. 120 VAC, 1-phase, 60 hertz.

B. Enclosures and panel components:
1. Enclosure:
    a. Manufacturers: One of the following or equal:
        1) Hoffman.
        2) Enclosure Industries, LLC.
    b. Rating: NEMA Type 4X stainless steel.
    c. Material: Type 304 stainless steel.
2. Enclosure support stand:
    a. Designed by manufacturer.
    b. Material: Type 304 stainless steel.
3. Pilot Air Filter:
    a. Manufacturers: One of the following or equal:
        1) Parker 14F15BB.
    b. Each VVCP shall include a 5-micron filter with 1/4-inch NPT inlet/outlet and an automatic pulse drain to remove fine particles, condensate, and oil from the air supply.
    c. The filter shall be rated for 150 psig maximum pressure, 175 degrees Fahrenheit maximum temperature, and 24 scfm.
4. Operator Interface: Each VVCP shall have a Local-Off-Remote (LOR) selector switch, a Frequency dial, and a Duration dial.
    a. In Local control, the ‘Duration’ dial and the ‘Frequency’ dial inside the VVCP shall allow the operator to adjust mixing intensity locally.
    b. In Remote control, the remote position will function the same as Off position since there is not a master control panel.
5. Controller:
    a. Manufacturers: One of the following or equal:
        1) EnviroMix Zombie Controller.
    b. The controller shall be rated for a -40 degrees Fahrenheit to 176 degrees Fahrenheit temperature range.
    c. The controller shall be programmed to operate according to the dial settings for valve open frequency and duration when the LOR is in Local mode.
6. Air control valves: The air control valves shall be mounted to a common manifold.
7. Nameplate: A stainless steel nameplate shall be provided on the VVCP. The nameplate shall be securely fastened in a conspicuous place and clearly inscribed with the Manufacturer’s name, year of manufacture, and serial number.
8. Alarm Light. A red stack light shall be mounted on the top of the VVCP and indicate an alarm condition specific to the VVCP.

2.07 CONTROL STRATEGY

A. General:
1. Control shall allow mixing to be started and stopped, and mixing intensity to be adjusted at any point during operation. Control features shall be initially set according to the Manufacturer’s recommendations.

2. Mixing Parameters: The operator shall be able to enable/disable mixing operation, select the firing duration and the frequency of firing. Minimum control features selected through the local interface shall include the following:
    a. Local-Off-Remote (LOR) Switch.
        1) Local Position: In Local, the controller in the VVCP controls the mixing intensity. The 'Duration' dial and the 'Frequency' dial inside the VVCP shall allow the operator to adjust mixing intensity locally.
        2) Remote Position: The system does not have a master control panel, so this mode will function the same as the Off position.
        3) Off Position. In Off, the VVCP will be disabled locally and remotely.
    b. Duration Dial:
        1) Selection of the length of time an individual ACV is open during a firing event.
        2) The duration shall be operator adjustable from 0.1 to 1 seconds by adjusting the dial.
        3) The duration will be the same for all ACVs in the VVCP.
    c. Frequency Dial:
        1) Section of the length of time to complete the firing sequence.
        2) The frequency shall be operator adjustable from 1 to 100 seconds by adjusting the dial.
    d. Valve Isolation: Individual ACVs may be removed from the firing sequence at any point during operation by unplugging the solenoid from the ACV. Alternatively, the header supply pipe isolation valve can be closed.
    e. Alarms: Each VVCP shall come equipped with a pressure switch plumbed to the valve manifold. The alarm light will illuminate, and a dry contact shall be provided for remote indication of low pressure.
3. Remote Communication with the Plant Control System.
    a. The VVCP shall interface with the Plant Control System with the following I/O through hard-wired conductors.
        1) Inputs - Mix enable signals (entire VVCP or by ACV/zone/tank) via dry contacts from Plant Control System.
        2) Outputs - Low pressure alarm via dry contact.

B. Control system requirements as specified in Section 17101A - Specific Control Strategies.

PART 3 EXECUTION

3.01 PREPARATION

A. Anchoring and bracing to structures:
    1. Prepare equipment anchor setting template(s) and use to position anchors during construction of supporting structure(s).
    2. Install anchors of type and material indicated on approved anchoring designs.
    3. Install anchors with embedment indicated on approved anchoring designs.

3.02 INSTALLATION

A. Install the specified large bubble mixing system in accordance with the accepted installation instructions, anchorage details, and approved Shop Drawings.

B. Inspect piping for proper joints, supports and threaded rod anchors prior to initiating any field-testing.

C. Test for mounting, levelness, air uniformity, and leakage.

D. Manufacturer's representative onsite to monitor the installation, leveling, and testing of the large bubble mixing equipment in each basin.

E. Flood the sludge blend tanks with water to the top of the nozzle headers.
   1. Check the level of the nozzles on each respective nozzle header to verify that they are at the same elevation within 0.25 inch of a common horizontal plane.

F. Complete the following tests as specified in Section 17100 - Control System Requirements:
   1. Loop checks.
   2. Loop validation tests.

G. Furnish Manufacturer's Certificate of Installation Verification.

3.03 COMMISSIONING

A. As specified in Section 01660 - Equipment and System Performance and Operational Testing, Section 15958 - Mechanical Equipment Testing, and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer's Certificate of Source Testing.
      b. Manufacturer's Certificate of Installation and Functionality Compliance.
   2. Manufacturer's Representative onsite requirements: Require manufacturer's representative to perform the following services as described below and as specified in Section 01660 - Equipment and System Performance and Operational Testing. The specified durations are the minimum required time on the job site. Additional services and/or longer durations shall be provided as needed at no cost to the Owner to meet the required quality of work. Work to be done in a minimum of 4 trips:
      a. Installation assistance: As required:
         1) Advise/observe the Contractor on the installation of the equipment.
         2) Provide additional assistance as required.
      a. Installation inspection: 1 trip, 2-day minimum.
      b. Functional Testing: 2 trips, 2-day minimum each trip.
   3. Training: As defined in Section 01660 - Equipment and System Performance and Operational Testing and this Section:
      a. Operations: 2-hour class, 2 sessions.
      b. Mechanical Maintenance: 3-hour class, 1 session.
      c. Combined Electrical and I&C Maintenance: 1-hour class, 1 session.
   2. Final acceptance checkout: 1 workday (trip may be combined with training).

C. Source Testing (Factory Acceptance Tests):
   1. As specified in Section 01660 - Equipment and System Performance and Operational Testing.

2. Not witnessed.
3. Each unit shall be tested, including control functions prior to shipment.
4. VCP testing:
    a. As specified in Section 17100 - Control System Requirements.
    b. Hardware testing.
    c. Platform testing.
5. Furnish test reports and the Manufacturer's Certificate of Source Testing.

D. Functional Testing:
1. Witnessed.
2. Field performance tests:
    a. Test mixer components with the respective basins full to the maximum water surface elevation.
    b. Test exposed air piping for leaks using soapsuds on joints and applying 100 pounds per square inch test pressure.
        1) Air piping in the tanks may be tested by submerging the piping in non-potable water and pressurizing the piping to 175 pounds per square inch, in lieu of using soapsuds on joints.
        2) Pressure testing requirements shall not apply to supply piping downstream from the VCP of pre-manufactured nozzle headers.
    c. Contractor is responsible for filling and emptying sludge blend tanks with water as required for testing activities.
        1) Water used shall be from the Owner's plant effluent water system.
        2) Contractor shall be responsible for conveying water between the plant's non-potable water and the sludge blend tanks.
        3) Provide written notification to the Engineer a minimum of 5 days in advance of any such use of the non-potable water.
    d. Operate each mixing system at the maximum water surface elevation in the basins for a continuous period of not less than 72 hours.

~~3. Test as specified in Section 15958 - Mechanical Equipment Testing:~~
~~a. Conduct Level 2 General Equipment Performance Test.~~
~~b. Conduct Level 2 Vibration Test.~~
~~c. Conduct Level 2 Noise Test.~~
~~1) Test equipment and installation to verify tightness, operation, and unit vibration is within the manufacturer's submitted maximum.~~ AD3

~~4.~~3. Complete end-to-end testing (CEET) as specified in Section 17100 - Control System Requirements. AD3

~~5.~~4. 7-day test: AD3
    a. Following successful completion of the 72-hour test, coordinate with the plant operations personnel in placing the sludge blend tanks in operation.
    b. Provide a minimum of 1 week for the Owner to establish operational conditions in the sludge blend tanks.
    c. Upon notice that the sludge blend tanks have achieved operational conditions, begin the 7-day test.
    d. Submit a written procedure for approval prior to beginning the 7-day test.
        1) Correct any deficiencies found during the 7-day test and, at the Owner's option, run the 7-day test again at no additional cost.

~~6.~~5. Field mixing performance testing:
    a. Do not begin mixing performance testing until after the 7-day testing is complete. AD3

b. Do not begin mixing performance testing until after the basins which will be tested shall have been in normal operating mode for at least 2 days with TSS concentration in typical operating ranges specified above. No flow shall enter or exit the respective basin for 2 hours prior to or during the test.
c. Mixing performance testing shall be conducted in the following basins:
    1) Sludge Blend Tank 1.
    2) Sludge Blend Tank 2.
d. Large bubble mixing system manufacturer shall conduct TSS testing using a Cerlic TSS probe, or equal, suspended solids analyzer.
e. Testing procedure:
    1) At least 4 horizontal-plane sample sites to be tested shall be selected by the Engineer.
        a) At each sample site, 3 vertical samples shall be collected as follows:
            (1) 24 inches from the surface, tank sidewall mid-point, and 24 inches above the tank sidewall bottom.
            (2) Each sample site must be a minimum of 4 feet away from any structure within the tank.
    2) Coefficient of variation (CV) shall be determined for the sample set, excluding the maximum and minimum samples.
        a) CV shall be calculated by taking the resultant set of 10 samples as follows:
            (1) CV = (100 x Standard Deviation of 10 Samples)/(Mean Value of 10 Samples).
    3) If the CV is less than or equal to 10 percent then the mixer performance shall be acceptable for that location.
    4) If the CV is greater than 10 percent then the mixer performance shall be unacceptable for that location and the Contractor and/or manufacturer shall make necessary improvements at no additional cost to the Owner and repeat the testing procedure at no additional cost to the Owner until the CV is less than or equal to 10 percent for that location.

~~7.~~6. Furnish test reports and the Manufacturer's Certificate of Functional Compliance.[AD3]

E. Additional testing:
1. After completion of the network testing, assist in the completion of the following as specified in Section 17100 - Control System Requirements:
    a. Complete end-to-end testing.
    b. Control logic operational validation.
    c. Loop tuning.

END OF SECTION

[AD3] Addendum 3

Replace Section in its Entirety

SECTION 11372C[AD3]

ROTARY SCREW AIR COMPRESSOR SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Rotary screw air compressor system.

B. Equipment tag numbers:
   1. As scheduled.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME).

B. International Organization for Standardization (ISO):
   1. 1217 - Displacement Compressors - Acceptance Tests.

C. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1,000 V Maximum).

D. Underwriters Laboratories, Inc. (UL):
   1. 508 - Standard for Industrial Control Equipment.
   2. 508A - Standard for Industrial Control Panels.

1.03 DELEGATED DESIGN

A. As specified in Section 01357 - Delegated Design Procedures.

B. Anchoring and bracing.

1.04 SUBMITTALS

A. Submit as specified in Section 01300 - Submittals.

B. Product Submittals:
   1. As specified in Section 01600 - Product Requirements.
   2. Product data.
   3. Shop Drawings.
      a. Vendor control panel (VCP):
         1) Wiring diagrams.
   4. Calculations.

C. Delegated Design Submittals:
   1. Anchoring and bracing: Provide project-specific calculations based on support conditions and requirements to resist loads specified in Section 01850 - Design Criteria.
      a. To structures for equipment installed in structures designated as seismic design category C, D, E, or F.
      b. For equipment installed outdoors.

D. Installation instructions:
   1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
   2. Provide manufacturer's installation instructions.

E. Quality Control Submittals:
   1. Manufacturer's representative qualifications.
   2. Manufacturer's Certificate of Installation as specified in Section 01660 - Equipment and System Performance and Operational Testing.
   3. Manufacturer's Certificate of Functional Compliance as specified in Section 01660 - Equipment and System Performance and Operational Testing.

F. Owner Training Submittals:
   1. As specified in Section 01660 - Equipment and System Performance and Operational Testing.

G. Operation and maintenance manuals:
   1. As specified in Section 01670 - Operations, Maintenance, and Training Requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 01600 - Product Requirements, Section 15050 - Common Work Results for Mechanical, and the manufacturer's instructions.

1.06 PROJECT OR SITE CONDITIONS

A. As specified in Section 01850 - Design Criteria.

1.07 WARRANTY

A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GENERAL

A. As specified in Section 01600 - Product Requirements and Section 15050 - Common Work Results for Mechanical Equipment.

B. System components:
   1. Air compressors.

2. Air dryers.
3. Air receivers.
4. Air filters.
5. Appurtenances.

2.02 MANUFACTURERS

A. As listed below for each type of equipment.

2.03 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Design equipment for environmental requirements as specified in Section 01850 - Design Criteria.
   2. Package system:
      a. Rated for continuous duty operation
   3. Air compressors:
      a. Type: Positive displacement, lubricated rotary screw.
   4. Air dryers:
      a. Type: Direct expansion refrigerated.
      b. Refrigeration capacity control: Design valve to control flow of refrigerant to evaporator to maintain design compressed air dew point and prevent dryer freeze-up under conditions of variable load from 0 percent to 100 percent of full capacity.
      ~~b.~~c. Air dryer to be furnished integral to the air compressor unit. AD3
   ~~5. Air receiver:~~
      ~~a. Type: Vertical.~~
      ~~b. Size: 200-gallon minimum.~~
      ~~c. Design working pressure: 250 pounds per square inch gauge minimum at 450 degrees Fahrenheit.~~
      ~~d. Certification: ASME stamped, National Board registered.~~ AD3
   ~~6.~~5. Air filters:
      a. Type: ~~In-line interceptor type, and in-line coalescing type~~Deep pleated inlet filter designed to remove particulate, water and oil from air.
      b. ~~Rated pressure: 250 pounds per square inch gauge at 175 degrees Fahrenheit~~Performance: Filter to allow the compressor to meet ISO 8573-1:2010 air purity class 2:4:2. AD3

B. Performance requirements:
   1. Air compressors:
      a. Rated free air delivery: 46 cubic feet per minute minimum.
      b. Rated discharge pressure: 125 pounds per square inch gauge minimum.
      c. Coolant carryover: 5 parts per million maximum, downstream of aftercooler.
      d. Free-field sound level: 75 dBA maximum at any point 3 feet from compressor enclosure.
      e. Rate performance in accordance with acceptance test standard ISO 1217, based on 35 to 115 degrees Fahrenheit ambient, 14.4 pounds per square inch absolute, 80 degrees Fahrenheit cooling air temperature.
      f. Design aftercooler to cool compressed air to maximum of 15 degrees Fahrenheit above ambient temperature.
   2. Refrigerated air dryers:

a. Rated capacity: 46 standard cubic feet per minute.
b. Rated pressure dew point: 36 within 3 degrees Fahrenheit.
c. Rating conditions: 100 degrees Fahrenheit inlet temperature, 100 pounds per square inch gauge inlet pressure, 100 percent relative humidity, 100 degrees Fahrenheit ambient temperature, and 5 pounds per square inch gauge maximum pressure drop.

2.04 ROTARY SCREW AIR COMPRESSORS

A. Manufacturers: One of the following or approved equal as determined by the City Engineer:
1. Kaeser SM 10T (basis of design).

B. Materials:
1. Rotors: Forged steel.
2. Rotor housings: Cast iron.
3. Base: Carbon steel.

C. Components:
1. Air inlet filter: Dry type, 99.9 percent removal efficiency on particles 3 microns and greater.
2. Air end: Single stage, rotary screw.
3. Bearings: Antifriction roller and tapered roller type, sized for maximum radial and thrust loads.
4. Shaft seal: Triple lip type.
5. Motor:
a. Provide motors as specified in Section 16100 - Electrical Requirements and as specified in this Section.
b. Horsepower: 10 minimum.
c. Synchronous speed: 3,600 revolutions per minute.
d. Enclosure: TEFC.
e. Electrical characteristics: 460 volts, 3-phase, 60 hertz.
f. Efficiency, service factor, insulation, and other motor characteristics: As specified in Section 16100 - Electrical Requirements .
g. Motor accessories: As specified in Section 16100 - Electrical Requirements .
h. Belt drive: As specified in Section 15050 - Common Work Results for Mechanical Equipment.
6. Cooling system:
a. Type: Recirculating coolant, air-cooled.
b. Coolant: Provide food-grade coolant.
c. Coolant filtration: Replaceable element with pressure by-pass.
d. Coolant temperature control: Thermostatic control valve.
e. Coolant/air separator: Provide 2-stage factory-mounted ASME separator with drain and fill ports, and sight level indicator.
f. Aftercooler: Air-cooled, aluminum tube and fin type, integrally factory-mounted.

D. Accessories:
1. Pressure relief valve: Factory-installed, sized as required for system protection.

2. Flexible pipe connectors: Provide as required for connecting to existing piping.

E. Fabrication:
1. Provide compressor package on a rigid steel base for base-mounted installation.
2. Provide sound-insulated enclosure for compressor package as required to meet specified noise limits.
3. Ship compressor package completely assembled, pre-wired and pre-piped, requiring only connection of power supply wiring, and discharge piping.

F. Finishes:
1. Factory standard finish.

2.05 REFRIGERATED AIR DRYERS

A. Manufacturers: The following or equal:
1. Ingersol-Rand Co., DXR Series.

B. Components:
1. Refrigeration system:
   a. Compressor: Hermetic.
   b. Condenser: Air-cooled.
   c. Liquid refrigerant filter dryer, include the following:
      1) Constant pressure valve: Design for refrigeration capacity control.
      2) Refrigerant: Charge system with R134a or R513a.
2. Compressor motor:
   a. Horsepower: 1/2.
   b. Voltage: 115 VAC.
   c. Cycles: 60 hertz.
   d. Phase: 1.
3. Heat exchangers:
   a. Provide precool/reheat section to reheat cooled dry air and precool inlet air.
   b. Non fouling copper tube construction.
   c. Encapsulate in flexible closed cell insulation.
4. Moisture separator:
   a. Factory installed centrifugal type.
   b. Insulated.
   c. Provide with electronically controlled automatic drain valve.

C. Electrical:
1. UL approved components.
2. NEMA Type 1 enclosure.
3. Provide normally closed dry contact rated 5 amps, 120 volts, for remote indication of occurrence of Alarm, Warning, or Service, due status of dryer.

D. Fabrication:
1. Provide dryer package on a rigid steel base for base-mounted installation.
2. Provide sheet metal enclosure for dryer package.
3. Ship dryer package completely assembled, pre-wired and pre-piped.

E. Finishes:

1. Factory standard finish.

2.06 AIR FILTERS

A. Manufacturers: The following or equal:
   1. Finite Filter Division, Parker Hannifin Corp. H-Series.

B. Materials:
   1. Housing: Metallic.
   2. Element - interceptor type: Pleated cellulose.
   3. Element - coalescing type: Glass fiber.

C. Components:
   1. Housing: 2-piece, with threaded bowl to head.
   2. Elements: Replaceable. With resilient end seals.

D. Accessories:
   1. Drain trap: Internally mounted automatic mechanical type.
   2. Differential pressure indicator.

2.07 ANCHOR BOLTS

A. As specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.

2.08 VENDOR CONTROL PANELS

A. General:
   1. Provide a separate control panel for each compressor and air dryer.
   2. Provide components and equipment with UL 508 listing.
   3. Provide control panels with a UL 508A label.
   4. VCP shall be fully functional, wired, and factory tested prior to shipment.
      a. Provide field wiring terminal strips for external connections.
      b. Additional testing requirements as specified in Section 17100 - Control System Requirements
   5. Provide surge protection on the incoming power feed.
   6. Provide necessary control hardware, software, and components as required for a fully functional and operational installation.

B. Rotary screw air compressor(s):
   1. Provide microprocessor-based VCP mounted on compressor.
   2. Power supply:
      a. 480 VAC, 3-phase, 60 hertz.
   3. Enclosure: NEMA Type 4.
   4. Motor starter with overload protection.
   5. Control power transformer:
      a. VCP will be powered by a single power source. Provide a control power transformer as required.
      b. Primary voltage: 480 VAC, 3-phase, 60 hertz.
      c. Secondary voltages:
         1) 120 VAC for controls.

2) Derive additional voltages as required by the application.
3) Sized for all panel components plus 10 percent spare capacity.
4) Primary and secondary fuses.

6. Controls:
   a. Emergency stop pushbutton.
   b. Display screen with pushbutton controls.
   c. Indicators:
      1) Elapsed time hour meter.
      2) Pressure.
      3) Status:
         a) Power On.
         b) Ready.
         c) Running.
      4) Alarms:
         a) Motor overload.
         b) High discharge air temperature.
7. Monitoring and control:
   a. Dry contact rating: 24 VDC @ 6 A.
   b. VCP outputs:
      1) Status:
         a) Running.
      2) Alarms:
         a) Compressor Fail.
8. Control functions:
   a. Factory installed, load/unload control with time-delayed auto stop and start:
      1) Factory-set adjustable time delay to prevent excessive motor cycling.
      2) Factory installed, adjustable dual pressure switch for load/unload and auto start operation:
         a) Provide adjustment scale to facilitate pressure switch adjustment.
   b. Provide safety shutdowns for:
      1) High discharge air temperature.
      2) Motor overload.

C. Refrigerated air dryer(s):
1. Provide microprocessor-based VCP mounted on the dryer enclosure.
2. Power supply:
   a. 120 VAC, 1-phase, 60 hertz.
3. Pilot devices:
   a. Controls:
      1) On-Off selector switch.
   b. Indicators:
      1) Elapsed time hour meter.
      2) Inlet air temperature.
      3) Refrigerant suction temperature.
      4) Refrigerant discharge temperature.
      5) Ambient air temperature.
      6) Status:
         a) Power On.
         b) Running.
      7) Alarms:
         a) Alarm:

(1) High/low temperature of inlet air.
(2) High/low temperature of ambient air.
(3) High/low temperature of refrigerant.

b) Warning:
(1) High discharge air dew point.

c) Service due:
(1) Pre-programmed maintenance schedule.

4. Monitoring and control:
   a. Dry contact rating: 24 VDC @ 6 A.
   b. VCP outputs:
      1) Status:
         a) Running.
      2) Alarms:
         a) Dryer Alarm.
         b) Dryer Warning.
         c) Dryer Service Due.
5. Control functions:
   a. Timer adjust controls for open/close operation of the automatic drain valve.
   b. Provide safety shutdowns for:
      1) Motor overload.
      2) High refrigerant pressure.

2.09 SPARE PARTS AND SPECIAL TOOLS

A. Spare parts:
   1. For each compressor furnished, provide the following:
      a. 2 sets of air intake filters.
      b. 2 lubrication oil filter cartridges.
      c. 1 set of drive belts.
      d. Coolant, quantity equal to 2 coolant changes.
   2. For each dryer furnished, provide the following:
      a. 1 automatic drain valve.
   3. For each air filter, provide the following:
      a. 2 elements.
      b. 1 automatic drain valve.

2.10 SOURCE QUALITY CONTROL

A. Source Testing (Factory Acceptance Tests):
   1. Not witnessed.
   2. Test as specified in Section 15958 - Mechanical Equipment Testing.
   3. Air compressor:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.
   4. Tank:
      a. Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
   5. Furnish test reports and Manufacturer’s Certificate of Source Testing.

PART 3 EXECUTION

3.01 PREPARATION

A. Anchoring and bracing to structures:
   1. Prepare equipment anchor setting template(s) and use to position anchors during construction of supporting structure(s).
   2. Install anchors of type and material indicated on approved anchoring designs.
   3. Install anchors with embedment indicated on approved anchoring designs.

3.02 INSTALLATION

A. Install condensate drain lines from moisture drain traps to nearest floor sink or drainage groove.

B. Install the equipment in accordance with the accepted installation instructions and anchorage details.

3.03 COMMISSIONING

A. As specified in Section 01660 - Equipment and System Performance and Operational Testing, Section 15958 - Mechanical Equipment Testing, and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer’s Certificate of Source Testing.
      b. Manufacturer’s Certificate of Installation and Functionality Compliance.
   2. Manufacturer’s Representative onsite requirements:
      a. Installation: 1 trip, 2-day minimum.
      b. Functional Testing: 1 trip, 2-day minimum each trip.
   3. Training: As defined in Section 01660 - Equipment and System Performance and Operational Testing and this Section:
      a. Maintenance: 4 hours per session, 2 sessions.
      b. Operation: 2 hours per session, 2 sessions.

C. Functional Testing:
   1. Witnessed.
   2. Test as specified in Section 15958 - Mechanical Equipment Testing.
   3. Air compressor system:
      a. Conduct Level 2 General Equipment Performance Test.
      b. Conduct Level 2 Vibration Test.
      c. Conduct Level 2 Noise Test.
   4. Furnish Manufacturer’s Certificate of Functional Compliance.

3.04 SCHEDULES

Equipment	Tag Number
Air Compressor	DIG-CMP-07-591 DIG-CMP-07-592

END OF SECTION

[AD3] Addendum 3

Replace Section in its Entirety

SECTION 13122[AD3]

CANOPY BUILDING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Prefabricated canopy building systems.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. 318 - Building Code Requirements for Structural Concrete and Commentary.

B. American Institute of Steel Construction (AISC):
   1. 303 - Code of Standard Practice for Steel Buildings and Bridges.
   2. 360 - Specification for Structural Steel Buildings.

C. American Iron and Steel Institute (AISI):
   1. SG02 - North American Specification for the Design of Cold-Formed Steel Structural Members.

D. American Welding Society (AWS):
   1. D1.1 - Structural Welding Code - Steel.
   2. D1.3 - Structural Welding Code - Sheet Steel.

E. ASTM International (ASTM):
   1. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
   3. A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
   4. A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
   5. B187 - Standard Specification for Copper, Bus Bar, Rod, and Shapes and General Purpose Rod, Bar, and Shapes.
   6. B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
   7. D1494 - Standard Test Method for Diffuse Light Transmission Factor of Reinforced Plastics Panels.
   8. F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
   9. F436 - Standard Specification for Hardened Steel Washers.
   10. F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength.

F. California Code of Regulations (CCR):
   1. Title 24 - Building Standards Code.

G. Research Council on Structural Connections (RCSC):
   1. Specification for Structural Joints Using High Strength Bolts.

H. Society for Protective Coatings (SSPC):
   1. SSPC-SP 2 - Hand Tool Cleaning.

I. Underwriters Laboratories, Inc. (UL).
   1. 580 - Tests for Uplift Resistance of Roof Assemblies.

1.03 TERMINOLOGY

A. The words and terms listed below are not defined terms that require initial capital letters, but, when used in this Section, have the indicated meaning.
   1. Primary framing: An assemblage of beams and columns that support the secondary framing members, and that collects loads to transfer to the foundation.
   2. Secondary framing: Members which directly support roof surfaces and convey loads to the primary framing.

1.04 DELEGATED DESIGN

A. As specified in Section 01357 - Delegated Design Procedures.

B. Calculations.

1.05 SUBMITTALS

A. Furnish Submittals as specified in Section 01300 - Submittals and Section 01600 - Product Requirements.

B. Product data:
   1. Manufacturer's standard color charts and profiles:
      a. Exterior roof panels.
      b. Interior roof liner panels.
      c. Gutters and downspout trim.
   2. Manufacturer's list of approved clamps that may be used to hang suspended items from roof purlins and details of acceptable methods of attachment to purlins.

C. Shop Drawings:
   1. Catalog cuts, design and erection drawings, and other data needed to clearly describe design, materials, construction details, fasteners, and erection.
      a. Erection drawings shall include building dimensions, required foundation footprint, anchor bolt and base plate settings, bracing, main and secondary framing, and sections and details required to fully describe construction of building.
      b. Indicate quantity, size, grade, embedment, and projection, and location of anchor bolts.

~~b.~~c. Include overhead pipe support and monorail design and erection drawings. AD1

2. Accessories, each type of flashing, trim closures, caps and similar items, roof openings, gutters, and downspouts.

D. Delegated Design Submittals:
1. Provide project-specific calculations based on support conditions and requirements to resist loads specified in Section 01850 - Design Criteria.
2. Calculations:
a. Complete structural system.
1) Clearly indicate foundation reactions at all columns. Identify applied loads, load factors, and load combinations used to develop the reactions.
~~1)~~2) Calculations shall include overhead pipe supports and monorail design. AD1

E. Quality Control Submittals:
1. Building manufacturer:
a. If requested by the Engineer, submit a record of the manufacturer's building systems of similar design manufactured and erected in the 5-year period preceding the bid date for this project.
1) Include date of installation, location of metal building, and name and address of the Owner.
b. Submit evidence of the manufacturer's certification under IAS AC472 accreditation.
1) Certification must be valid for the facility at which the building will be fabricated.
c. Confirmation of UL 580 wind uplift rating.
2. Erector:
a. Submit welder qualification certificates.
3. Certificate of Compliance: At the completion of the metal building manufacture, the manufacturer will furnish a letter to the inspector stating that the work was performed in accordance with the approved construction documents.

F. Record documents:
1. As specified in Section 01700 - Contract Closeout.
2. 1 set of reproducible record drawings for the erected structure.
a. Stamped and signed by the Professional Engineer who provided responsible charge for the design.

G. Operation and maintenance manuals:
1. As specified in Section 01670 - Operations, Maintenance, and Training Requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer shall have been engaged in the design, manufacture, and erection of building systems of the type specified for at least 5 years preceding the Bid Date of this Contract.
1. Building manufacturer shall be certified by IAS AC472 accreditation.

B. Erectors shall be trained, approved, and certified by the manufacturer prior to Bidding of the Project. Erectors shall demonstrate at least 3 years of experience in successfully erecting metal building systems of the type specified in this Section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 01600 - Product Requirements and the manufacturer's instructions.

B. Packing and shipping: Deliver materials and fabrications to the jobsite in the manufacturer's original containers with seals unbroken and labeled with the manufacturer's identification and number.

C. Delivery:
1. Deliver materials dry and undamaged and store out of contact with ground.
2. Cover materials with weathertight coverings and keep dry.
3. Provide good air circulation and protection from surface staining for roof and wall covering sheets.

D. Storage and protection: Store materials in original, unopened containers in compliance with the manufacturer's printed instructions.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 01850 - Design Criteria.

1.09 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

B. Special warranty:
1. Provide the Owner with warranty that the exterior finish system for metal panels shall be guaranteed against blister, peeling, cracking, chipping, or material rust-through for a period of 10 years from the date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
~~1.~~ ~~Behlen Building Systems.~~ LGM Construction.[AD1]
~~2.~~1. Butler Manufacturing Co.
~~3.~~2. Nucor.
3. Varco Pruden.
4. Behlen Building Systems.[AD3]

2.02 DESIGN AND PERFORMANCE CRITERIA

A. System:

1. Design: Furnish metal building with gable roof, and with column layout as indicated on the Drawings.
2. Size:
   a. Furnish structure of the size and configuration indicated on the Drawings.
   b. Coordinate the manufacturer's design dimensions for structural system components, including columns and details indicated on the Drawings.
3. Use a roof slope of 0.5~~1~~ inch vertical in ~~24~~ 12 inches horizontal or steeper. AD3
4. Provide building with horizontal and vertical bracing as required per calculations.
5. Column reactions shall be vertical and horizontal only.
   a. No bending moments shall be transferred at column bases.
6. Building indicated on the Drawings is a roof canopy only.
   a. Wall framing and wall panels will not be provided under this Contract; however, design the structural framing and report frame reactions to accommodate both the present condition and the possibility of adding wall panels to enclose the structure at a future date.
7. Building roofing system will be listed for a UL 580, Class 90 designation.
8. Frame openings for doors, windows, louvers, equipment with structural framing to replace panels and secondary framing cut for opening.
   a. Provide curbs to suit roof-mounted equipment compatible with roof sheathing.

B. Performance requirements:
1. General:
   a. Design of the structure and its appurtenances shall be in accordance with the requirements of the IBC, the Metal Building Systems Manual, and the requirements of this Section.
      1) Where the Metal Building Systems Manual conflicts with the requirements of this Section, the more restrictive requirements will govern.
   b. Do not include collateral or auxiliary loads in load combinations where dead loads offset other load effects (i.e., uplift due to wind loads).
   c. Hot-rolled structural steel sections or welded-up plate sections: Design in accordance with AISC 360.
   d. Cold-formed steel structural members: Design in accordance with the AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
   e. Anchor bolt design:
      1) Resist column reactions reported from analysis.
      2) In accordance with ACI 318, Chapter 17, for cracked concrete to fail in a ductile manner, yielding the steel section before fracturing the surrounding concrete.
      3) Assume concrete foundation strength, f'c = 4,000 pounds per square inch at 28 days.
2. Loading:
   a. General:
      1) Design building for dead load, live loads, and combinations of loads, including unbalanced loads in accordance with the IBC and the MBMA Metal Building Systems Manual, except as modified in this Section.
      ~~1)~~2) Loading shall include overhead pipe supports and monorail as shown on contract drawings. AD1

~~2)~~3) Reduction in wind, live, or snow loads based on tributary loaded area will not be permitted.

b . Roof loading requirements:

1) Live load: Minimum 20 pounds per square foot assumed to act vertically on horizontal projected area of roof.

~~1)~~2) Roof panels shall be designed to be solar-ready for future installation of solar panels and associated hardware and assembly.[AD1]

c. Collateral loading: Uniform roof load of 10 pounds per square foot assumed to act vertically on horizontal projected area of roof to account for miscellaneous accessories supported from the structure.

1) Collateral loading shall be considered a live load.

2) Design primary and secondary framing to support the additional weight of mechanical equipment such as fans, air conditioners, monorails, pipe supports,[AD1] etc., shown on plans.

a) Mechanical equipment weights are in addition to collateral loading.

d. Auxiliary loading:

1) Structural members: Any single point along the secondary roof framing members shall be designed to carry a concentrated load of 200 pounds in addition to the roof live load.

2) Roof panels: Design panels to support a 200 pound load uniformly distributed over a 2 square foot area centered between supporting framing members, without exceeding a panel deflection to span ratio of 1/180 in a 2-span condition.

3) Auxiliary loading shall be considered a ~~live~~ dead load. [AD3]

4) Auxiliary is not to be considered concurrently with collateral loading.

e. Wind design criteria: As specified in Section 01850 - Design Criteria.

1) Design roof purlins and structural frames for loads specified, but not less than 40 pounds per square foot uplift on horizontally projected roof area.

f. Seismic design criteria: As specified in Section 01850 - Design Criteria.

1) Bolted joints subject to seismic loading shall be designated pretensioned joints.

3. Deflection limitations:

a. Primary frames:

1) Gravity deflection:

a) Live load deflection: L/240.

b) Total load deflection: L/180.

2) Horizontal drift of rigid frames measured at ~~ridge~~eaves: [AD3]

a) Seismic drift limitation: H/60.

b) Wind drift limitation: H/60.

b. Secondary framing:

1) Gravity deflection:

a) Live load deflection: L/180.

b) Snow load deflection: L/180.

c) Total load deflection: L/150.

2) Horizontal deflection: L/180.

c. Deflection of roof panels: Span/180.

d. Deflection calculations should be based on the wind loads presented in AISC Design Guide 3.

1) Deflection calculations should be based on the unreduced wind loads required in the IBC (50-year reoccurrence intervals).

4. Climatic conditions:
   a. Gutters and downspouts: Design for a rainfall rate of ~~5~~4 inches AD1 per hour.
   b. Temperature: Provide for movement (expansion or contraction) caused by a range of ambient temperature of 120 degrees Fahrenheit without detrimental effects.

2.03 MATERIALS

A. Primary framing (rigid frames):
   1. Welded plates or hot-rolled steel columns and roof beams, complete with necessary splice or connector plates for bolted field assembly.
      a. Minimum nominal thickness of structural shapes or their elements shall be 1/4 inch.
   2. Welding procedures, welder qualifications, and welding quality standards shall be in accordance with AWS D1.1 and AWS D1.3.
   3. Base, cap, compression plates, and stiffener plates shall be factory-welded in place and shall have shop-fabricated connection holes.
      a. Provide minimum 4 anchor bolts per column base.
   4. Columns and roof beams shall be fabricated complete with holes in webs and flanges for attaching bracing and roof and sidewall framing.
   5. Shop finishing:
      a. Shop primed for field painting:
         1) Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances, in accordance with the SSPC-SP 2.
         2) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection.
            a) Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.
      b. Shop primed and field-coated high solids epoxy coating system:
         1) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection.
            a) Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.
         2) Prepare surfaces and apply finishes as specified in Section 09960 - High-Performance Coatings.

B. Secondary framing (purlins, girts, framing at endwalls and openings, eave struts, bracing):
   1. Hot rolled structural steel or cold-formed members.
   2. Minimum thickness: 16 gauge.
   3. Bracing elements constructed of wire rope, stranded tendons, or other similar material is not permitted.
      a. Rolled angle sections or solid steel bar is permitted.
   4. Provide factory-punched holes for panel connections.
   5. Shop finishing - hot rolled sections:
      a. Shop-primed for field painting:
         1) Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances, in accordance with the SSPC-SP 2.

2) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection.
a) Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.

b. Shop primed and field-coated high solids epoxy coating system:
1) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection. Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.
2) Prepare surfaces and apply finishes as specified in Section 09960 - High-Performance Coatings.

6. Shop finishing (cold-formed sections):
a. Shop primed for field painting:
1) Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances, in accordance with the SSPC-SP 2.
2) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection.
a) Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.

b. Shop-primed and field-coated high solids epoxy system:
1) Apply 1 coat of shop primer in accordance with SSPC Paint Specification No. 15 for temporary corrosion protection.
a) Remove shop primer as specified in Section 09960 - High-Performance Coatings prior to field coating.
2) Prepare surfaces and apply coating as specified in Section 09960 - High-Performance Coatings.

C. Roof and wall panels:
1. Roll-formed minimum 24-gauge steel, factory-finished each side.
2. Panels shall have interlocking side seams and shall be the manufacturer's maximum standard width, factory cut to maximum possible length to minimize end laps.
3. Factory pre-punched for fastening.
4. Panel finish:
a. Factory pre-painted, pre-finished coating consisting of a UV light-resistant polyvinylidene difluoride (PVDF) resin based paint and primer system having a total thickness not less than 1.0 mil on an approximately 55 percent aluminum-43 percent zinc-1 percent silicone galvanized coating complying with ASTM A792.
b. Galvanized coating shall be deposited at a minimum rate of 0.50 ounces/square foot.
c. Furnish the manufacturer's standard color chart for the Owner's selection.
5. Ridge panel: 1-piece, factory-formed to match roof slope at each side, of same material as roof panels, and capable of completely sealing roof ridge.

D. Bolted joint components: High-strength steel bolts used for steel-to-steel structural connections.
1. Bolts: ASTM F3125, Grade A325, Type 1, or ASTM F3125, Grade A490, Type 1.
2. Nuts: ASTM A563, heavy hex. Grade and finish to match bolts as specified in RCSC Specification for Structural Joints Using High Strength Bolts.

3. Washers: ASTM F436; flat unless otherwise noted.
4. Load indicator devices:
    a. Twist-off type tension-control bolt assemblies: ASTM F3125, Grade A1852, or ASTM F3125, Grade F2280.
    b. Compressible washer direct tension indicators: ASTM F959, Type 325-1 for ASTM F3125, Grade A325 bolts, or ASTM F959, Type 490-1 for ASTM F3125, Grade A490 bolts.
5. Bolts furnished for the project shall be a single size and grade.

E. Anchor bolts or anchor rods: As specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry, except that material shall be Type 316 stainless steel unless otherwise indicated on the Drawings.

F. Fasteners and washers:
1. Used for attachment of wall and roof panels.
2. Fasteners: Vinyl-coated steel or stainless steel.
3. Washers: Neoprene or other accepted type washer capable of being used to ensure watertightness at fastening locations.

G. Gutters and downspouts:
1. 24-gauge steel.
2. Galvanized in accordance with ASTM A653 to G60 designation.
3. Field painted. Color to be selected by the Owner to complement wall panels.

H. Touch-up painting materials:
1. For structural elements:
    a. Shop primer: Manufacturer’s standard primer.
    b. Touch-up paint: Same as shop primer.
2. For sheet metal skin:
    a. Exterior finish paint: Match specified coating.
        1) Color as selected by the Engineer.
3. Panels at roof must be capable of withstanding a 200-pound point load as required by OSHA 1910.23(e)(8), without the use of wire screens or external guardrail systems.
4. Color shall be as selected by the Engineer.

I. Accessories:
1. Bird screen.
2. Flashing.

2.04 FABRICATION

A. Shop fabrication:
1. Structural elements:
    a. Fabricate rigid frame of hot-rolled sections or continuously welded plate sections.
    b. Field connections shall be bolted unless otherwise accepted by the Engineer.
2. Roof panels:
    a. Panels may be spliced with minimum end overlap of 9 inches at purlins.

b. Provide 1-piece ridge panel, factory formed to match roof slope, of same material as roof panel, and capable of completely sealing roof ridge.
c. Provide means to allow expansion of roof panels.

3. Fasteners for roof panels:
   a. Secure with fasteners that ensure maximum weathertightness, proper bearing surface, and permanent seal at point of fastening.
   b. Use washers capable of assuring watertightness at fastening locations.
4. Accessories:
   a. Gutters, downspouts, and hangers:
      1) Provide 4-inch gutters, downspouts, and hangers.

B. Tolerances:
1. Hot-rolled sections: In accordance with AISC 303.
2. Cold-formed and built-up sections: In accordance with MBMA Metal Building Systems Manual.

2.05 SOURCE QUALITY CONTROL

A. General.
1. Components of the metal building system fabricated in the manufacturer's shop will be subject to special inspection, as specified in this Section.
2. Manufacturer shall communicate the proposed fabrication schedule to the Contractor with sufficient notice and lead time to schedule the required inspections.
3. Manufacturer shall cooperate with the inspection agencies and personnel and shall facilitate access for the inspector to the components requiring inspection.
4. Inspector will verify that the manufacturer maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the manufacturer's ability to conform to approved construction documents and referenced standards.
   a. Inspector will review the procedures for completeness and adequacy relative to the code requirements for the manufacturer's scope of work.

B. Source inspection.
1. Special inspection of the metal building system components fabricated in the manufacturer's shop will be performed at the time and frequency outlined in Attachment A - Metal Building System Construction Special Inspection.
2. Components of the metal building system that will be subject to special inspection are as indicated in Attachment A - Metal Building System Construction Special Inspection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions:
1. Verify site conditions prior to start of Work. Unacceptable conditions shall be reported to the Engineer.

2. Starting of erection of metal building system work shall indicate acceptance of existing conditions.
    a. Manufacturer or the manufacturer's trained erector shall review and examine existing site conditions, foundation, and surface preparation, and adequacy of site-prepared components prior to commencing erection of the building.

3.02 ERECTION

A. General:
1. Erect in accordance with the MBMA Metal Building Systems Manual and the manufacturer's instruction, except as modified in this Section.
2. Separate dissimilar materials with gaskets or suitable insulating coatings.
3. Keep exposed surfaces clean and free from sealant, metal cuttings, and other foreign materials.

B. Framing and structural members:
1. Set anchor rods by template and securely tie into formwork before concrete placement.
2. Grout below baseplates and sills with 1 inch minimum [AD3] non-shrink cement grout as specified in Section 03600 - Grouting.

C. Walls and roof:
1. Erect a structure that will be free from water leaks and meet design requirements.
2. Direct side lap edges away from the prevailing winds at the Site.
3. Do not exceed the maximum fastener spacings specified.
    a. Space fasteners uniformly not to exceed: 8 inches on center at ends of covering, 12 inches on center at intermediate supports and at roof covering side laps, and 18 inches on center at wall covering side laps.
4. Install fasteners in straight lines within a tolerance of 1/2-inch per bay.
5. Seal side laps, ends of roof, wall coverings, and joints at accessories.
    a. Drive fasteners to the surface and seat gasketed heads and washers.
6. Fasten accessories to framing members, except as otherwise accepted by the Engineer.
7. Wall panels shall be isolated from concrete floor slab and/or foundation.
8. Flashing shall be provided at the base of wall panels to prevent wind-driven rain from entering the building envelope.

D. Gutters and downspouts:
1. Attach securely to the building.
2. Install gutters sloped to drain with adequate provisions for expansion and contraction.

E. Doors and roof openings:
1. Anchor securely to the supporting construction.
2. Install doors plumb and true and adjust to provide operation.

3.03 FIELD QUALITY CONTROL

A. General:
   1. Installation of metal building system will be subject to special inspection and evaluation during construction, as specified in this Section.

B. Site inspection:
   1. Special inspection of the metal building system components will be performed at the time and frequency outlined in Attachment A - Metal Building System Construction Special Inspection.
   2. The elements of the metal building system construction that will be subject to special inspection are as indicated in Attachment A - Metal Building System Construction Special Inspection.

3.04 ADJUSTING

A. Field painting:
   1. Prepare and touch up abraded or corroded spots on shop-primed surfaces immediately after erection.
      a. Use the same material as was used for the shop coat.
   2. Paint shop-primed ferrous surfaces as specified in Section 09960 - High-Performance Coatings.

B. Field coated:
   1. Prepare and apply coating as specified in Section 09960 - High-Performance Coatings.

C. Touch-up factory finished surfaces of roof and wall panels with the manufacturers recommended paint where damaged or abraded.

D. Where shop processes such as shearing or punching leave edges of galvanized steel unprotected by galvanization, touch up unprotected edges as specified in this Section.

E. Repair damaged galvanized surfaces in accordance with ASTM A780.

3.05 CLEANING

A. Remove excess materials, equipment, and debris incidental to this work upon completion.

3.06 PROTECTION

A. During erection, the erector shall be responsible for the protection of this and all adjacent work from damage.

END OF SECTION

ATTACHMENT A - METAL BUILDING SYSTEM CONSTRUCTION SPECIAL INSPECTION

METAL BUILDING SYSTEM CONSTRUCTION SPECIAL INSPECTION

IBC Table 1704.3	Inspection Task	Frequency/Timing of Inspection	Criteria Reference
Prior to beginning installation of metal building, verify high-strength bolts, nuts, and washers:			
1.a.	Identification markings conform to ASTM standards required by approved design.	Periodic: Confirm from stockpile of materials delivered to site whether material furnished complies with the materials in the approved design.	
1.b.	Confirmation of manufacturer's certificate of compliance.	Periodic: Confirm that manufacturer has furnished the required Certificate of Compliance.	
Inspection of high-strength bolted joints:			
2.a.	Joints designated bearing-type connections by the approved design.	Periodic: Provide continuous inspection of the initial installation of each type and size of joint. Subsequent installations of the same type and size of joint may be inspected on a periodic basis with inspections of a minimum of 20 percent of installations, or once per calendar week, whichever is more frequent.	
2.b.	Joints designated slip-critical connections by the approved design.	Continuous: Provide continuous inspection as specified in Section 01455 - Regulatory Quality Assurance.	
Inspection of structural steel welding:			
5.a.1.	Complete and partial penetration groove welds.	Continuous: Provide continuous inspection as specified in Section 01455 - Regulatory Quality Assurance.	
5.a.2.	Multipass fillet welds.	Continuous: Provide continuous inspection as specified in Section 01455 - Regulatory Quality Assurance.	
5.a.3.	Single-pass fillet welds greater than 5/16 inch.	Continuous: Provide continuous inspection as specified in Section 01455 - Regulatory Quality Assurance.	

IBC Table 1704.3	Inspection Task	Frequency/Timing of Inspection	Criteria Reference
5.a.4.	Single-pass fillet welds less than or equal to 5/16 inch.	Periodic: Provide continuous inspection of the initial production of each type and size of welded joint. Subsequent production of the same type and size of joint may be inspected on a periodic basis with inspections of a minimum of 20 percent of installations, or once per calendar week, whichever is more frequent.	
5.a.5.	Floor and roof deck welds.	Periodic: Provide continuous inspection of the initial production of each type and size of welded joint. Subsequent production of the same type and size of joint may be inspected on a periodic basis with inspections of a minimum of 20 percent of installations, or once per calendar week, whichever is more frequent.	
Inspection of steel frame joint construction for compliance with approved design.			
6.a.	Bracing and stiffening details.	Periodic: Provide periodic inspection of any bracing and stiffening details of construction. Inspection should include, as a minimum, verification of member sizes and proper orientation. A minimum of 15 percent of locations should be verified.	
6.b.	Member locations.	Periodic: Provide periodic inspection of member locations. Inspection should include, as a minimum, verification of member sizes and proper spacing/location. A minimum of 15 percent of locations should be verified.	
6.c.	Connection joint details.	Periodic: Provide periodic inspection of joint details of construction. Inspection should include, as a minimum, verification of miscellaneous steel detailing, including stiffener plates, concrete pourstops, gusset plates and similar miscellaneous steel framing. A minimum of 15 percent of locations should be verified.	

[AD3] Addendum 3

Replace Section in its Entirety

SECTION 15052[AD3]

COMMON WORK RESULTS FOR GENERAL PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Basic materials and methods for metallic and plastic piping systems.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through 24.
   2. B16.47 - Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard.

B. American Water Work Association (AWWA):
   1. C11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe.
   2. C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
   3. C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   4. C151 - Ductile-Iron Pipe, Centrifugally Cast.
   5. C207 - Standard for Steel Pipe Flanges for Waterworks Services-Size 4 In. Through 144 In.

C. ASTM International (ASTM):
   1. A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
   2. A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
   3. A194 - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
   4. A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
   5. A320 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
   6. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
   7. B88 - Standard Specification for Seamless Copper Water Tube.
   8. F37 - Standard Test Methods for Sealability of Gasket Materials.
   9. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
   10. F594 - Standard Specification for Stainless Steel Nuts.
   11. F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements of Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

D. California Health and Safety Code.

E. NSF International (NSF):
   1. 61 - Drinking Water System Components - Health. Effects.
   2. 372 - Drinking Water System Components - Lead Content.

1.03 DEFINITIONS

A. Buried pipes: Pipes that are buried in the soil with or without a concrete pipe encasement.

B. Exposed pipe: Pipes that are located above ground, or located inside a structure, supported by a structure, or cast into a concrete structure.

C. Underground pipes: Buried pipes - see A. above.

D. Underwater pipes: Pipes below the top of walls in basins or tanks containing water.

E. Wet wall: A wall with water on at least 1 side.

F. Pipes adjacent to a wet wall: Pipe centerline within 10 inches of the wet wall.

1.04 SUBMITTALS

A. Submit as specified in Section 01300 - Submittals.

B. Product data:
   1. For each piping product in this Section as applicable:
      a. Design features.
      b. Load capacities.
      c. Material designations by UNS alloy number or ASTM Specification and Grade.
      d. Data needed to verify compliance with the Specifications.
      e. Catalog data.
      f. Clearly mark submittal information to show specific items, materials, and accessories or options being furnished.
      g. Detailed piping layout drawings.

C. Calculations:
   1. Provide calculations in accordance with NSF 372 for materials in contact with drinking water.

PART 2 PRODUCTS

2.01 GENERAL

A. Pipes:
   1. Provide new pipe.
   2. Piping provided from manufacturers/distributors inventory is subject to the following condition:
      a. Provide proof pipe manufactured more than 6 months prior to delivery was stored properly and the material and/or coating was not subjected to ultraviolet (UV) degradation.
   3. Mark each piece of pipe in accordance with applicable standards.

2.02 LINK TYPE SEALS

A. Characteristics:
   1. Modular mechanical type, consisting of interlocking neoprene or synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening.
   2. Links to form a continuous rubber belt around the pipe.
   3. Provide a nylon polymer pressure plate with Type 316 stainless steel hardware. Isolate pressure plate from contact with wall sleeve.
   4. Hardware to be Type 316 stainless steel.
      a. Provide anti-galling lubricant for threads.

B. One of the following or equal:
   1. Link-Seal.
   2. Pipe Linx.

2.03 FLANGE BOLTS AND NUTS

A. General:
   1. Washer:
      a. Provide a washer for each nut.
      b. Washer shall be of the same material as the nut.
   2. Nuts: Heavy hex-head:
      a. Stainless steel nuts shall be finished with TRIPAC 2000 coating system to minimize galling and provide proper torque.
   3. Cut and finish flange bolts to project:
      a. Face of the bolt shall exceed face of nut by 1/8 inch minimum.
      b. A maximum of 1/4 inch beyond outside face of nut after assembly.
   4. Tap holes for cap screws or stud bolts when used.
   5. Lubricant for stainless steel bolts and nuts:
      a. Chloride-free.
      b. Manufacturers: One of the following or equal:
         1) Huskey FG-1800 Anti-Seize.
         2) Weicon Anti-Seize High-Tech.

B. Ductile iron pipe:
   1. On exposed pipes with pressures equal to or less than 150 pounds per square inch gauge (psig):
      a. Bolts: In accordance with ASTM A307, Grade B.
      b. Nuts: In accordance with ASTM A563, Grade A.
      c. Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
   2. On exposed pipes with pressures greater than 150 psig:
      a. Bolts: In accordance with ASTM A193, Grade B7.
      b. Nuts: In accordance with ASTM A194, Grade 2H.
      c. Bolts and nuts: Hot-dip galvanized in accordance with ASTM F2329.
   3. On underwater pipes and pipes adjacent to wet walls:
      a. Bolts: In accordance with ASTM A193, Grade B8M.
      b. Nuts: In accordance with ASTM A194, Grade 8M.
   4. On buried pipes:
      a. Bolts: In accordance with ASTM A193, Grade B8M.
      b. Nuts: In accordance with ASTM A194, Grade 8M for nuts.
      c. Encase in 2 layers of loose polyethylene wrap in accordance with AWWA C105.

C. Plastic pipe:
   1. On exposed pipes:
      a. Bolts: In accordance with ASTM A307, Grade B.
      b. Nuts: In accordance with ASTM A563, Grade A.
      c. Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
   2. On underwater pipes and pipes adjacent to wet walls:
      a. Bolts: In accordance with ASTM A193, Grade B8M.
      b. Nuts: In accordance with ASTM A194, Grade 8M.

D. Steel pipe:
   1. On exposed pipes:
      a. For ASME B16.5 Class 150 flanges and AWWA C207 Class D flanges:
         1) Bolts: In accordance with ASTM A307, Grade B.
         2) Nuts: In accordance with ASTM A563, Grade A.
         3) Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
      b. For ASME B16.5 and B16.47 Class 300 flanges and AWWA C207 Class E and F flanges:
         1) Bolts: In accordance with ASTM A193, Grade B7.
         2) Nuts: In accordance with ASTM A194, Grade 2H.
   2. On underwater pipes and pipes adjacent to wet walls:
      a. Bolts: In accordance with ASTM A193, Grade B8M.
      b. Nuts: In accordance with ASTM A194, Grade 8M.
   3. Low-temperature service: Stainless steel, Type 316:
      a. Bolts: In accordance with ASTM A320, Grade B8M, Class 1, heavy hex.
      b. Nuts: In accordance with ASTM A194, Grade B8M, heavy hex.
      c. Washers: Alloy group matching bolts and nuts.
   4. High-temperature service or high-pressure service: Stainless steel, Type 316:
      a. Bolts: In accordance with ASTM A193, Grade B8M, Class 1, heavy hex.
      b. Nuts: In accordance with ASTM A194, Grade 8, heavy hex.
      c. Washers: Alloy group matching bolts and nuts.

2.04 MECHANICAL JOINTS BOLTS AND NUTS

A. Bolts including T-Bolts:
   1. Type 316 stainless steel in accordance with ASTM F593.

B. Heavy Hex Nuts:
   1. Type 316 stainless steel in accordance with ASTM F594, finished with TRIPAC 2000 coating system to minimize galling and provide proper torque.

2.05 GASKETS

A. General:
   1. Gaskets shall be suitable for the specific fluids, pressure, and temperature conditions.
   2. Capable of being applied on surface of piping with cavities to provide for an improved seal with the internal piping pressure.

B. Gaskets for flanged joints in ductile iron and steel piping for sewage service:
   1. Suitable for pressures equal and less than 150 pounds per square inch gauge, temperatures equal and less than 250 degrees Fahrenheit, and raw sewage service.
   2. Gasket material:
      a. SBR or neoprene elastomer with minimum Shore A hardness value of 70.
      b. Reinforcement: Cloth or synthetic fiber.
      c. Thickness: Minimum 3/32-inch thick for less than 10-inch pipe; minimum 1/8 inch thick for 10-inch and larger pipe.
   3. Manufacturers: One of the following or equal:
      a. Pipe less than 48 inches in diameter:
         1) Garlock, Style 7797.
         2) John Crane, similar product.
      b. Pipe 48 inches in diameter and larger:
         1) Garlock, Style 3760.
         2) John Crane, similar product.

C. Gaskets for grooved end ductile iron and steel piping:
   1. Suitable for pressures equal to the encapsulating coupling or flange adapter.
   2. Material: Pressure responsive elastomer.
      a. Ductile iron piping: FlushSeal® type.
         1) Halogenated Butyl: Grade M; for temperatures to 200 degrees Fahrenheit.
         2) Nitrile: Grade S; for temperatures to 180 degrees Fahrenheit.
      b. Steel piping:
         1) EPDM: Grade E; for temperatures to 230 degrees Fahrenheit.
         2) EPDM-HP: Grade EHP, for temperatures to 250 degrees Fahrenheit.
         3) Nitrile: Grade T, for temperatures to 180 degrees Fahrenheit.
   3. Gaskets shall be verified as suitable for the intended service.
      a. Temperature ratings may vary depending on the fluid/media.
   4. Manufacturers: Gaskets shall be of the same manufacturer as the encapsulating couplings/flange adapters.
      a. Victaulic Company.

D. Gaskets for flanged joints in polyvinyl chloride and polyethylene piping:
   1. Suitable for pressures equal to and less than 150 pounds per square inch gauge, with low flange bolt loadings, temperatures equal to and less than 120 degrees Fahrenheit, and polymer, chlorine, caustic solutions, and other chemicals, except chemicals which liberate free fluorine including fluorochemicals and gaseous fluorine.
   2. Material:
      a. Chemical systems: 0.125-inch thick Viton™ rubber.
      b. Sewer and water: 0.125-inch thick SBR.
   3. Manufacturers: One of the following or equal:
      a. Garlock.
      b. John Crane, similar product.

E. Gaskets for flanged joints in low pressure air piping:
   1. Suitable for pressures equal to and less than 150 pounds per square inch gauge, temperatures equal to and less than 300 degrees Fahrenheit, and compressed air service.
   2. Material: EPDM elastomer, 1/8-inch thick, 60 Shore hardness, smooth surface.
   3. Manufacturers: One of the following or equal:
      a. Garlock, Style 8314.
      b. John Crane, similar product.

F. Gaskets for flanged joints in ductile iron or steel water piping:
   1. Suitable for hot or cold water, pressures equal to and less than 150 pounds per square inch gauge, and temperatures equal to and less than 160 degrees Fahrenheit.
   2. Material:
      a. SBR or neoprene elastomer, compressed, with non-asbestos fiber reinforcement.
   3. Manufacturers: One of the following or equal:
      a. Garlock, Bluegard 3300.
      b. John Crane, similar product.

G. Gaskets for flanged joints in ductile iron or steel drinking water piping meeting NSF 61 requirements:
   1. Suitable for hot or cold water, pressures equal to or less than 150 pounds per square inch gauge, and temperatures equal to or less than 160 degrees Fahrenheit.
   2. Material:
      a. EPDM material with 80 Shore A durometer rating.
   3. Manufacturers: One of the following or equal:
      a. Garlock, 98206.
      b. John Crane, similar product.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Piping drawings:
      a. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Drawings. Sizes and locations are indicated on the Drawings.
      b. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.
         1) Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Times.
   2. Piping alternatives:
      a. Provide piping as specified in this Section, unless indicated on the Drawings or specified otherwise.
      b. Alternative pipe ratings:
         1) Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price.
         2) Piping of different material may not be substituted in lieu of specified piping.
      c. Valves in piping sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.
      d. Grooved joints: Use couplings, flange adapters, and fittings of the same manufacturer.
         1) Manufacturer's factory trained representative:
            a) Provide on-site training for Contractor's field personnel.
            b) Periodically visit the jobsite to verify Contractor is following best recommended practices.
         2) Distributor's representative is not considered qualified to conduct the training or jobsite visits.
      e. Flanged joints: where 1 of the joining flanges is raised face type, provide a matching raised face type flange for the other joining flange.
         1) Wire brush and clean flange faces to remove all oil, grease, loose primer, mill scale, and any other foreign matter that could affect the proper seating of the gasket.
   3. Unless otherwise indicated on the Drawings, piping at pipe joints, fittings, couplings, and equipment shall be installed without rotation, angular deflection, vertical offset, or horizontal offset.

B. Wall and slab penetrations:
   1. Provide sleeves for piping penetrations through aboveground masonry and concrete walls, floors, ceilings, roofs, unless specified or otherwise indicated on the Drawings.
   2. For piping 1 inch in nominal diameter and larger, provide sleeves with minimum inside diameters of 1 inch plus outside diameter of piping. For piping

smaller than 1 inch in nominal diameter, provide sleeve of minimum twice the outside diameter of piping.
    a. Arrange sleeves and adjacent joints so piping can be pulled out of sleeves and replaced without disturbing the structure.
    b. Cut ends of sleeves flush with surfaces of concrete, masonry, or plaster.
    c. Conceal ends of sleeves with escutcheons where piping runs through floors, walls, or ceilings of finished spaces within buildings.
    d. Seal spaces between pipes and sleeves with link-type seals when not otherwise specified or indicated on the Drawings.
3. Provide flexibility in piping connecting to structures to accommodate movement due to soil settlement and earthquakes. Provide flexibility using details indicated on the Drawings.
4. Core drilled openings:
    a. Do not damage or cut existing reinforcing bars, electrical conduits, or other items embedded in the existing concrete without acceptance by Engineer.
    b. Determine location of reinforcing bars or other obstructions with a non-destructive indicator device.
    c. Remove dust and debris from hole using compressed air.

C. Exposed piping:
1. Install exposed piping in straight runs parallel to the axes of structures, unless otherwise indicated on the Drawings:
    a. Install piping runs plumb and level, unless otherwise indicated on the Drawings.
        1) Slope plumbing drain piping with a minimum of 1/4-inch per foot downward in the direction of flow.
2. Install exposed piping after installing equipment and after piping and fitting locations have been determined.
3. Support piping: As specified in Sections 15061 - Pipe Supports and 15062 - Preformed Channel Pipe Support System:
    a. Do not transfer pipe loads and strain to equipment.
4. In addition to the joints indicated on the Drawings, provide unions, flexible couplings, flanged joints, flanged coupling adapters, and other types of joints or means which are compatible with and suitable for the piping system, and necessary to allow ready assembly and disassembly of the piping.
5. Assemble piping without distortion or stresses caused by misalignment:
    a. Match and properly orient flanges, unions, flexible couplings, and other connections.
    b. Do not subject piping to bending or other undue stresses when fitting piping.
    c. Do not correct defective orientation or alignment by distorting flanged joints or subjecting flange bolts to bending or other undue stresses.
    d. Flange bolts, union halves, flexible connectors, and other connection elements shall slip freely into place.
    e. Alter piping assembly to fit when proper fit is not obtained.
    f. Install eccentric reducers or increasers with the top horizontal for pump suction piping.

D. Buried piping:
   1. Bury piping with minimum 3-foot cover without air traps, unless otherwise indicated on the Drawings.
   2. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench.
      a. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.
   3. Laying piping:
      a. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.
      b. Place piping with top or bottom markings with markings in proper position.
      c. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
      d. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.
      e. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.
   4. Concrete encase buried pipe installed under concrete slabs or structures.

E. Venting piping under pressure:
   1. Lay piping under pressure flat or at a continuous slope without air traps, unless otherwise indicated on the Drawings.
   2. Install plug valves as air bleeder cocks at high points in piping.
      a. Provide 1-inch plug valves for water lines, and 2-inch plug valves for sewage and sludge lines, unless otherwise indicated on the Drawings.
   3. Provide additional pipe taps with plug cocks and riser pipes along piping as required for venting during initial filling, disinfecting, and sampling.
   4. Before piping is placed into service, close plug valves and install plugs. Protect plugs and plug valves from corrosion in as specified in Section 09960 - High-Performance Coatings.

F. Restraining buried piping:
   1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
      a. When piping is underground, use mechanical restraints or push-on restraints.
         1) Concrete thrust blocks shall not be used unless specifically called out with a note on the Drawings or specified.
      b. Determine thrust forces by multiplying the nominal cross-sectional area of the piping by design test pressure of the piping.
   2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
      a. During testing, provide suitable temporary restraints where piping does not require permanent restraints.
   3. Where thrust blocks are allowed, place concrete thrust blocks against undisturbed soil.

4. Where thrust blocks are allowed, place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
5. Provide underground mechanical restraints where specified in Attachment A - Piping Schedule.

G. Restraining above ground and underwater piping:
   1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
      a. When piping is aboveground or underwater, use mechanical or structural restraints.
      b. Determine thrust forces by multiplying the nominal cross-sectional area of the piping by design test pressure of the piping.
   2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
      a. During testing, provide suitable temporary restraints where piping does not require permanent restraints.

H. Connections to existing piping:
   1. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings:
      a. Protect domestic water/potable water supplies from contamination:
         1) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
         2) Provide devices approved by Owner of domestic water supply system to prevent flow from other sources into the domestic supply system.
   2. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
   3. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.
   4. For flanged connections, provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.

I. Connections between ferrous and nonferrous metals:
   1. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
   2. Nonferrous metals include aluminum, copper, and copper alloys.

J. Flanged connections between dissimilar metals such as ductile iron pipe and steel pipe:
   1. Provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.

K. Where stainless steel bolts and/or nuts are in contact with non-stainless steel metals, use isolation bushings and washers.

3.02 CLEANING

A. Piping cleaning:
   1. Upon completion of installation, clean piping interior of foreign matter and debris.
   2. Perform special cleaning when required by the Contract Documents.

B. Cleaning potable water piping:
   1. Flush and disinfect potable water piping as specified in Section 01757 - Disinfection, and other regulatory requirements.

C. Cleaning air piping:
   1. Perform special cleaning of filtered air piping from the intake clean air plenums to the discharge points and high-pressure air piping.
      a. Protect surfaces from contamination.
   2. Special cleaning shall include wire brushing, power tool cleaning, wiping down with lint-free cloths, brooming, and vacuuming to remove rust, scale, weld spatter, dust, dirt, oil, and other matter deleterious to operation of the air system:
      a. Do not sandblast installed piping.
   3. To the greatest extent possible, clean piping immediately prior to final closure of piping systems:
      a. Enter piping, clean and wipe down surfaces, and vacuum out residue.
      b. Clean surfaces not accessible to this cleaning operation after installation within 6 hours preceding installation.
   4. Subsequent to cleaning, protect surfaces from contamination by dust, dirt, construction debris, and moisture, including atmospheric moisture:
      a. Whether or not pipe upstream has been cleaned, temporarily seal openings in partially completed work except when installation is actively in progress.
      b. When installation is actively in progress, seal openings at the end of each day's construction or when construction is temporarily stopped.
   5. Suspend cleaning and seal openings when inclement weather, including dust storms, is imminent.
   6. Use clean, dry air for testing the piping and other elements of the system.
   7. Prior to introduction of air to the system, blow piping clean.
      a. Blow with maximum discharge rate possible for minimum 4 hours, using new blowers or compressors and filters.
   8. Clean surfaces that become contaminated prior to acceptance.

D. Conduct pressure and leak test, as specified.

3.03 COMMISSIONING

A. As specified in Section 01660 - Equipment and System Performance and Operational Testing and this Section.

B. Field testing:
   1. Piping system:
      a. Witnessed.
      b. Conduct pressure and leak test, as specified.

3.04 PIPING SCHEDULE

A. Provide piping As specified in Attachment A - Piping Schedule unless noted otherwise in the Specifications or indicated on the Drawings with a written callout or note.

END OF SECTION

ATTACHMENT A - PIPING SCHEDULE

PIPING SCHEDULE

Process Abbrev.	Service	Nominal Diameter (inches)	Material	Class or Schedule	Pipe Spec. Section	Joints/ Fittings	Test Pressure/ Method	Lining	Coating	Comments
1W	**Potable Water**									
	Buried	Under 4	PVC	SCH 80	15230	SW/PVC	100 psig/HH	None	None	Disinfect.
	Exposed	Under 4	CU	See Spec	15400	Soldered/CU	100 psig/HH	None	EPU-M-1	
3W	**Reclaimed Water (Chlorinated Plant Effluent)**									
	Buried	Under 4	PVC	SCH 80	15230	SW/PVC	100 psig/HH	None	None	
		4 and over	DI	CL 53	15211	~~RMJ or~~ RPO/DI [AD3]	100 psig/HH	CM	AC and Double PEE	
	Exposed	Under 4	GSP	SCH 40	15270	SC/300# MI	150 psig/HH	None	EPX-GM-1	
BSL	**Blended Sludge**									
	Buried	All	DI	CL 53	15211	~~RMJ or~~ RPO/DI [AD3]	100 psig/HH	CM	AC and Double PEE	
	Exposed	All	DI	CL 53	15211	FL or GE/DI	100 psig/HH	CM	EPU-M-1	For exposed service, at connections to pumps and valves, use flanged ends only. All 90 degree bends shall be long-radius unless specifically noted otherwise on the Drawings.
CAS	**Compressed Air - Service**									
	Buried	All	316 SST	SCH 40S	15286	SCRD	175 psig/AM	None	PCW	
	Exposed	All	316 SST	SCH 40S	15286	SCRD	175 psig/AM	None	None	
CD	**Condensate Drain**									
	Buried	All	PVC	SCH 80	15230	SW	25 feet/GR	None	None	
	Exposed (exterior)	All	316 SST	SCH 40	15286	Double pass full welded	25 feet/GR	None	None	
CEN	**Centrate**									
	Exposed	4 and over	Flexible Reinforced Hose			FL or Quick Connect	15 feet/GR	None	None	Hosecraft Model TD11 or equal.
DSL	**Digested Sludge**									
	Exposed	Under 3	316 SST	SCH 80	15286	Double pass full welded	100 psig/HH	None	None	
	Exposed	Under 4	Flexible reinforced hose			FL or Quick Connect	100 psig/HH	None	None	Where indicated on drawings. Hosecraft model Model RC2 UHMWPE.
	Exposed	3 and over	DI	CL 53	15211	FL or GE/DI	100 psig/HH	GL	EPU-M-1	For exposed service, at connections to pumps and valves, use flanged ends only.
DWS	**Dewatered Sludge**									
	Exposed	4 and over	Flexible Reinforced Hose			FL or Quick Connect	15 feet/GR	None	None	Where indicated on drawings. Hosecraft Model TD11 or equal.
FIL	**Filtrate**									
	Buried	4 and over	DI	CL 53	15211	~~RMJ or~~ RPO/DI [AD3]	25 feet/GR	CM	AC and Double PEE	
	Exposed	4 and over	DI	CL 53	15211	FL or GE/DI	25 feet/GR	CM	EPU-M-1	For exposed service, at connections to pumps and valves, use flanged ends only.
HW	**Hot Water**									
	Exposed (Interior)	All	CU	See Spec	15400	Soldered/CU	100 psig/HH	None	EPU-M-1	Insulate per Section 15400
PD	**Process Drain**									
	Buried	Under 4	PVC	SCH 80	15230	SW/PVC	25 psig/GR	None	None	

Process Abbrev.	Service	Nominal Diameter (inches)	Material	Class or Schedule	Pipe Spec. Section	Joints/ Fittings	Test Pressure/ Method	Lining	Coating	Comments
		4 through 10	DI	CL 53	15211	~~RMJ or~~ RPO/DI	25 psig/GR	CM	AC and Double PEE AD3	
		12 and over~~4 and over~~	~~DI~~PVC	~~CL 53~~SDR 26	~~15211~~02705	~~RMJ or~~ RPO/DI/~~DI~~	25 psig/GR	None~~CM~~	None~~AC and Double PEE~~ AD3	
	Exposed	Under 4	GSP	SCH 40	15270	SC/300# MI	25 psig/GR	None	EPX-GM-1	
		4 and over	DI	CL 53	15211	FL or GE/DI	25 psig/GR	CM	EPU-M-1	
POL	**Neat Polymer**									
	Exposed	All	PVC	SCH 80	15230	SW or Flanged/PVC	15 psig/AM	None	ACR-PVC-1	
POS	**Polymer Solution**									
	Exposed	All	PVC	SCH 80	15230	SW or Flanged/PVC	125 psig/HH	None	ACR-PVC-1	
PS	**Primary Sludge**									
	Buried	All	DI	CL 53	15211	~~RMJ or~~ RPO/DI AD3	100 psig/HH	CM	AC and Double PEE	
	Exposed	All	DI	CL 53	15211	FL or GE/DI	100 psig/HH	CM	EPU-M-1	For exposed service, use flanged ends at connections to pumps, valves, and where shown on Drawings. All 90-degree bends shall be long-radius unless specifically noted otherwise on the Drawings.
PSC	**Primary Scum**									
	Buried	All	DI	CL 53	15211	~~RMJ or~~ RPO/DI AD3	100 psig/HH	GL	AC and Double PEE	
	Exposed	All	DI	CL 53	15211	FL or GE/DI	100 psig/HH	GL	EPU-M-1	For exposed service, use flanged ends at connections to pumps, valves, and where shown on Drawings. All 90-degree bends shall be long-radius unless specifically noted otherwise on the Drawings.
SAM	**Sample**									
	Exposed	All	316 SST	SCH 40S	15286	FL/316 SST	150 psig/HH	None	None	
SW	**Seal Water**									
	Buried	All	PVC	SCH 80	15230	SW/PVC	150 psig/HH	None	None	
	Exposed	All	CU	See Spec	15400	Soldered/CU	150 psig/HH	None	EPU-M-1	
TD	**Tank Drain**									
	Exposed	All	DI	CL 53	15211	FL or GE/DI	25 psig/GR	CM	EPU-M-1	
TSL	**Thickened Sludge**									
	Buried	All	DI	CL 53	15211	~~RMJ or~~ RPO/DI AD3	100 psig/HH	GL	AC and Double PEE	
	Exposed	All	DI	CL 53	15211	FL or GE/DI	100 psig/HH	GL	EPU-M-1	For exposed service, use flanged ends at connections to pumps, valves, and where shown on Drawings. All 90-degree bends shall be long-radius unless specifically noted otherwise on the Drawings.
V	**Vent**									
	Buried	All	PVC	SCH 80	15230	SW/PVC	25 psig/AM	None	None	
	Exposed	All	PVC	SCH 80	15230	SW/PVC	25 psig/AM	None	ACR-PVC-1	
	Exposed (dewatering)	All	Flexible reinforced hose			FL or Quick Connect	25 psig/AM	None	None	Where indicated on drawings. Hosecraft Model TD11 or equal.

Process Abbrev.	Service	Nominal Diameter (inches)	Material	Class or Schedule	Pipe Spec. Section	Joints/ Fittings	Test Pressure/ Method	Lining	Coating	Comments
WAS	**Waste Activated Sludge**									
	Buried	All	DI	CL 53	15211	~~RMJ or~~ RPO/DI AD3	100 psig/HH	CM	AC and Double PEE	
	Exposed	All	DI	CL 53	15211	FL	100 psig/HH	CM	EPU-M-1	
SD	**Storm Drain**[KL1] AD3									
	Buried	All	PVC	SDR 26	02705	RPO/DI AD3	10 psig/GR	None	None	
	Exposed	All	PVC	SDR 26	02705	RPO/DI AD3	10 psig/GR	None	None	
UD	**Underdrain**[KL2] AD3									
	Buried	All	PVC	SDR 26	02705	RPO/DI	10 psig/GR	None	None AD3	
	Exposed	All	PVC	SDR 26	02705	RPO/DI	10 psig/GR	None	None AD3	

Notes:

1. The following abbreviations used in the column of test method refer to the respective methods as specified in Section 15956.

AM: Air method
GR: Gravity method
HH: High head method
LH: Low head method
SC: Special case

2. Abbreviations to designate piping include the following:

AC: Asphaltic coating
ACR-PVC-1: Refer to Section 09960 - High-Performance Coatings.
B&SP, BS: Bell and spigot
BSP: Black steel pipe
CI: Cast iron
CISP: Cast iron soil pipe
CL: Class, followed by the designation
CM: Cement mortar
CPVC: chlorinated polyvinyl chloride
CTP: Coal tar pitch
CU: Copper
DG: double gasketed
DI: Ductile iron
EP: Elastomeric polyurethane
EPU-M-1: Refer to Section 09960 - High-Performance Coatings.
EPX-GM-1: Refer to Section 09960 - High-Performance Coatings.
FL: Flange
FW: Fusion welded
GA: Gauge, preceded by the designation
GAL: Galvanized
GE: Grooved end joint
GL: Glass lined
GSP: Galvanized steel pipe
HSE: High Solids Epoxy system, refer to Section 09960 - High-Performance Coatings
I: Insulated
JT: Joint test
MI: Malleable iron
MJ: Mechanical joint
NPS: Nominal pipe size, followed by the number in inches
PCW: Plastic coating or wrapping
PE: Polyethylene
PEE: Polyethylene encasement
PO: Push-on
psi: pounds per square inch
psig: pounds per square inch gauge
PTW: Polyethylene tape wrap
PVC: Polyvinyl chloride
RCCP: Reinforced concrete cylinder pipe, AWWA C300
RMJ: Restrained Mechanical Joint
RPO: Restrained Push-on
SC: Screwed-on
SCH: Schedule, followed by the designation
SCW: Socket welded
SST: Stainless steel
STL: Steel
SW: Solvent welded
VCP: Vitrified clay piping
W, WLD: Weld
WAE: Waterborne acrylic emulsion
WT: Warning tape

3. All buried piping shall have underground warning tape per section 15076.

4. All buried non-metallic pipe shall have tracer wire per Section 15076.

AD3 Addendum 3

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
CIP NO. 24006 & 24007

ADDENDUM 3
DATED: February 27, 2025

ATTACHMENT 2

Drawing Plan Sheets (Replacement)

- 00G002 – DRAWING INDEX 1
- 00C002 – YARD PIPING PLAN – NORTH
- 07M101 – SLUDGE BLEND TANKS PLAN
- 00TC001 – CIVIL TYPICAL DETAILS 1
- 00TC002 – CIVIL TYPICAL DETAILS 2
- 00TC003 – CIVIL TYPICAL DETAILS 3
- 00TH001 – HVAC TYPICAL DETAILS 1
- 00TM001 – MECHANICAL TYPICAL DETAILS 1
- 00TM007 – MECHANICAL TYPICAL DETAILS 7
- 00E022 – EXISTING MCC-12-01 SINGLE LINE DIAGRAM – MODIFICATIONS 2
- 00E023 – EXISTING MCC-15-01 FRONT ELEVATION – MODIFICATIONS
- 00E039 – CONTROL SCHEMATICS 9
- 00E045 – CONTROL SCHEMATICS 15
- 00E047 – CONTROL SCHEMATICS 17
- 00E052 – CIRCUIT SHCEDULES 2
- 00E053 – CIRCUIT SCHEDULES 3
- 00E054 – CIRCUIT SCHEDULES 4
- 07E401 – DEWATERING FACILITY POWER AND CONTROL PLAN
- 07N071 – P&ID: CENTRIFUGE 3
- 07N072 – P&ID: POLYMER DILUTION UNIT 3

Drawing Plan Sheets (Addition)

- 003S101 – BIOTOWER PUMP STATION AND EFFLUENT CHANNEL PLAN AND SECTIONS

SHEET NO.	DRAWING NO.	DESCRIPTION
		(G) - GENERAL
1	00G001	COVER SHEET, VICINITY MAP, AND LOCATION MAP
2	00G002	DRAWING INDEX 1
3	00G003	DRAWING INDEX 2
4	00G004	NOTES, LEGENDS, AND SYMBOLS
5	00G005	ABBREVIATIONS
6	00G006	SITE PLAN AND SURVEY CONTROL
7	00G007	CONTRACTOR STAGING PLAN
8	00G008	BIOSOLIDS PROCESS SCHEMATIC
9	00G009	WAS TEMPORARY BYPASS PUMPING PLAN
		(D) - DEMOLITION
10	00D001	SITE PLAN
11	00D002	PARTIAL SITE PLAN
12	00D003	PARTIAL SITE PLAN YARD PIPING
13	00D004	FLOW METER VAULT PHOTOS
14	03D001	BIOTOWER EFFLUENT CHANNEL STRUCTURAL FOUNDATION PLAN
15	03D002	BIOTOWER EFFLUENT CHANNEL STRUCTURAL TOP PLAN
16	03D003	BIOTOWER PUMP STATION AND EFFLUENT CHANNEL STRUCTURAL PLAN AND SECTIONS
17	03D004	BIOTOWER PUMP STATION AND EFFLUENT CHANNEL PHOTOS
18	03D101	NORTH AERATION BLOWER GALLERY STRUCTURAL BOTTOM PLAN
19	03D102	NORTH AERATION BLOWER GALLERY STRUCTURAL SECTIONS
20	07D101	DISSOLVED AIR FLOTATION THICKENERS STRUCTURAL PLANS AND SECTIONS
21	07D102	DISSOLVED AIR FLOTATION THICKENERS STRUCTURAL SECTIONS
22	07D103	DISSOLVED AIR FLOTATION THICKENERS MECHANICAL PLAN
23	07D104	DISSOLVED AIR FLOTATION THICKENERS MECHANICAL SECTIONS
24	07D105	DISSOLVED AIR FLOTATION THICKENERS MECHANICAL SECTIONS
25	07D106	DISSOLVED AIR FLOTATION THICKENERS PHOTOS
26	07D107	DISSOLVED AIR FLOTATION THICKENERS PHOTOS
27	07D401	DEWATERING FACILITY PHOTOS
28	07D501	DIGESTER CONTROL BUILDING NO. 2 PLAN AND PHOTOS
		(C) - CIVIL
29	00GC001	GENERAL CIVIL LEGEND AND SYMBOLS
30	00GC002	GENERAL CIVIL NOTES AND ABBREVIATIONS
31	00C001	PAVING AND GRADING PLAN
32	00C002	YARD PIPING PLAN - NORTH
33	00C003	YARD PIPING PLAN - SOUTH
34	00C004	PLAN AND PROFILE 6" PRIMARY SLUDGE
35	00C005	PLAN AND PROFILE 16" PROCESS DRAIN
36	00C006	PLAN AND PROFILE 12" 3W
37	00C007	PLAN AND PROFILE 8" SD
38	00C008	YARD PIPING DETAIL AND SECTION
39	00C009	YARD PIPING PHOTOS 1
39A	00C010	YARD PIPING PHOTOS 2
		(S) - STRUCTURAL
40	00GS001	GENERAL NOTES
41	00GS002	SUBGRADE PREPARATION
42	00GS003	SOIL MITIGATION PLAN
42A	03S101	BIOTOWER PUMP STATION AND EFFLUENT CHANNEL PLAN AND SECTION
43	07S101	SLUDGE BLEND TANKS LOWER PLAN
44	07S102	SLUDGE BLEND TANKS TOP PLAN
45	07S103	SLUDGE BLEND TANKS SECTIONS
46	07S104	SLUDGE BLEND TANKS SECTIONS AND DETAILS
47	07S201	RDT FACILITY LOWER PLAN
48	07S202	RDT FACILITY INTERMEDIATE PLAN
49	07S203	RDT FACILITY MONORAIL PLAN
50	07S204	RDT FACILITY SECTIONS 1
51	07S205	RDT FACILITY SECTIONS 2
52	07S206	RDT FACILITY DETAILS

SHEET NO.	DRAWING NO.	DESCRIPTION
		(S) - STRUCTURAL (CONTINUED)
53	07S301	THICKENING ODOR CONTROL FACILITY PLAN AND SECTION
54	07S401	DEWATERING FACILITY TOP PLAN
55	07S402	DEWATERING FACILITY MEZZANINE PLAN
56	07S403	DEWATERING FACILITY SECTION
57	07S501	NORTH AERATION BLOWER GALLERY PLAN AND SECTIONS
		(M) - MECHANICAL
58	00GM001	GENERAL MECHANICAL LEGEND AND SYMBOLS
59	00GM002	GENERAL MECHANICAL NOTES
60	07M100	SLUDGE BLEND TANKS PERSPECTIVE VIEWS
61	07M101	SLUDGE BLEND TANKS PLAN
62	07M102	SLUDGE BLEND TANKS SECTIONS
63	07M103	SLUDGE BLEND TANKS SECTIONS
64	07M104	SLUDGE BLEND TANKS SECTIONS
65	07M200	RDT FACILITY PERSPECTIVE VIEWS
66	07M201	RDT FACILITY SUBGRADE PLAN
67	07M202	RDT FACILITY LOWER PLAN
68	07M203	RDT FACILITY UPPER PLAN
69	07M204	RDT FACILITY ENLARGED PLAN
70	07M205	RDT FACILITY SECTIONS
71	07M206	RDT FACILITY SECTIONS
72	07M207	RDT FACILITY SECTIONS
73	07M208	RDT FACILITY DETAILS
74	07M300	THICKENING ODOR CONTROL FACILITY PERSPECTIVE VIEWS
75	07M301	THICKENING ODOR CONTROL FACILITY PLAN
76	07M302	THICKENING ODOR CONTROL FACILITY SECTION
77	07M303	THICKENING ODOR CONTROL FACILITY SECTION
78	07M304	THICKENING ODOR CONTROL FACILITY SECTIONS
79	07M305	THICKENING ODOR CONTROL SCHEMATIC 1
80	07M306	THICKENING ODOR CONTROL SCHEMATIC 2
81	07M401	DEWATERING FACILITY TOP PLAN
82	07M402	DEWATERING FACILITY PARTIAL PLAN AND ENLARGED PLAN
83	07M403	DEWATERING FACILITY SECTIONS
84	07M404	DEWATERING FACILITY SECTIONS
85	07M405	DEWATERING FACILITY DETAILS
86	07M501	DIGESTER CONTROL BUILDING NO. 2 PLAN
87	07M502	COMPRESSED AIR SYSTEM SCHEMATIC
		(E) - ELECTRICAL
88	00E001	LEGEND AND GENERAL NOTES
89	00E002	KEY SITE PLAN
90	00E003	NOT USED
91	00E004	ELECTRICAL SITE PLAN - MODIFICATIONS
92	00E011	EXISTING MCC-E SINGLE LINE DIAGRAM - DEMOLITION
93	00E012	MCC-TEMP SINGLE LINE DIAGRAM
94	00E013	NEW MCC-E SINGLE LINE DIAGRAM 1
95	00E014	NEW MCC-E SINGLE LINE DIAGRAM 2
96	00E015	MCC-TEMP FRONT ELEVATION
97	00E016	NEW MCC-E FRONT ELEVATION
98	00E017	PANELBOARD SCHEDULES
99	00E021	EXISTING MCC-15-01 SINGLE LINE DIAGRAM - MODIFICATIONS 1
100	00E022	EXISTING MCC-15-01 SINGLE LINE DIAGRAM - MODIFICATIONS 2
101	00E023	EXISTING MCC-15-01 FRONT ELEVATION - MODIFICATIONS
102	00E025	EXISTING DIG-MCC-07-001 PARTIAL SINGLE LINE DIAGRAM - DEMOLITION
103	00E026	EXISTING DIG-MCC-07-001 PARTIAL SINGLE LINE DIAGRAM - MODIFICATIONS
104	00E031	CONTROL SCHEMATICS 1
105	00E032	CONTROL SCHEMATICS 2
106	00E033	CONTROL SCHEMATICS 3
107	00E034	CONTROL SCHEMATICS 4
108	00E035	CONTROL SCHEMATICS 5
109	00E036	CONTROL SCHEMATICS 6
110	00E037	CONTROL SCHEMATICS 7

SHEET NO.	DRAWING NO.	DESCRIPTION
		(E) - ELECTRICAL (CONTINUED)
111	00E038	CONTROL SCHEMATICS 8
112	00E039	CONTROL SCHEMATICS 9
113	00E040	CONTROL SCHEMATICS 10
114	00E041	CONTROL SCHEMATICS 11
115	00E042	CONTROL SCHEMATICS 12
116	00E043	CONTROL SCHEMATICS 13
117	00E044	CONTROL SCHEMATICS 14
118	00E045	CONTROL SCHEMATICS 15
119	00E046	CONTROL SCHEMATICS 16
120	00E047	CONTROL SCHEMATICS 17
121	00E051	CIRCUIT SCHEDULES 1
122	00E052	CIRCUIT SCHEDULES 2
123	00E053	CIRCUIT SCHEDULES 3
124	00E054	CIRCUIT SCHEDULES 4
125	00E061	ELECTRICAL DETAILS 1
126	00E062	ELECTRICAL DETAILS 2
127	00E063	ELECTRICAL DETAILS 3
128	00E064	ELECTRICAL DETAILS 4
129	00E065	ELECTRICAL DETAILS 5
130	00E066	ELECTRICAL DETAILS 6
131	00E067	ELECTRICAL DETAILS 7
132	00E068	NOT USED
133	00E069	NOT USED
134	00E070	NOT USED
135	00E071	NOT USED
136	00E072	NOT USED
137	07E101	SLUDGE BLEND TANKS POWER AND CONTROL PLAN
138	07E102	SLUDGE BLEND TANKS LIGHTING PLAN
139	07E201	RDT FACILITY LOWER POWER AND CONTROL PLAN
140	07E202	RDT FACILITY UPPER POWER AND CONTROL PLAN
141	07E203	RDT FACILITY LOWER LIGHTING PLAN
142	07E204	RDT FACILITY UPPER LIGHTING PLAN
143	07E301	THICKENING ODOR CONTROL FACILITY POWER AND CONTROL PLAN
144	07E302	THICKENING ODOR CONTROL FACILITY LIGHTING PLAN
145	07E401	DEWATERING FACILITY POWER AND CONTROL PLAN
146	07E501	NORTH AERATION BLOWER GALLERY DEMOLITION PLAN
147	07E502	NORTH AERATION BLOWER GALLERY MODIFICATION PLAN
148	07E601	DIGESTER CONTROL BUILDING NO.2 DEMOLITION PLAN
149	07E602	DIGESTER CONTROL BUILDING NO.2 MODIFICATION PLAN
150	XXEXX1	NOT USED
151	XXEXX2	NOT USED
152	XXEXX3	NOT USED
153	XXEXX4	NOT USED
154	XXEXX5	NOT USED

AREA INDEX

AREA	AREA NAME
00	SITE/GENERAL
03	BIOLOGICAL TREATMENT
07	SOLIDS TREATMENT

REV	DATE	BY	DESCRIPTION
3	2/26/25	KTL	CHANGED PER ADDENDUM 3
2	2/17/25	KTL	CHANGED PER ADDENDUM 2
1	2/12/25	BG	CHANGED PER ADDENDUM 1

DESIGNED CE
DRAWN CE
CHECKED LJE
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER KYLE T. LEONARD No. 86011 CIVIL STATE OF CALIFORNIA

Digitally signed by Kyle Thomas Leonard
Contact Info: Carollo Engineers, Inc.
Date: 2025.02.27 10:56:55-08'00'

carollo

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

GENERAL

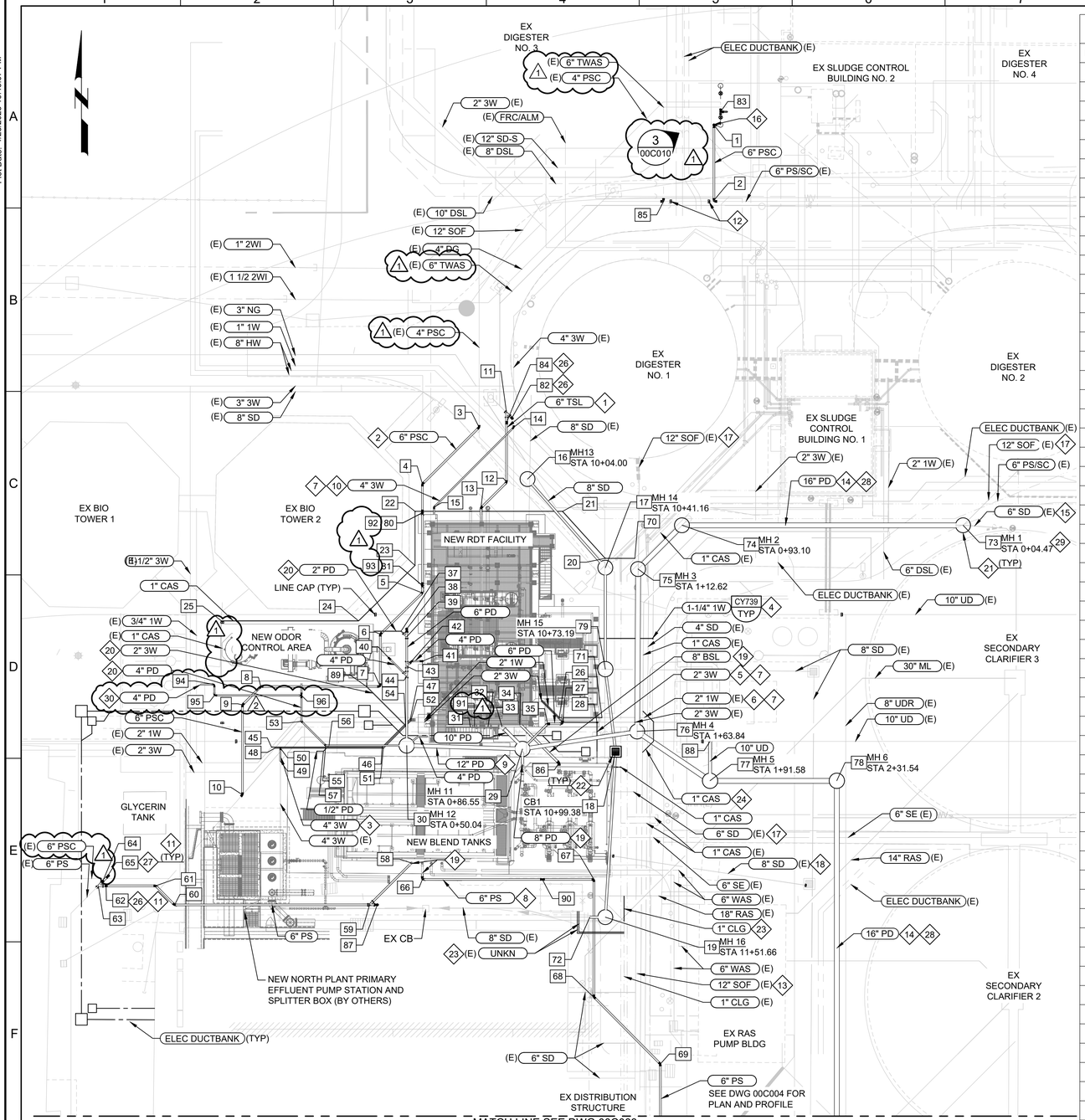
DRAWING INDEX 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00G002
SHEET NO. 2 OF 239

LAST SAVED BY: gleal

PROJECT NO. 202645-100000 FILE NAME: 202645_00G002.dwg



PLAN

FILE: 202645_00C002

COORDINATE CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	2112794.98	6342040.22	18.1[illegible] (CL)	6" VERT BEND 90 DEG
2	2112771.55	6342040.49	18.1[illegible] (CL)	6" BEND 90 DEG
3	2112699.66	6341966.19	17.1[illegible] (CL)	1 6"x4" RED BEND 45 DEG
4	2112681.76	6341948.29	17.1[illegible] (CL)	6" BEND 45 DEG
5	2112647.42	6341948.29	17.1[illegible] (CL)	6" BEND 45 DEG
6	2112634.40	6341935.02	17.1[illegible] (CL)	6" BEND 45 DEG
7	2112617.93	6341935.02	17.1[illegible] (CL)	6" BEND 90 DEG
8	2112617.93	6341897.38	17.1[illegible] (CL)	6" BEND 45 DEG
9	2112612.12	6341891.57	17.1[illegible] (CL)	6" BEND 45 DEG
10	2112583.78	6341891.57	17.1[illegible] (CL)	6" BEND 45 DEG
11	2112704.24	6341974.82	18.1[illegible] (CL)	6" WYE
12	2112682.28	6341974.85	18.1[illegible] (CL)	6" BEND 45 DEG
13	2112674.22	6341966.76	18.1[illegible] (CL)	6" BEND 45 DEG
14	2112699.64	6341977.10	19.5[illegible] (CL)	4" BEND 45 DEG
15	2112674.52	6341951.98	19.5[illegible] (CL)	4" BEND 45 DEG
16	2112683.30	6341981.44	DWG 00C007	MH 13
17	2112655.39	6342005.98	DWG 00C007	MH 14
18	2112597.39	6342009.23	DWG 00C007	CB 1
19	2112545.20	6342005.98	DWG 00C007	MH 16
20	2112658.34	6342005.94	22.4[illegible] (CL)	1" BEND 45 DEG
21	2112673.15	6341992.48	22.4[illegible] (CL)	1" BEND 45 DEG
22	2112673.15	6341945.98	22.4[illegible] (CL)	1" BEND 90 DEG
23	2112656.13	6341945.93	22.4[illegible] (CL)	1" BEND 45 DEG
24	2112638.62	6341928.16	22.4[illegible] (CL)	1" BEND 45 DEG
25	2112638.67	6341884.83	22.4[illegible] (CL)	1" TEE
26	2112608.13	6341991.46	19.6[illegible] (CL)	2" BEND 45 DEG
27	2112606.65	6341992.48	19.6[illegible] (CL)	2" BEND 45 DEG
28	2112606.63	6342003.36	19.6[illegible] (CL)	2" TEE
29	2112598.22	6341979.86	DWG 00C005	MH 11
30	2112599.33	6341943.36	DWG 00C005	MH 12
31	2112605.26	6341963.43	19.32 (INV)	6" BEND 90 DEG
32	2112605.30	6341968.98	19.32 (INV)	10" TEE
33	2112605.26	6341973.40	19.32 (INV)	10" BEND 45 DEG
34	2112605.99	6341978.98	19.10 (INV)	8" BEND 45 DEG
35	2112606.15	6341987.79	19.10 (INV)	6" BEND 45 DEG
37	2112635.34	6341941.57	15.09 (INV)	2" BEND 45 DEG
38	2112636.06	6341943.36	14.63 (INV)	CLEANOUT
39	2112633.61	6341943.36	14.63 (INV)	6"x2" RED. WYE
40	2112626.95	6341937.68	14.99 (INV)	2" BEND 45 DEG
41	2112625.90	6341948.31	14.63 (INV)	4" VERT BEND 90 DEG
42	2112625.90	6341944.89	14.63 (INV)	4" BEND 45 DEG
43	2112624.34	6341943.36	14.92 (INV)	6"x4" RED WYE
44	2112621.26	6341943.36	14.63 (INV)	6"x4" WYE
45	2112598.80	6341900.74	19.65 (CL)	2" BEND 45 DEG
46	2112598.85	6341935.63	21.2[illegible] (CL)	2" BEND 45 DEG
47	2112607.65	6341944.50	21.7[illegible] (CL)	2" BEND 45 DEG
48	2112598.52	6341901.83	19.65 (CL)	2" BEND 45 DEG
49	2112594.35	6341903.52	19.65 (CL)	6" COUPLING TIE-IN
50	2112598.52	6341903.51	19.65 (CL)	4"x2"x2" TEE
51	2112598.52	6341936.00	21.2[illegible] (CL)	2" BEND 45 DEG
52	2112607.15	6341944.63	21.7[illegible] (CL)	2" BEND 45 DEG
53	2112606.94	6341910.16	20.7[illegible] (INV)	4" BEND 45 DEG
54	2112605.62	6341942.99	20.9[illegible] (CL)	2" TEE
55	2112599.33	6341917.78	20.6[illegible] (INV)	4" BEND 45 DEG
56	2112599.34	6341918.85	20.6[illegible] (INV)	4"x1/2" WYE
57	2112597.53	6341917.10	20.6[illegible] (INV)	1/2" BEND 45 DEG
58	2112562.31	6341944.69	18.5[illegible] (CL)	6" VERT BEND 90 DEG
59	2112549.08	6341931.67	18.5[illegible] (CL)	6" WYE
60	2112549.05	6341870.15	18.5[illegible] (CL)	6" BEND 45 DEG

COORDINATE CONTROL POINTS (CONT)

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
61	2112555.08	6341864.22	18.5[illegible] (CL)	6" BEND 45 DEG
62	2112555.10	6341848.58	18.5[illegible] (CL)	6" PLUG VALVE
63	2112555.07	6341846.13	18.5[illegible] (CL)	6" WYE
64	2112556.45	6341847.50	18.5[illegible] (CL)	6" PLUG VALVE 1
65	2112557.61	6341848.65	18.[illegible] (CL)	CLEANOUT
66	2112557.09	6341948.29	DWG 00C004	6" BEND 90 DEG
67	2112557.09	6342002.38	DWG 00C004	6" BEND 90 DEG
68	2112520.04	6342002.25	DWG 00C004	6" BEND 45 DEG
69	2112498.90	6342023.32	DWG 00C004	6" BEND 45 DEG
70	2112658.33	6342015.29	22.4[illegible] (CL)	1" BEND 45 DEG
71	2112608.13	6342004.91	20.8[illegible] (CL)	2" COUPLING TIE-IN
72	2112545.20	6342001.09	DWG 00C007	8" COUPLING TIE-IN
73	2112668.74	6342118.76	DWG 00C005	MH 1
74	2112668.77	6342030.13	DWG 00C005	MH 2
75	2112654.99	6342016.28	DWG 00C005	MH 3
76	2112603.78	6342015.99	DWG 00C005	MH 4
77	2112588.23	6342038.97	DWG 00C005	MH 5
78	2112588.23	6342078.92	DWG 00C005	MH 6
79	2112623.37	6342005.98	DWG 00C007	MH15
80	2112672.71	6341948.30	28.1[illegible] (CL)	6" VERT BEND 90 DEG
81	2112649.80	6341948.30	28.1[illegible] (CL)	6" VERT BEND 90 DEG
82	2112702.57	6341976.49	21.3[illegible] (CL)	6" PLUG VALVE
83	2112799.13	6342042.32	18.1[illegible] (CL)	4" TEE
84	2112701.12	6341974.82	21.3[illegible] (CL)	6" PLUG VALVE
85	2112770.88	6342024.32	18.1[illegible] (CL)	6" BEND 90 DEG
86	2112593.77	6341991.37	19.1[illegible] (INV)	8" BEND 45 DEG
87	2112549.12	6341934.09	18.5[illegible] (CL)	CLEANOUT
88	2112600.61	6342038.97	12.7[illegible] (INV)	10" TEE
89	2112617.87	6341930.75	20.[illegible] (CL)	2" BEND 45 DEG
90	2112557.09	6341986.13	DWG 00C004	6" VERT BEND 22.5 DEG
91	2112605.28	6341964.75	19.32 (INV)	10"x6" REDUCER
92	2112672.71	6341948.30	17.10 (CL)	6" VERT BEND 90 DEG
93	2112649.80	6341948.30	17.10 (CL)	6" VERT BEND 90 DEG
94	2112618.55	6341882.71	20.86	4" BEND 90 DEG
95	2112615.12	6341882.71	20.82	4" BEND 90 DEG
96	2112615.12	6341910.16	20.67	4" TEE 2

GENERAL NOTES:

1. REFER TO DRAWING 00GC001 FOR GENERAL AND CIVIL LEGEND AND SYMBOLS.
2. REFER TO DRAWING 00GC002 FOR CIVIL NOTES AND ABBREVIATIONS.
3. RESTORE DISTURBED PAVEMENT PER CITY OF MANTECA TYPICAL DETAIL ST-14 AND SECTION 02952 OF THE SPECIFICATIONS.
4. RESTRAIN PRESSURE PIPES PER SECTION 15211 AND 02705 OF THE SPECIFICATIONS AND CAROLLO STANDARD DETAIL CY134.
5. INSTALL PIPE IN TRENCH PER CITY OF MANTECA STANDARD DETAILS U-5 AND U-6.

KEY NOTES:

1. 6" TSL LINE TIE-IN INTO EXISTING 6" TWAS LINE. SEE DWG 07M201 FOR CONNECTION TO RDT FACILITY. 1
2. NEW 6" PSC LINE AND TIE-IN INTO EXISTING 4" PSC LINE C/W RESTRAINED TRANSITION COUPLINGS.
3. TIE INTO EXISTING 4" 3W. REDUCE TO 2" AND TIE INTO EXISTING 2" 3W.
4. NEW 1-1/4 1W SERVICE LINE C/W CORP STOP, ISOLATION BALL VALVE. TIE INTO EXISTING 1W LINE. PIPE MATERIAL AND INVERT ELEVATION OF EXISTING 1W LINE TO BE CONFIRMED BY CONTRACTOR.
5. TIE INTO EXISTING 2" 3W LINE.
6. TIE INTO EXISTING 2" 1W LINE.
7. FLOOR PENETRATE LINE. SEE DWG 07M202 FOR PENETRATION LOCATIONS. 1
8. INSTALL NEW 6" PS LINE. SEE DWG 07M102 FOR PENETRATION TO ABOVEGROUND LOCATION. ALIGNMENT CONTINUES SOUTH (SEE DWG 00C003). SEE DWG 00C004 FOR PROFILE.
9. NEW 12" PROCESS DRAIN LINE. TIE INTO NEW 16" PD LINE. SEE DWG 07M201 FOR CONNECTIONS TO RDT FACILITY.
10. TIE INTO EXISTING EXISTING 4" 3W LINE.
11. TIE IN NEW 6" PS TO EXISTING 6" PS LINE W/ WYE AND RESTRAINED TRANSITION COUPLINGS.
12. CAP EXISTING 6" PS/SC AND FILL WITH CLSM PER SPECIFICATION 01738. INSTALL 90 DEG BEND.
13. MAINTAIN EXISTING 12" SOF IN PLACE DOWNSTREAM OF MH 4. 12" SOF LINE CONNECTS TO NEW 16" PD AT MH7, REFER TO DWG 00C003.
14. REPLACE IN KIND EXISTING 12" SOF, UPSIZE TO A 16 INCH. SEE DWG 00C003 AND 00C005 FOR CONTINUATION REFER TO SECTION 02552 OF THE SPECIFICATIONS FOR BYPASSING DETAILS.
15. RESTORE CONNECTION TO THE NEW 16" PD LINE.
16. BRING 6" PSC PIPE UP ABOVE GRADE TO CORNER OF BUILDING AND TIE IT TOGETHER WITH THE EXISTING 4" PSC PIPE ABOVE GRADE. SEE DWG 00C010 FOR CONNECTION TO THE EXISTING 4" PSC AND SLUDGE BUILDING NO.2. 1
17. ABANDON EXISTING CONNECTION TO SOF LINE. CAP AND FILL WITH CLSM PER SPEC 01738.
18. ABANDON 8" SD PIPE AND FILL WITH CLSM PER SPEC 01738. PARTIALLY DEMOLISH, SEE DWG 00D003 FOR DEMOLITION PLAN.
19. SEE DWG 07M101 FOR CONNECTION TO NEW BLEND TANKS.
20. SEE DWG 07M301 FOR CONNECTION TO ODOR CONTROL AREA.
21. CONSTRUCT SEWER MANHOLES IN ACCORDANCE WITH CITY OF MANTECA STANDARD DETAILS S-3 AND S-5. USE MANHOLE COVERS CONFORMING TO CITY OF MANTECA STANDARD DETAIL S-8.
22. CONSTRUCT STORM MANHOLES IN ACCORDANCE WITH CITY OF MANTECA STANDARD DETAIL D-1. USE INLET CONFORMING TO CITY OF MANTECA STANDARD DETAIL D-4.
23. REROUTE LINES TO AVOID CONFLICT WITH M 16. REFER TO DWG 00D003 FOR DEMOLITION PLAN.
24. REROUTE 1" CAS TO AVOID CONFLICT WITH MH 4. REFER TO DWG 00D003 FOR DEMOLITION PLAN.
25. NOT USED. 1
26. INSTALL VALVES PER CITY OF MANTECA STANDARD DETAIL W-6.
27. INSTALL CLEANOUT AND FRAME AND COVERS PER CITY OF MANTECA STANDARD DETAILS S-10 AND S-11.
28. REFER TO SPECIFICATION 02552 FOR LINE PLUGGING AND BYPASSING DETAILS.
29. PROPOSED BYPASSING SUCTION MANHOLE.
30. BRING NEW 4" PD TO GRADE AND CONNECT TO THE BULKHEAD. REFER TO DWG 03S101 FOR CONNECTION. 2

Know what's below. Call before you dig. usanorth811.org

SCALE

0 10' 20' 40'

SCALE: 1" = 20'

REV	DATE	BY	DESCRIPTION
2	2/26/25	BG	CHANGED PER ADDENDUM 3
1	2/12/25	BG	CHANGED PER ADDENDUM 1

DESIGNED BG
DRAWN JJ
CHECKED TR
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

Digitally signed by Ryan A. Hook
Contact Info: Carollo Engineers, Inc.
Date: 2025.02.26 09:40:40 -08'07'

carollo

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

CIVIL

YARD PIPING PLAN - NORTH

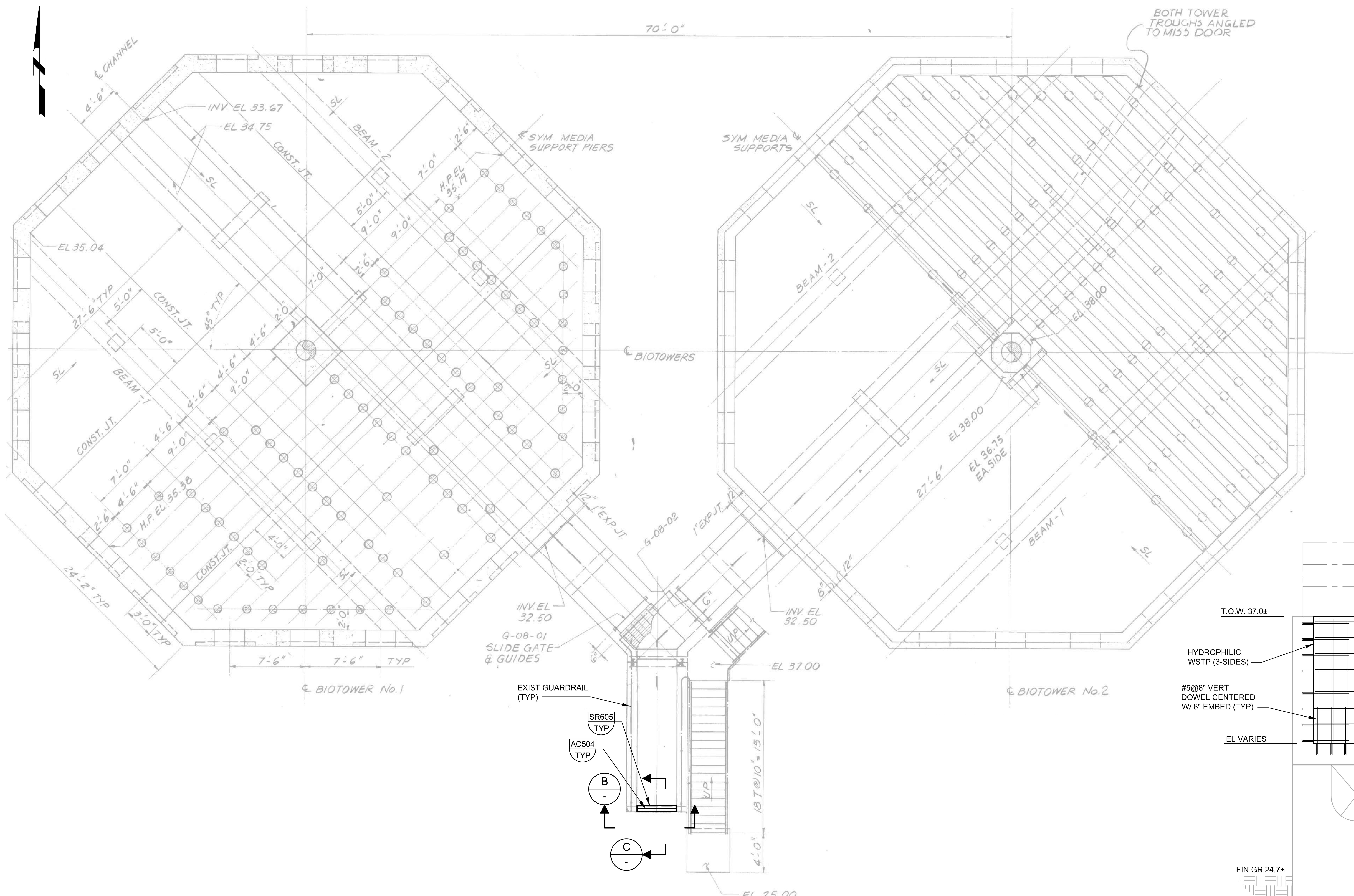
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00C002
SHEET NO. 32 OF 239

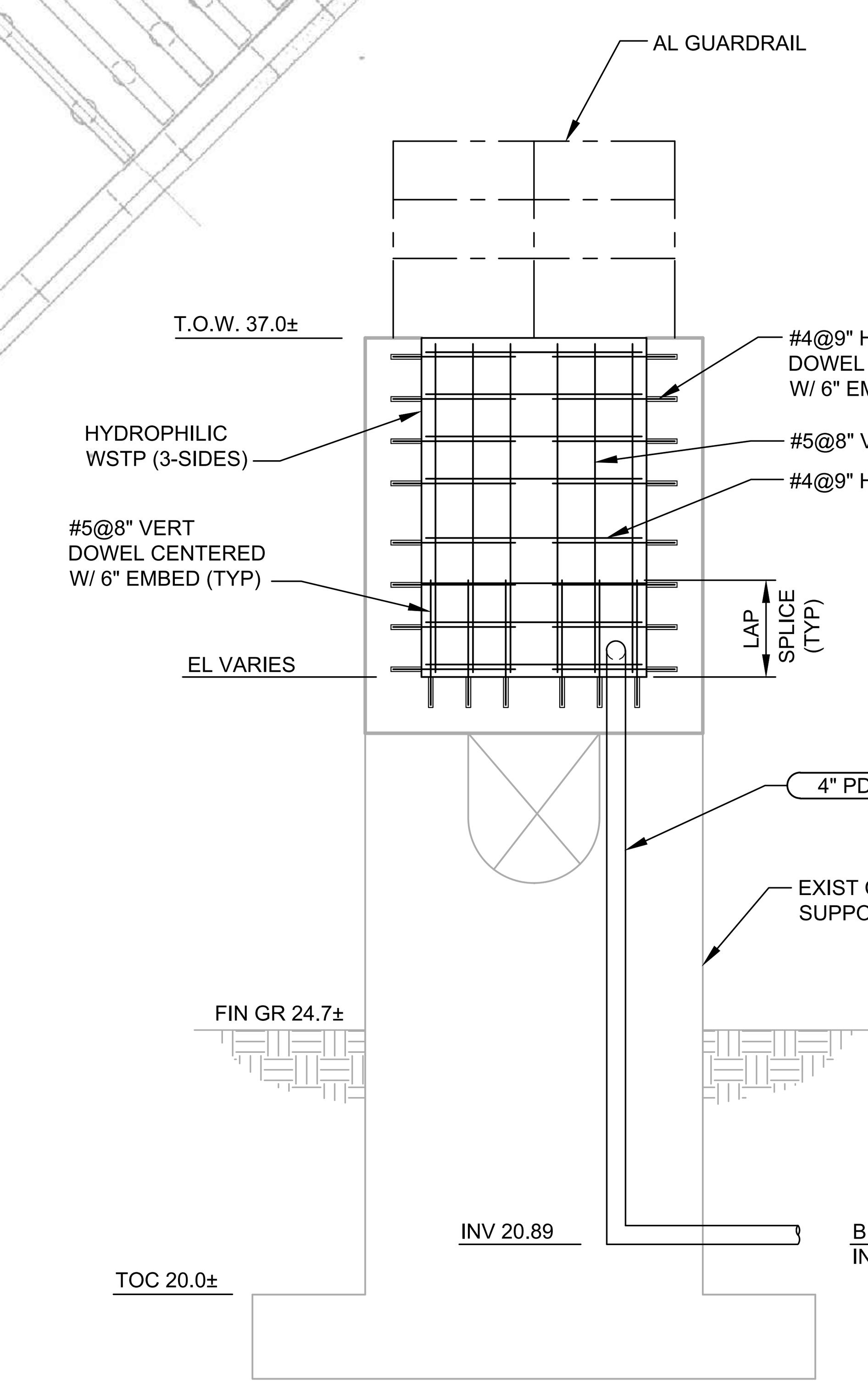
LAST SAVED BY: JJabla

Plot Date: 1/29/2025 10:43:07 PM

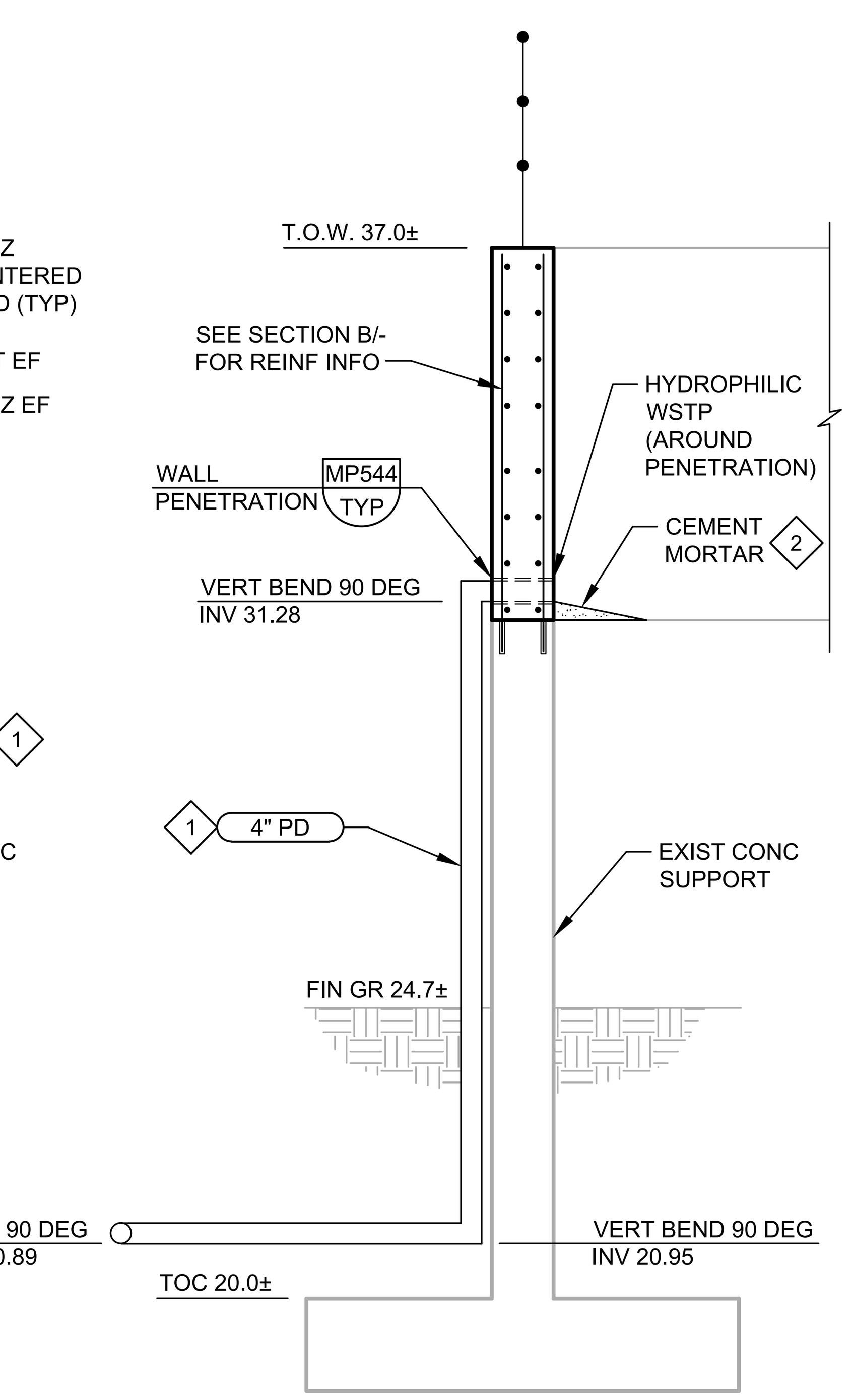
PROJECT NO. 202645-100000 FILE NAME: 202645_00C002.dwg



A PLAN
SCALE: NO SCALE
FILE: 202645_03S101A



B SECTION
SCALE: 3/8" = 1'-0"
FILE: 202645_03S300



C SECTION
SCALE: 3/8" = 1'-0"
FILE: 202645_03S300

GENERAL NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING 00GS001.
2. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, AND CONDITIONS. NOTIFY THE ENGINEER OF ANY DISCREPANCIES IMMEDIATELY.
3. NOT ALL PENETRATIONS ARE SHOWN OR DIMENSIONED. COORDINATE ALL PENETRATIONS WITH ELECTRICAL DRAWINGS.
4. DO NOT INTERRUPT REINFORCING BARS FOR INSTALLATION OF POST-INSTALLED ANCHORS/DOWELS. CONTRACTOR SHALL COORDINATE PLACEMENT OF REINFORCING BARS TO CLEAR ANCHOR/DOWEL LOCATIONS.

KEY NOTES:

1. SEE DRAWING 00C002 FOR NEW 4" PD LINE ALIGNMENT. MAINTAIN A MINIMUM PIPE SLOPE OF 0.3% AT THE WALL PENETRATION.
2. APPLY CEMENT MORTAR TO SLOPE TO THE 4" PD PIPE. REFER TO SPECIFICATION 03600 FOR CEMENT MORTAR DETAILS.

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED KA
DRAWN RYW
CHECKED ABE
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER BRIAN STUETZEL No. 96063 CIVIL STATE OF CALIFORNIA

Digitally signed by Brian Stuetzel

carollo

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

STRUCTURAL

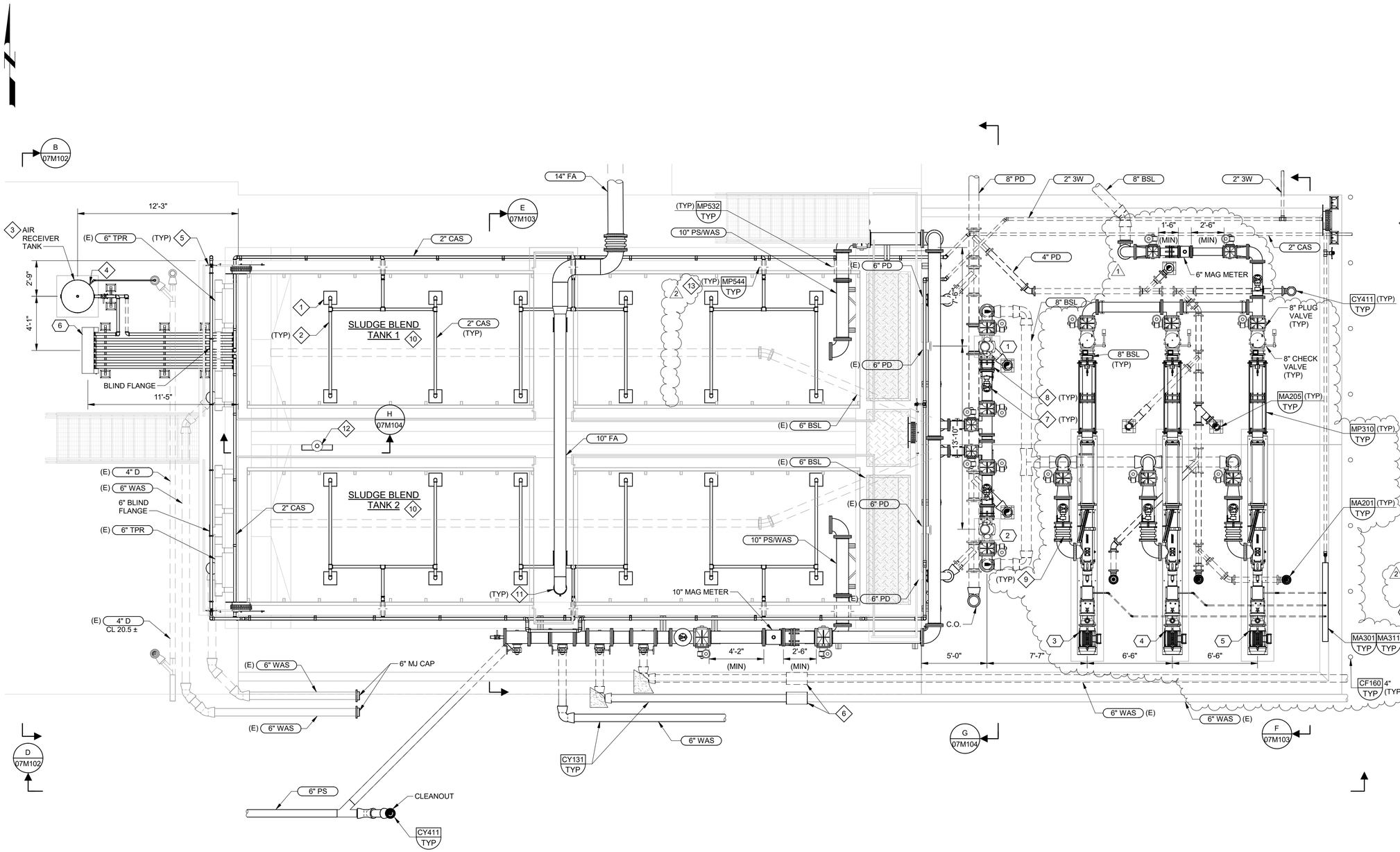
BIOTOWER PUMP STATION AND EFFLUENT CHANNEL PLAN AND SECTIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 03S101
SHEET NO. 42A OF 239

LAST SAVED BY: RWelch

PROJECT NO. 202645-100000 FILE NAME: 202645_03S101.dwg



GENERAL NOTES:

1. REFER TO THE GENERAL MECHANICAL NOTES ON DRAWING 00GM002.
2. FOR CONTINUATION OF YARD PIPING, REFER TO CIVIL DRAWINGS.
3. ALL PIPING BELOW THE CONCRETE SLAB SHALL BE CONCRETE ENCASED PER DETAILS MP003/TYP AND MP005/TYP. CONTINUE ENCASEMENT BEYOND THE EDGE OF SLAB TO A DIMENSION EQUAL TO THE DISTANCE FROM BOTTOM OF SLAB TO TOP OF PIPE OR 2'-0", WHICHEVER IS GREATER.
4. MAINTAIN A MINIMUM OF 2% SLOPE ON ALL DRAIN LINES.
5. NOT ALL PIPE AND DUCT SUPPORTS ARE SHOWN. CONTRACTOR SHALL PROVIDE ADDITIONAL SUPPORTS AS REQUIRED PER SPECIFICATIONS.
6. SUPPORT ALL 3W AND CAS PIPING PER DETAILS MP073/TYP, MP218/TYP, AND MP253/TYP.
7. SUPPORT ALL PS AND WAS PIPING PER DETAILS MP032/TYP, MP222/TYP, AND MP250/TYP.
8. SUPPORT ALL BSL PIPING PER DETAILS MP032/TYP AND MP034/TYP.

KEY NOTES:

1. PROVIDE LARGE BUBBLE MIXING SYSTEM PER SECTION 11227. A GENERAL MIXING SYSTEM ARRANGEMENT IS SHOWN FOR EXAMPLE ONLY AND SHALL BE DESIGNED BY THE MIXING SYSTEM MANUFACTURER.
2. PROVIDE ADDITIONAL PIPE SUPPORTS AND ANCHORAGE ON LARGE BUBBLE MIXING SYSTEM NOZZLE HEADERS, NOZZLE OFFSETS, AND NOZZLES TO MAINTAIN PIPE STABILITY WHEN FILLING AND DRAINING THE TANK PER SECTION 11227.
3. PROVIDE AIR RECEIVER TANK PER SECTION 11227.
4. PROVIDE EXTERNALLY MOUNTED AUTOMATIC MECHANICAL TYPE DRAIN TRAP ON AIR RECEIVER DRAIN PIPING. ROUTE DRAIN PIPING TO EXISTING FLOOR DRAIN.
5. PROVIDE HOSE BIBB AND HOSE RACK PER DETAILS MA415/TYP AND MA417/TYP.
6. CONNECT TO EXISTING 6" WAS PIPES WITH MJ SLEEVES.
7. PROVIDE 2" COMBINATION VACUUM AND AIR RELEASE VALVE PER DETAIL MP896/TYP. ROUTE DISCHARGE PIPE TO THE NEAREST DRAIN.
8. DISMANTLING JOINT.
9. PROVIDE RESTRAINED RUBBER EXPANSION JOINT PER DETAIL MP302/TYP.
10. COVER NOT SHOWN. REFER TO STRUCTURAL DRAWINGS.
11. NEW FA DUCT SHALL PENETRATE WALKWAY WITH A TYPE 316 SST SPOOL PER DETAIL MP566/TYP (SIM). PROVIDE A FLEXIBLE COUPLING BETWEEN THE DUCT AND THE SPOOL IN THE WALKWAY.
12. THE CENTERLINE OF THE GATE STEM SHALL BE AT LEAST 5" FROM THE EDGE OF THE WALL. STEM CENTERLINE SHALL NOT BE ADJUSTED WITH THE USE OF UNIVERSAL JOINTS.
13. CONTRACTOR SHALL SCAN THE WALL TO LOCATE REBAR PRIOR TO CORE DRILLING AND ADJUST LOCATION OF CORE DRILL SO THAT NO HORIZONTAL REBAR ARE CUT AND A MAXIMUM OF ONE VERTICAL REBAR IS CUT.

KEY TAGS:

1	SLB-GRD-07-001	BLENDED SLUDGE GRINDER 1
2	SLB-GRD-07-002	BLENDED SLUDGE GRINDER 2
3	SLB-PMP-07-001	RDT FEED PUMP 1
4	SLB-PMP-07-002	RDT FEED PUMP 2
5	SLB-PMP-07-003	RDT FEED PUMP 3
6	SLB-VCP-07-011	LARGE BUBBLE MIXING CONTROL PANEL

A PLAN
SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
2	2/26/25	KTL	CHANGED PER ADDENDUM 3
1	2/12/25	KTL	CHANGED PER ADDENDUM 1

DESIGNED KTL
DRAWN GL
CHECKED KJB
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER KYLE T. LEONARD No. 86011 CIVIL STATE OF CALIFORNIA

Digitally signed by Kyle Thomas Leonard
Contact Info: Carollo Engineers, Inc.
Date: 2025.02.27 09:20:07-08'00'

carollo

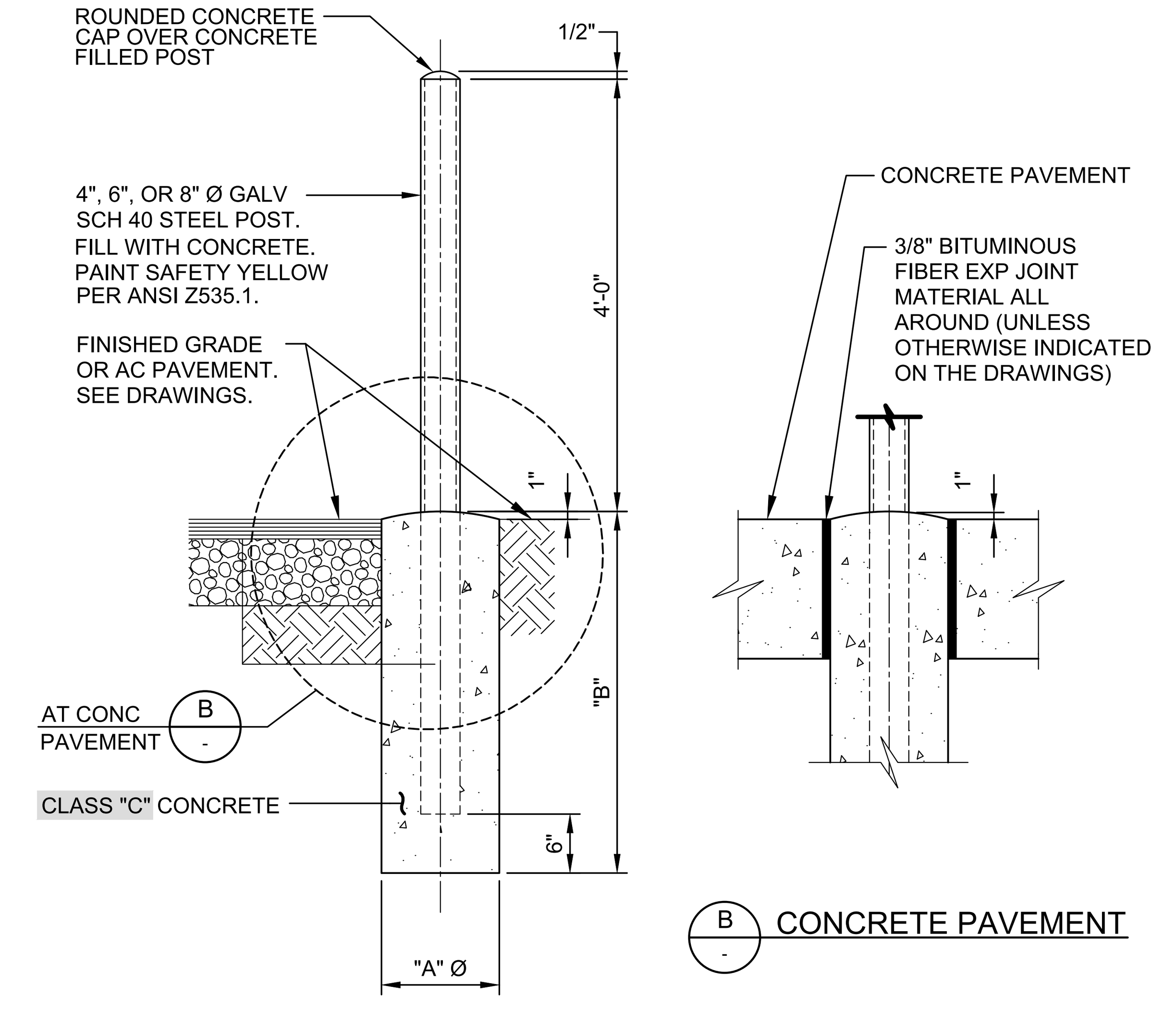
CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
MECHANICAL
SLUDGE BLEND TANKS PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 07M101
SHEET NO. 61 OF 239

PLOT DATE: 2/27/2025 9:20:05 AM

FILE NAME: R:\d0299007\202645_00M0800.rvt



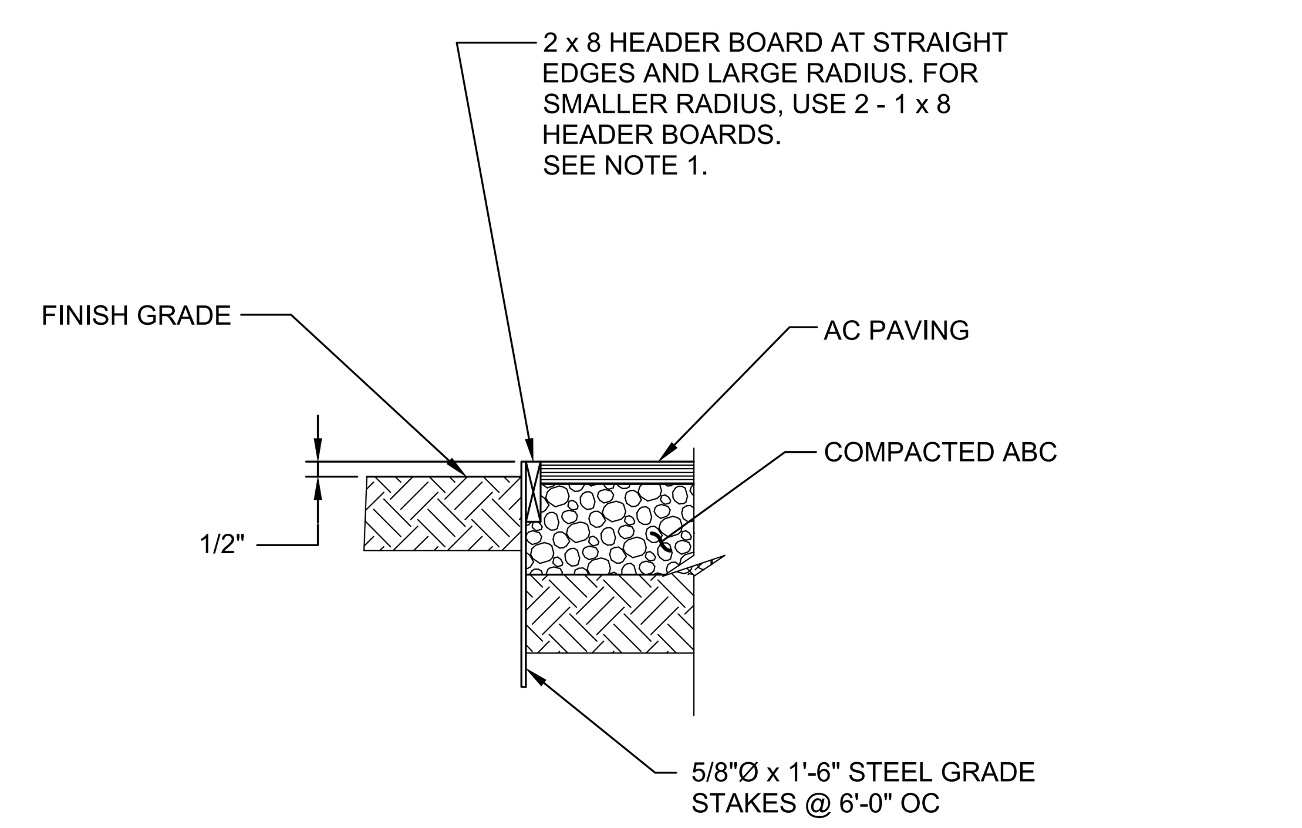
A - AC PAVEMENT OR FINISHED GRADE

B - CONCRETE PAVEMENT

SIZE	"A"	"B"
4"Ø	1'-3"	3'-0"
6"Ø	1'-6"	4'-0"
8"Ø	1'-9"	5'-0"

CF160 GUARD POST
TYP

N 03/22/2021

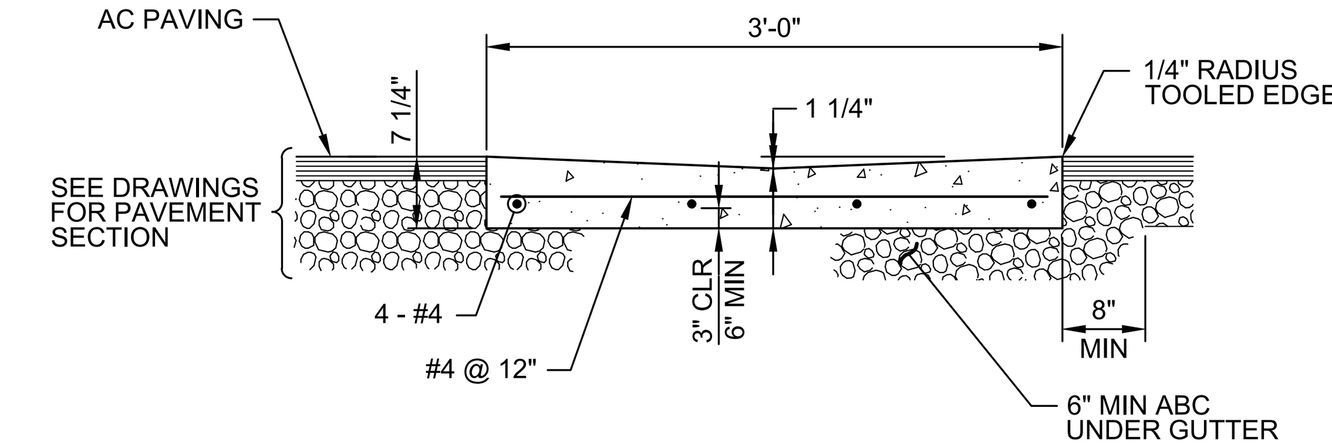


NOTES:

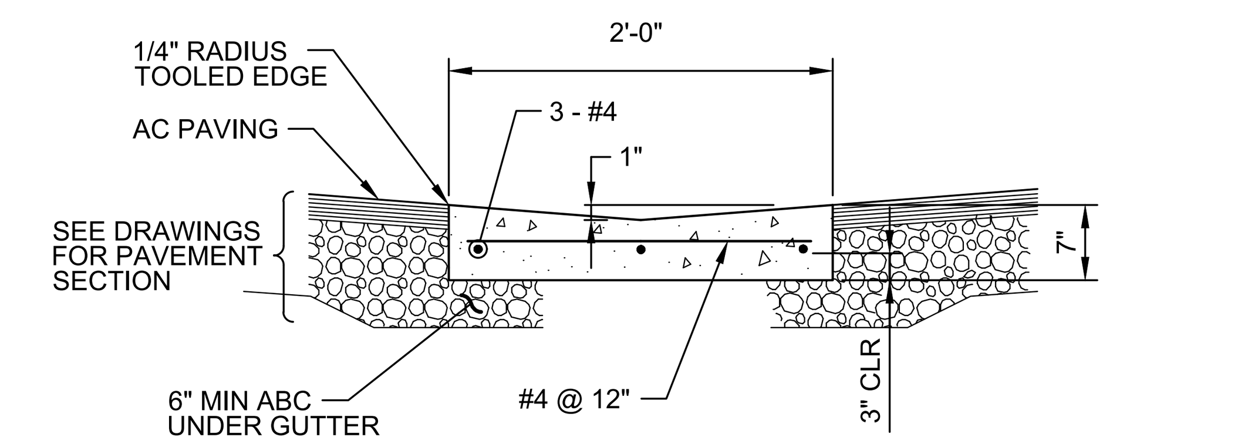
1. HEADER BOARD MATERIAL SHALL BE EITHER PRESSURE TREATED DOUGLAS FIR OR REDWOOD.

CR106 YARD CURB - WOOD HEADER
TYP

12/29/2020



A - SECTION - CROSS GUTTER



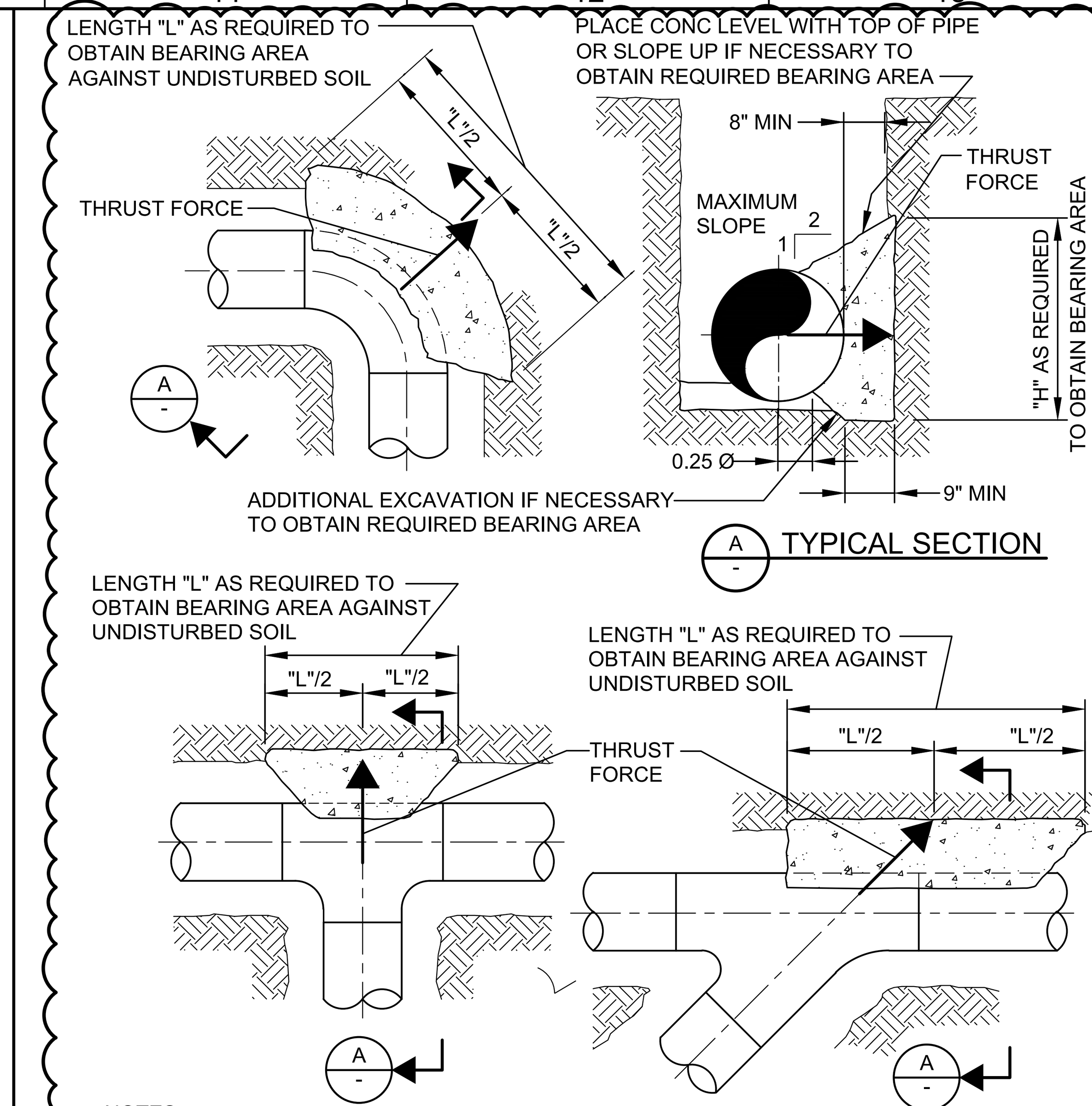
B - SECTION - VALLEY GUTTER

NOTES:

1. PROVIDE 3/4" EXPANSION JOINTS AT ENDS OF CONCRETE PLACEMENT, AT POINTS OF CURVATURE, AT INTERSECTIONS, AND AT MAXIMUM SPACING OF 30 FEET. EXPANSION JOINTS SHALL BE 3/4" WIDE WITH 1/4" RADIUS CONCRETE EDGES AT BOTH SIDES OF JOINT. USE BITUMINOUS FIBER EXPANSION JOINT MATERIAL.
2. DO NOT PASS REINFORCING BARS THROUGH EXPANSION JOINTS.
3. PROVIDE WEAKENED PLANE JOINTS AT 10 FEET OC MAXIMUM. AT FRONT, TOP AND BACK FACES, PROVIDE 1/2" RADIUSED EDGE EACH SIDE AT JOINTS.

CR110 GUTTER - CROSS AND VALLEY
TYP

12/29/2020

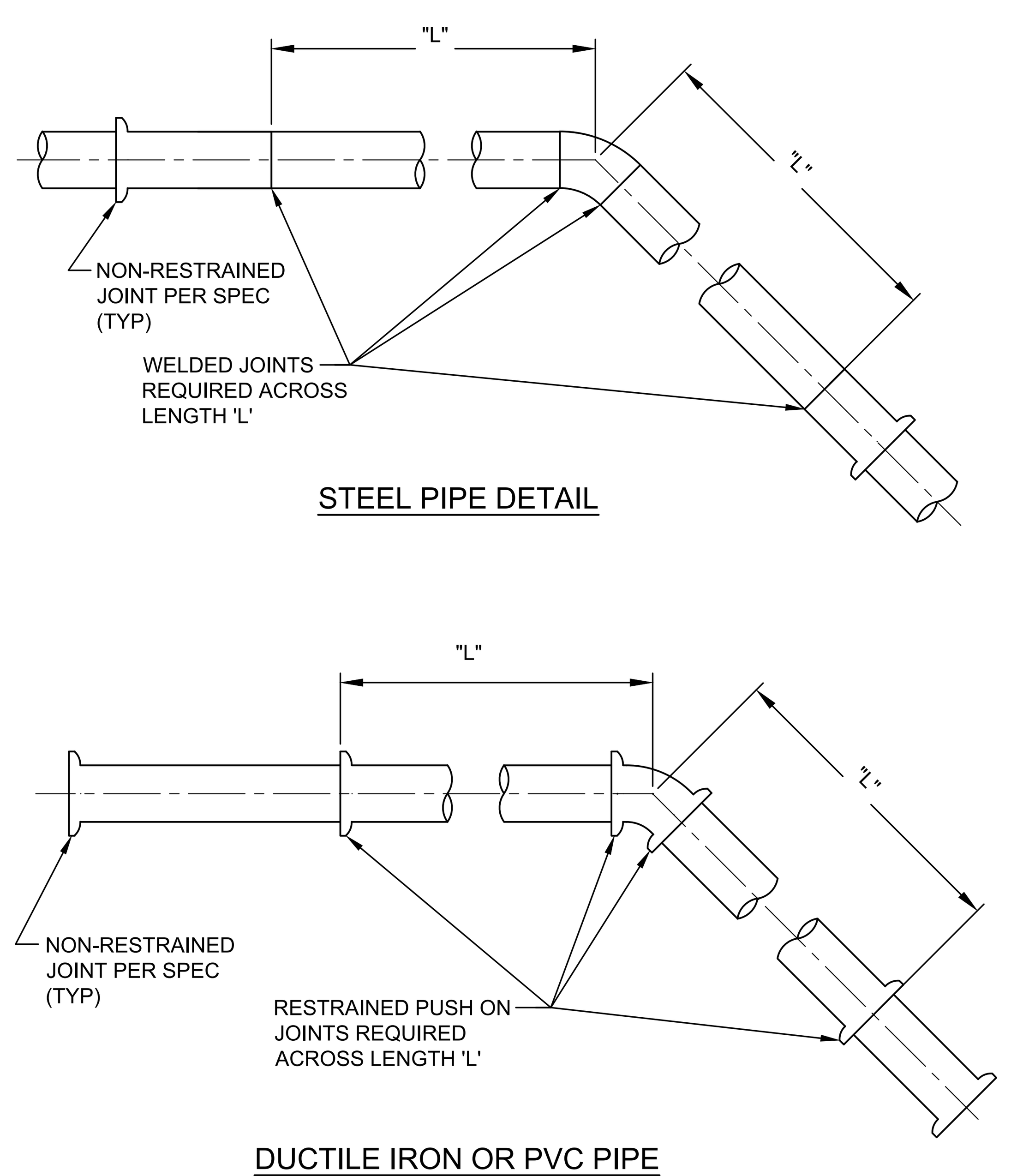


NOTES:

1. BEARING AREA IS THE AREA REQUIRED TO OBTAIN A MAXIMUM PRESSURE NOT GREATER THAN 1500 PSF AT THE TOP OF THRUST BLOCK WHEN THE PIPE IS SUBJECTED TO ITS TEST PRESSURE, OR BEARING AREA INDICATED ON THE DRAWINGS USING A PASSIVE RESISTANCE OF 200 PSF/FT DEPTH.
2. CONCRETE SHALL BE CLASS "A" OR "C".
3. THRUST BLOCK SHALL BEAR ON UNDISTURBED SOIL.

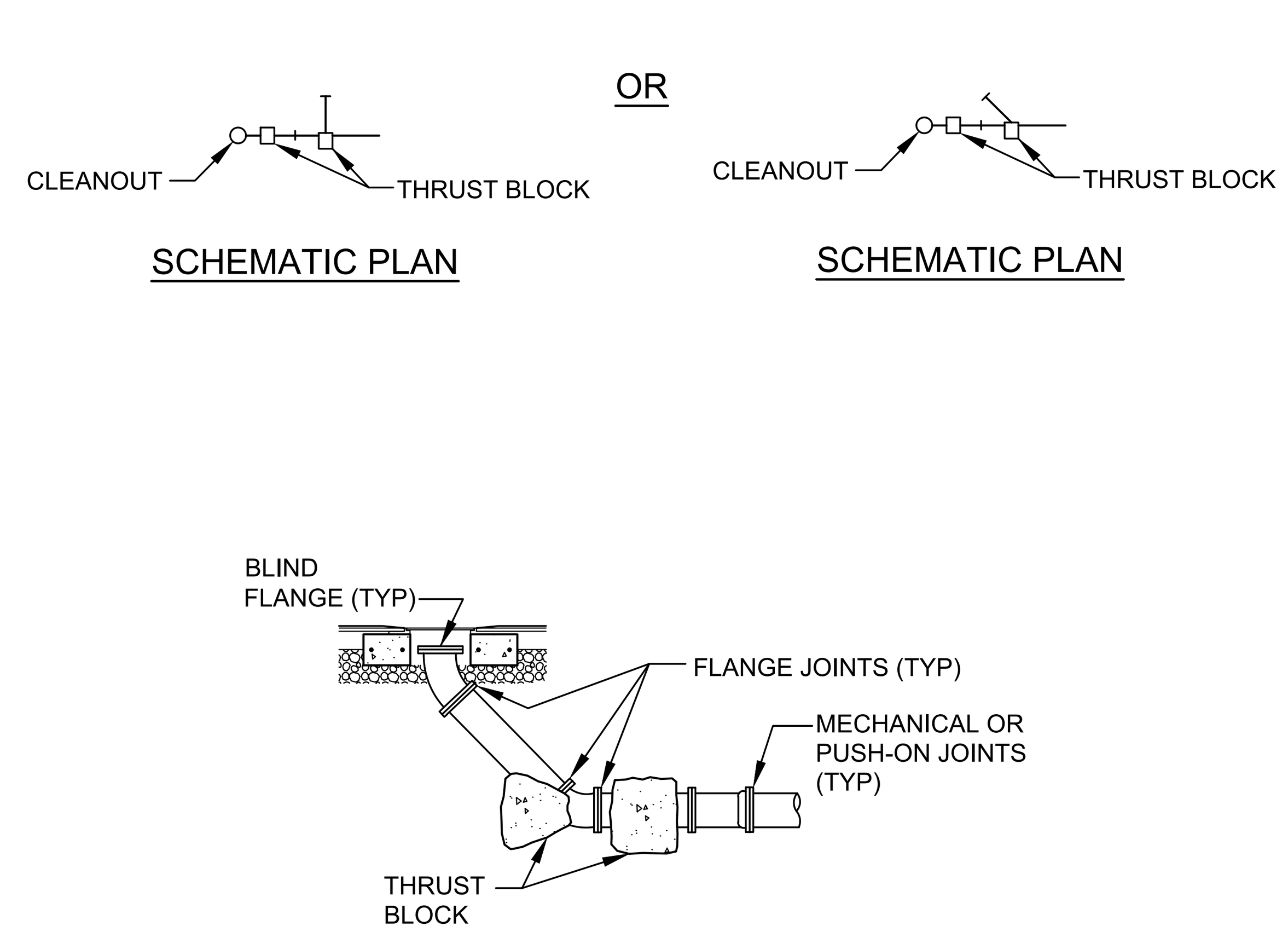
CY131 THRUST RESTRAINT - BURIED THRUST BLOCK
TYP

N 08/19/22



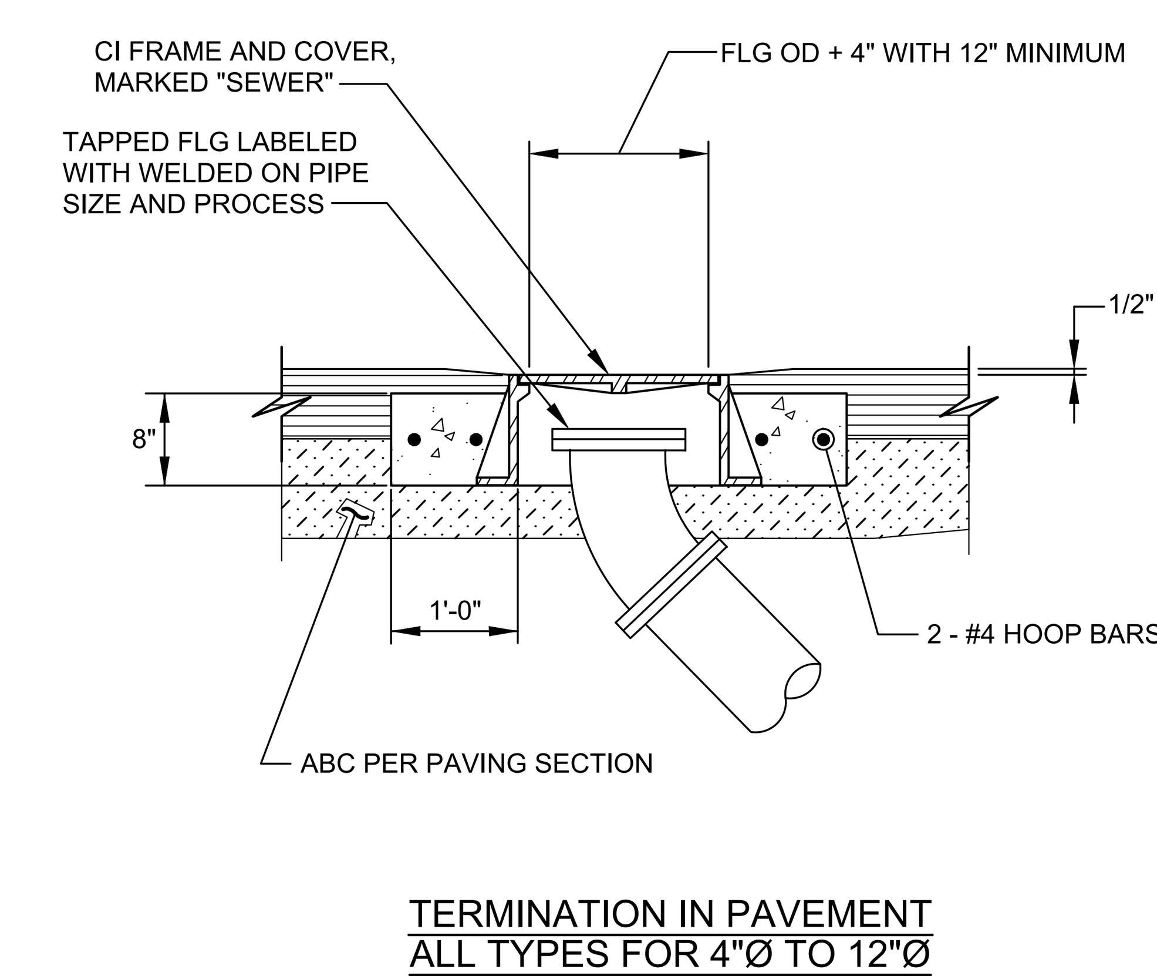
CY134 THRUST RESTRAINT - BURIED RESTRAINED LENGTH
TYP

N R 01/27/25



CY411 CLEANOUTS
TYP

R SHEET 1 OF 2 1/17/25



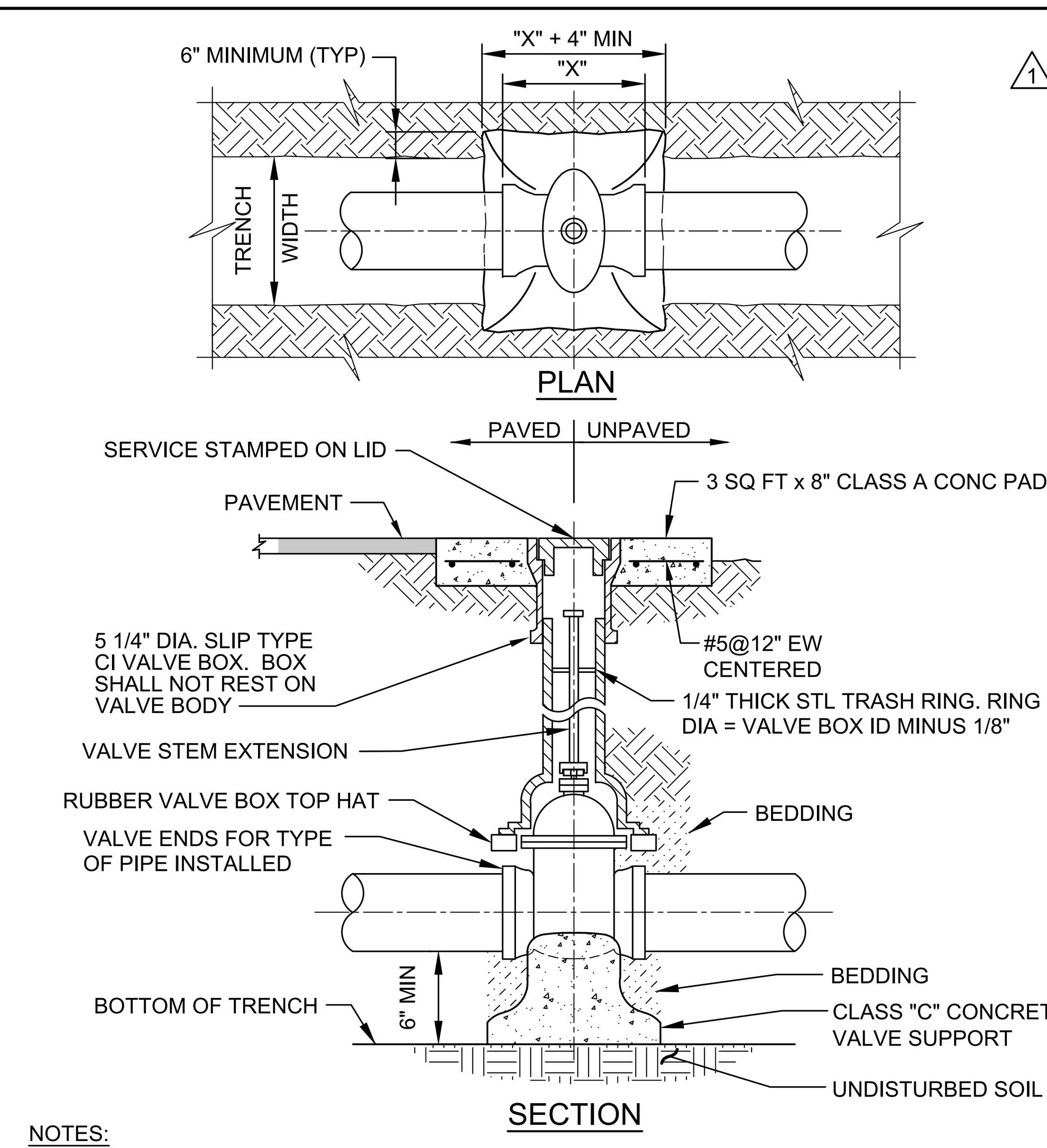
TERMINATION IN PAVEMENT ALL TYPES FOR 4"Ø TO 12"Ø

NOTES:

1. ALL THRUST BLOCKS SHALL BE PLACED PER TYPICAL DETAIL CY131.
2. CONCRETE RING SHALL BE PLACED AFTER PAVEMENT PLACEMENT.
3. ALL FLANGES SHALL BE TAPPED TO ALLOW THE INSTALLATION OF BLIND FLANGES WITH BOLTS.
4. CLEANOUT PIPE SHALL BE SAME SIZE AS LINE PIPE.
5. FOR CLEANOUTS IN YARD AREA, PLACE 12" SQUARE BY 4" THICK CONCRETE PAD.

CY411 CLEANOUTS
TYP

S SHEET 2 OF 2 04/08/24



NOTES:

1. ALL BURIED VALVES SHALL BE PROVIDED WITH EXTENSION STEM OPERATION WITH 2" SQUARE AWWA NUT WITHIN 36" OF VALVE BOX COVER. NUT IS TO INDICATE DIRECTION OF ROTATION TO OPEN VALVE.
2. COAT BURIED PIPE AND VALVE BOX AS SPECIFIED.
3. CLEAN VALVE BOX OF ALL DEBRIS AND SOIL.
4. VALVE TYPE AS INDICATED ON THE DRAWINGS.

CY716 GATE VALVE - DIRECT BURY
TYP

S 10/20/20

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED CE
DRAWN CE
CHECKED TR
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

Digitally signed by Ryan A. Hook

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

TYPICAL DETAILS

CIVIL 1

VERIFY SCALES: BAR IS ONE INCH ON ORIGINAL DRAWING. 0 — 1". IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

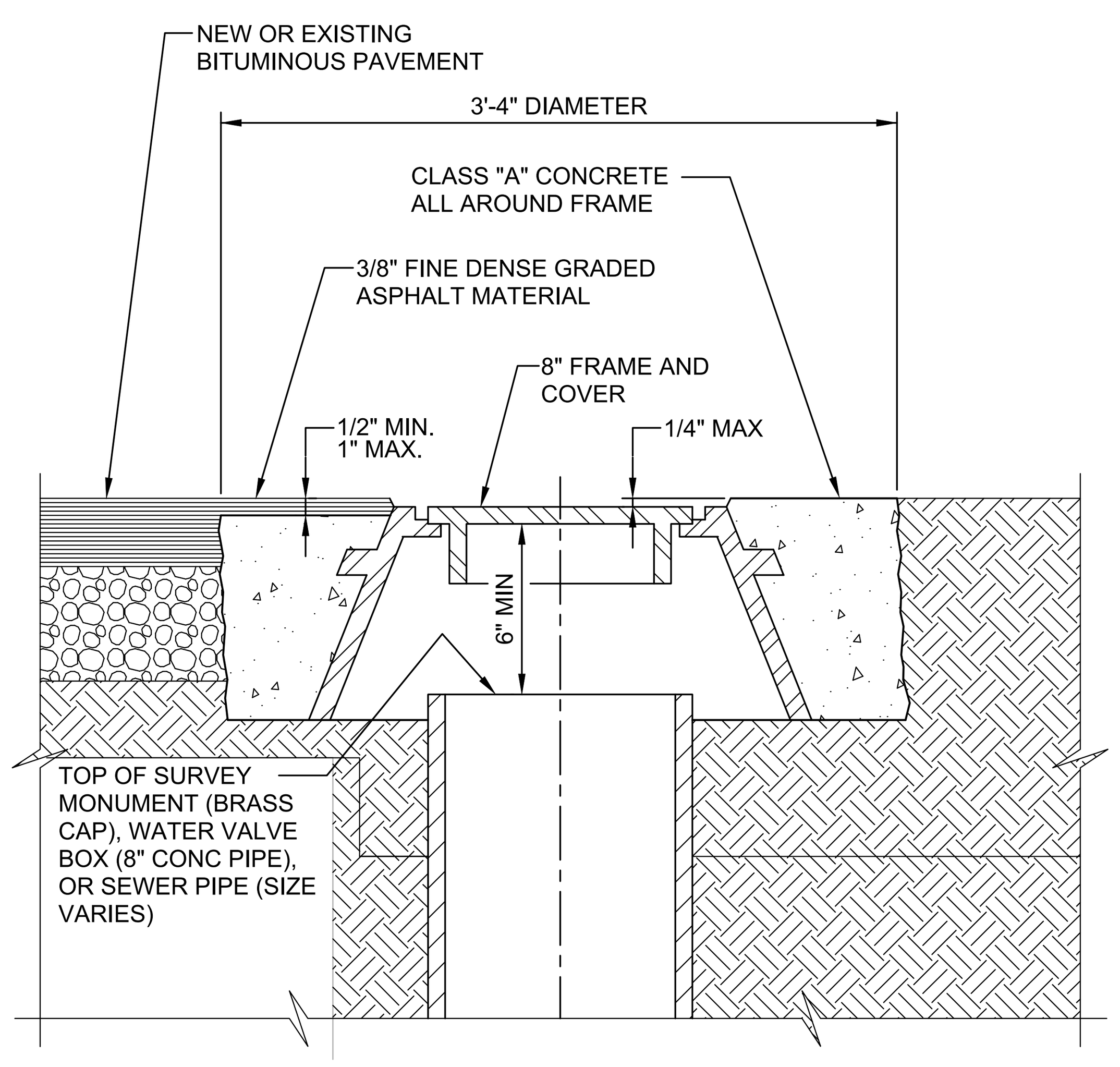
JOB NO. 202645

DRAWING NO. 00TC001

SHEET NO. 219 OF 239

LAST SAVED BY: gleal

PROJECT NO. 202645-100000 FILE NAME: 202645_00TC001.dwg

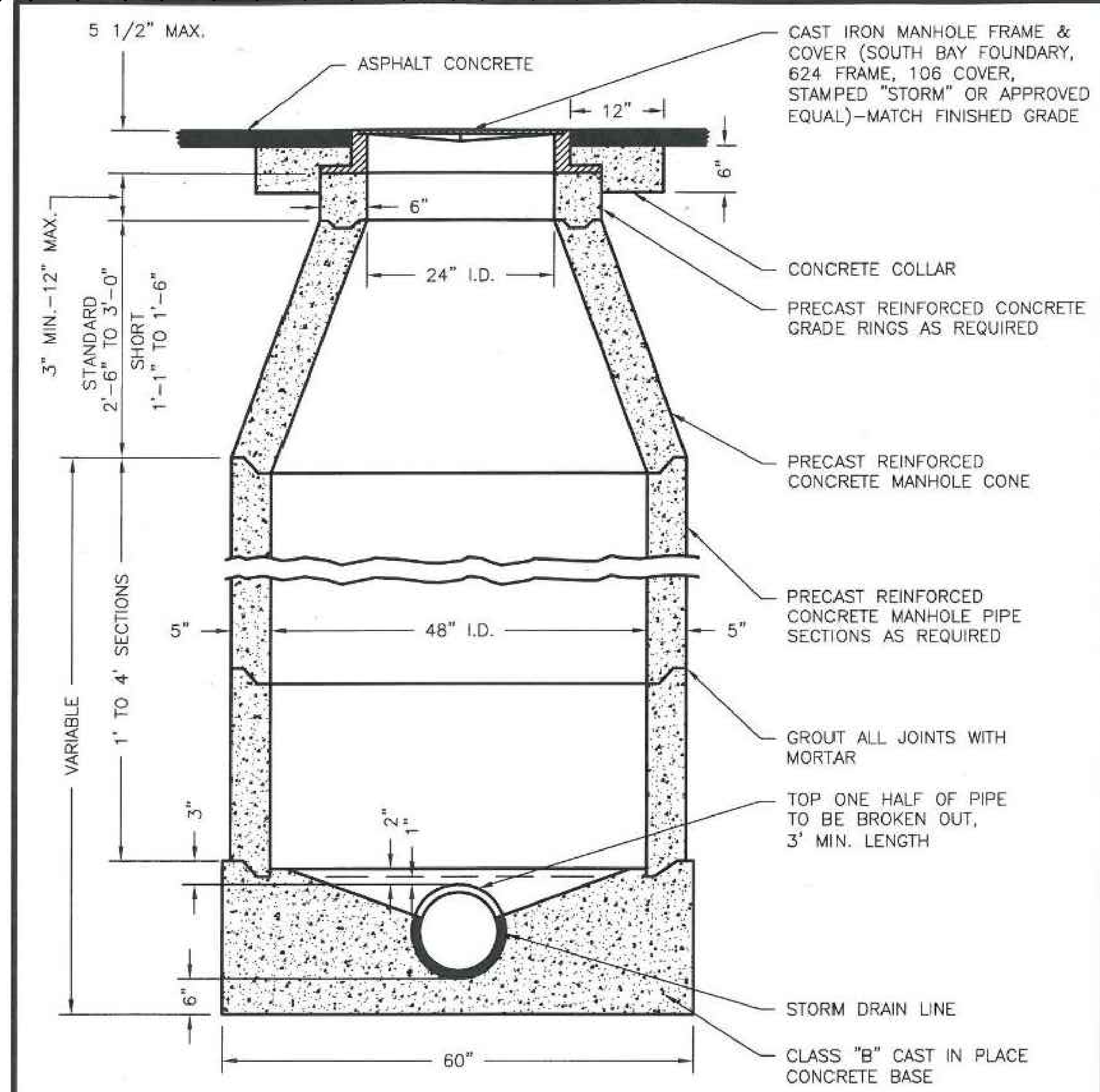


CY739 VALVE BOX FRAME - GRADE ADJUSTMENT

TYP

S

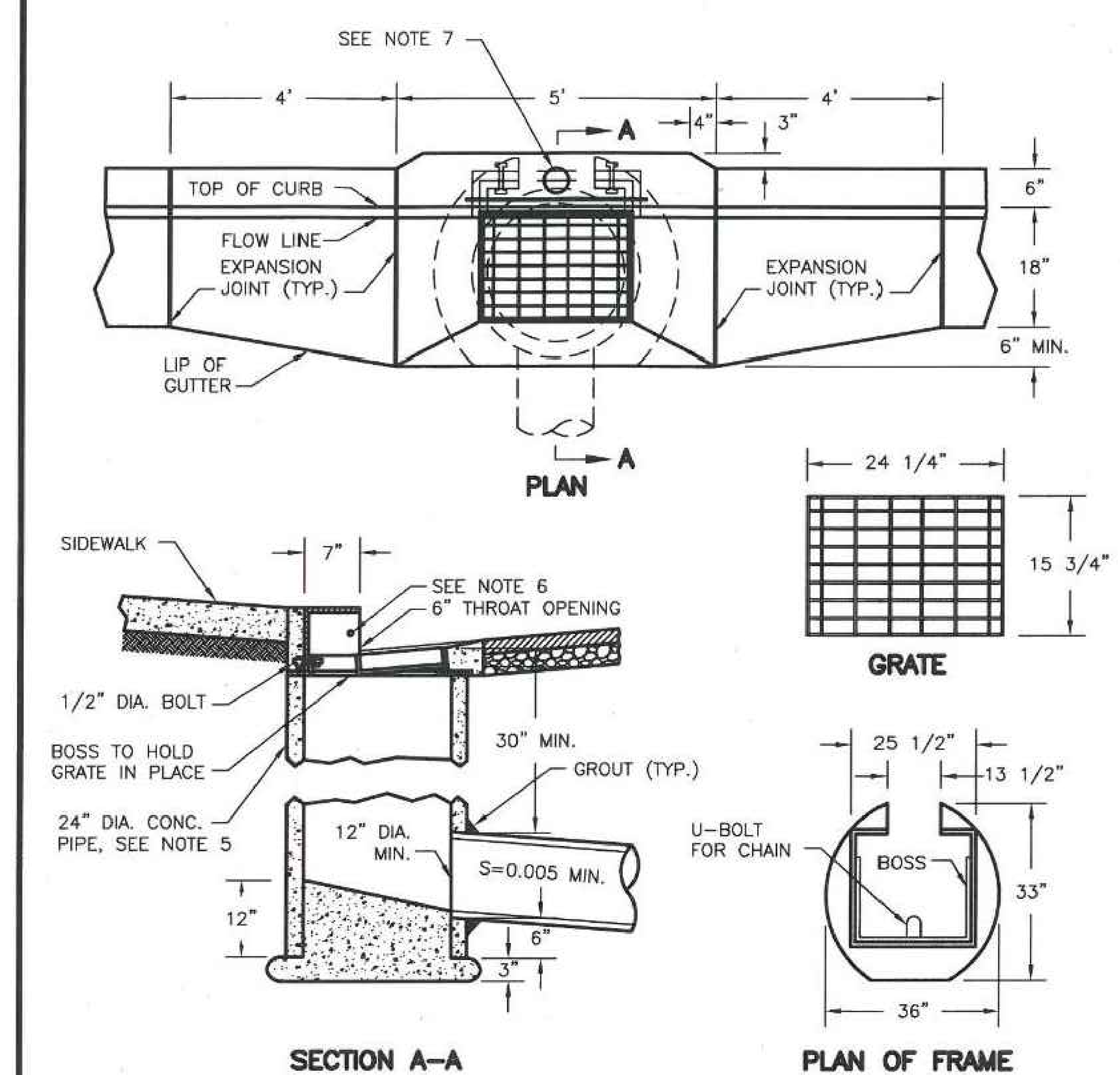
12/29/2020



NOTES

1. PRECAST REINFORCED CONCRETE MANHOLE UNIT SHALL CONFORM TO A.S.T.M. C-478.
2. PIPE JOINT SHALL BE WITHIN 6 INCHES OF OUTER WALLS OF MANHOLE.
3. MANHOLE BASE TO BE TROWELED SMOOTH INSIDE.
4. MANHOLE SHALL BE CLEANED IN ACCORDANCE WITH CITY OF MANTECA SPECIFICATIONS.
5. SHORT CONE TO BE USED ONLY WHEN MANHOLE DEPTH JUSTIFIES.
6. COLLAR SHALL BE CLASS "B" CONCRETE AND CONSTRUCTED 2 1/2 INCHES BELOW FINISHED GRADE.

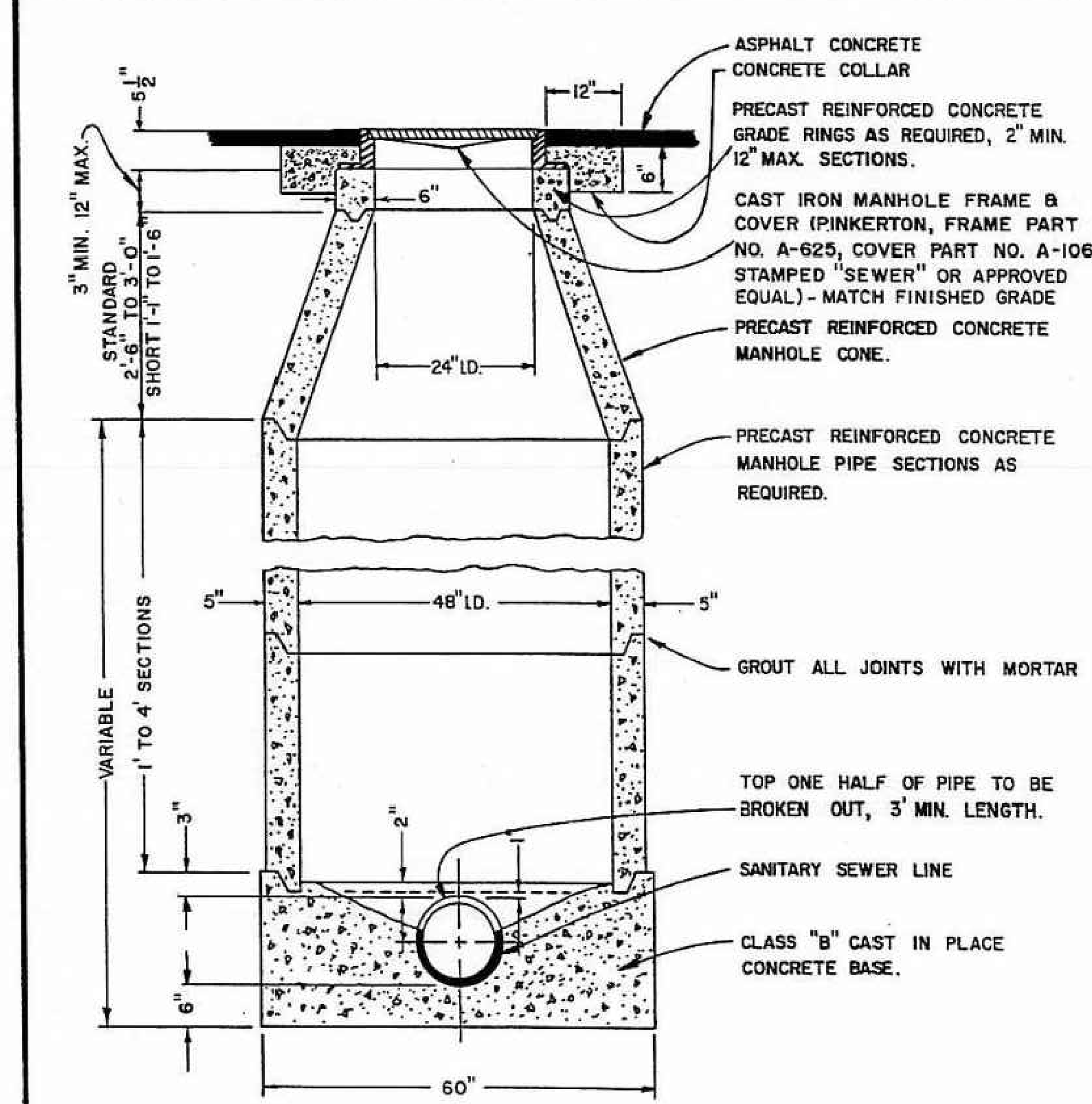
DATE:	JAN. 2012	STORM DRAIN MANHOLE 12" THRU 33" DIA. PIPES	APPROVED: 3-6-13	
DRAWN BY:	S. FOX		DIRECTOR OF PUBLIC WORKS	
CHECKED BY:	K. KIM	CITY OF MANTECA		D-1
SCALE:	NOT TO SCALE	PUBLIC WORKS DEPARTMENT		



NOTES

1. EXPOSED SURFACES OF THE FRAMES, HOODS, AND GRATES, WITH THE PARTS ASSEMBLED AND DISASSEMBLED, SHALL BE PAINTED WITH COMMERCIAL QUALITY ASPHALT PAINT AFTER TESTING AND ASSEMBLY, OR GALVANIZED.
2. FRAME, SIDE INLET, AND GRATE SHALL CONFORM TO SOUTH BAY FOUNDRY 645 FRAME, 645-B HOOD, AND 1903 GRATE WITH CHAIN, OR APPROVED EQUAL.
3. GRATE SHALL BE CHAINED TO FRAME.
4. GRATE SHALL BE DEPRESSED 1" BELOW GUTTER PROFILE GRADE.
5. 24" PIPE BARREL SHALL BE CLASS III R.C.P.
6. 3/4" HOT DIPPED GALVANIZED STEEL BAR.
7. INSTALL STORM DRAIN MARKER PER CITY STANDARD D-7.

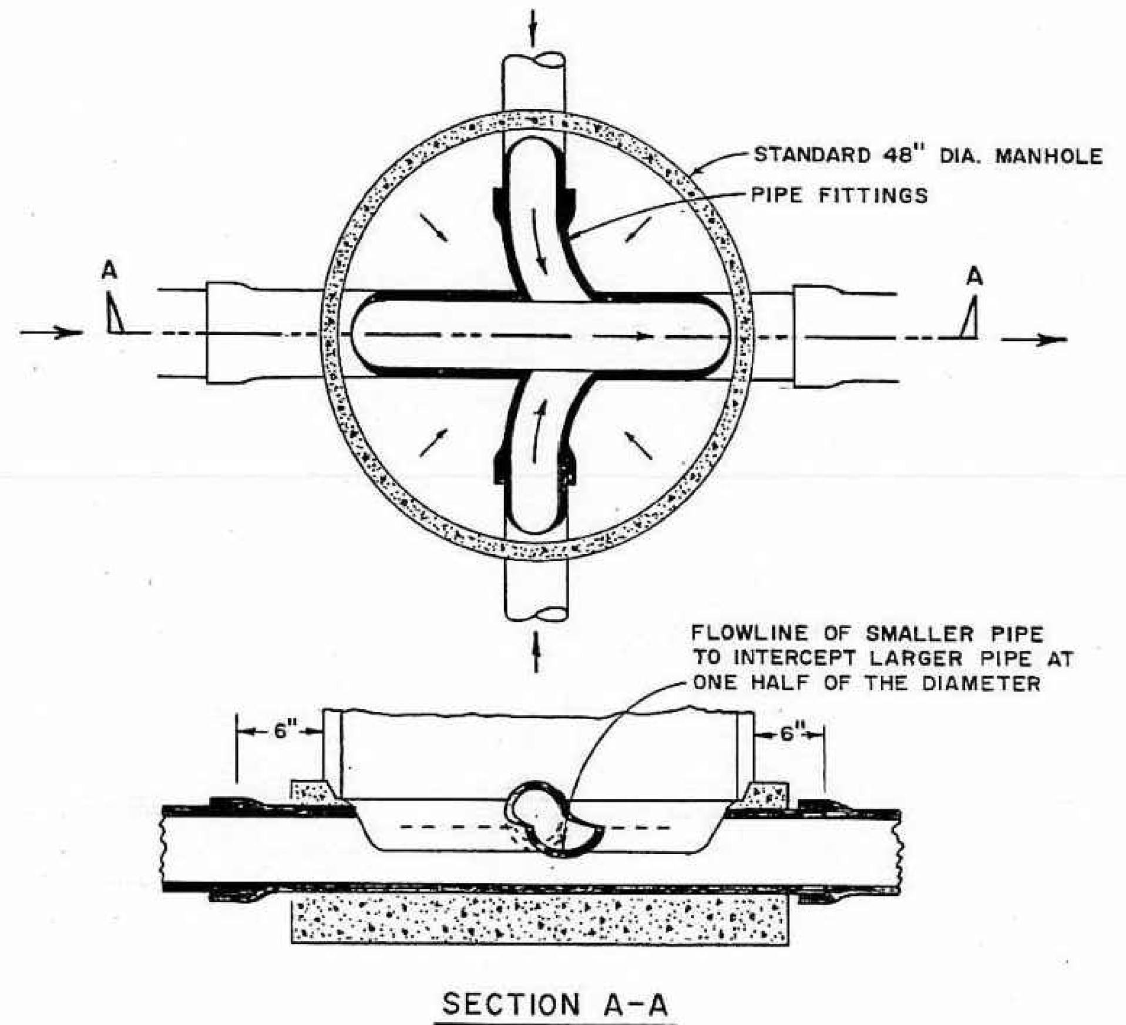
DATE:	JAN. 2012	CURB INLET TYPE I	APPROVED: 3-6-13	
DRAWN BY:	S. FOX		DIRECTOR OF PUBLIC WORKS	
CHECKED BY:	K. KIM	CITY OF MANTECA		D-4
SCALE:	NOT TO SCALE	PUBLIC WORKS DEPARTMENT		



NOTES:

1. PRECAST REINFORCED CONCRETE MANHOLE UNIT SHALL CONFORM TO A.S.T.M. C-478.
2. PIPE JOINT SHALL BE WITHIN 6 INCHES OF OUTER WALLS OF MANHOLE.
3. MANHOLE BASE TO BE TROWELED SMOOTH INSIDE.
4. MANHOLE SHALL BE CLEANED IN ACCORDANCE WITH CITY OF MANTECA SPECIFICATIONS.
5. SHORT CONE TO BE USED ONLY WHEN MANHOLE DEPTH JUSTIFIES.
6. COLLAR SHALL BE CLASS "B" CONCRETE AND CONSTRUCTED 2 1/2 INCHES BELOW FINISHED GRADE.

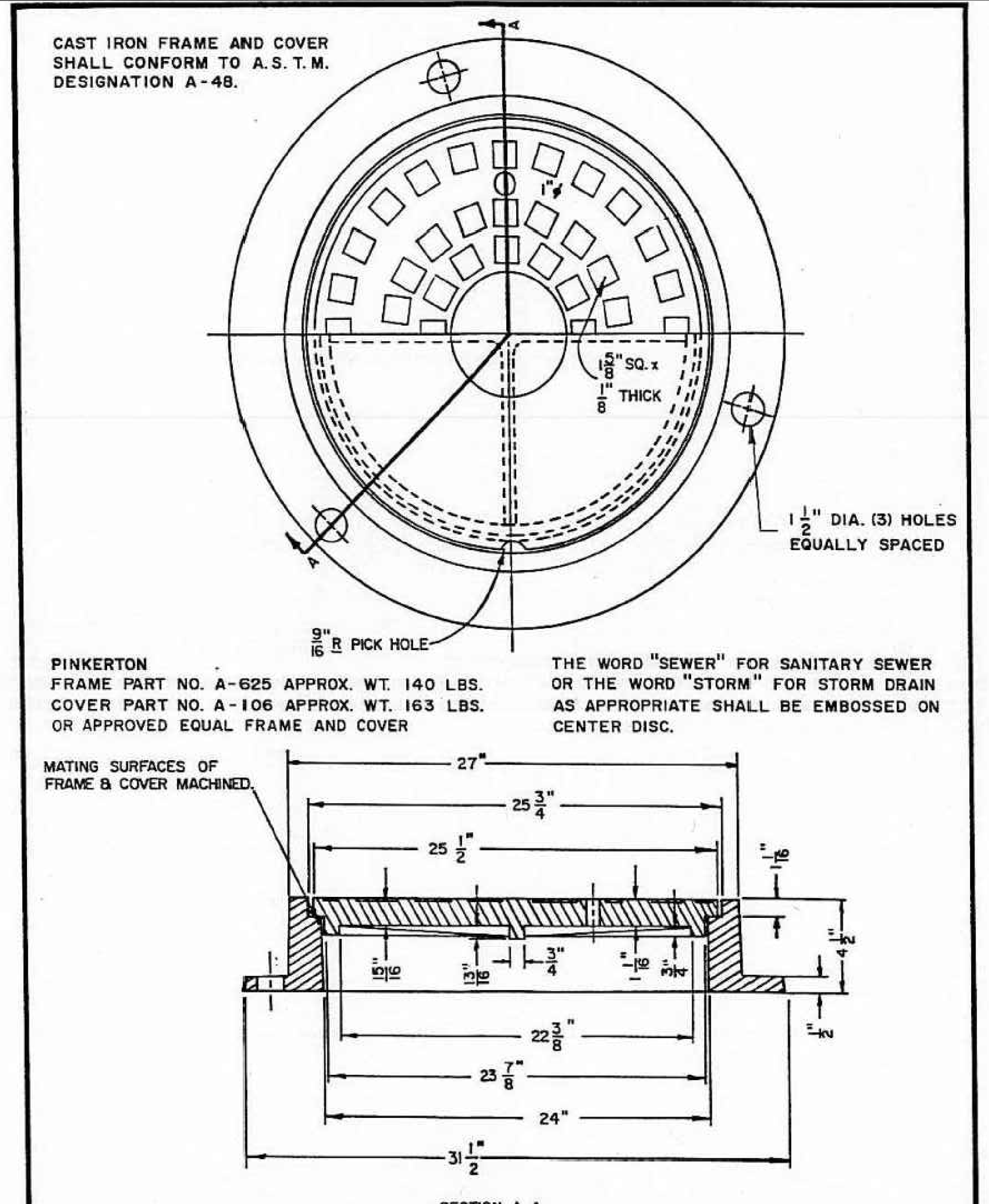
NO.	REVISED	BY	SANITARY SEWER MANHOLE 6" THRU 33" DIA. PIPES	APPROVED BY: DIRECTOR OF PUBLIC WORKS	
DRAWN BY:	C. SABERTON		CITY OF MANTECA	DRAWING NO.	S-3
CHECKED BY:	J. PODESTA		DEPARTMENT OF PUBLIC WORKS	DATE: JAN 1988	
SCALE:	NONE				



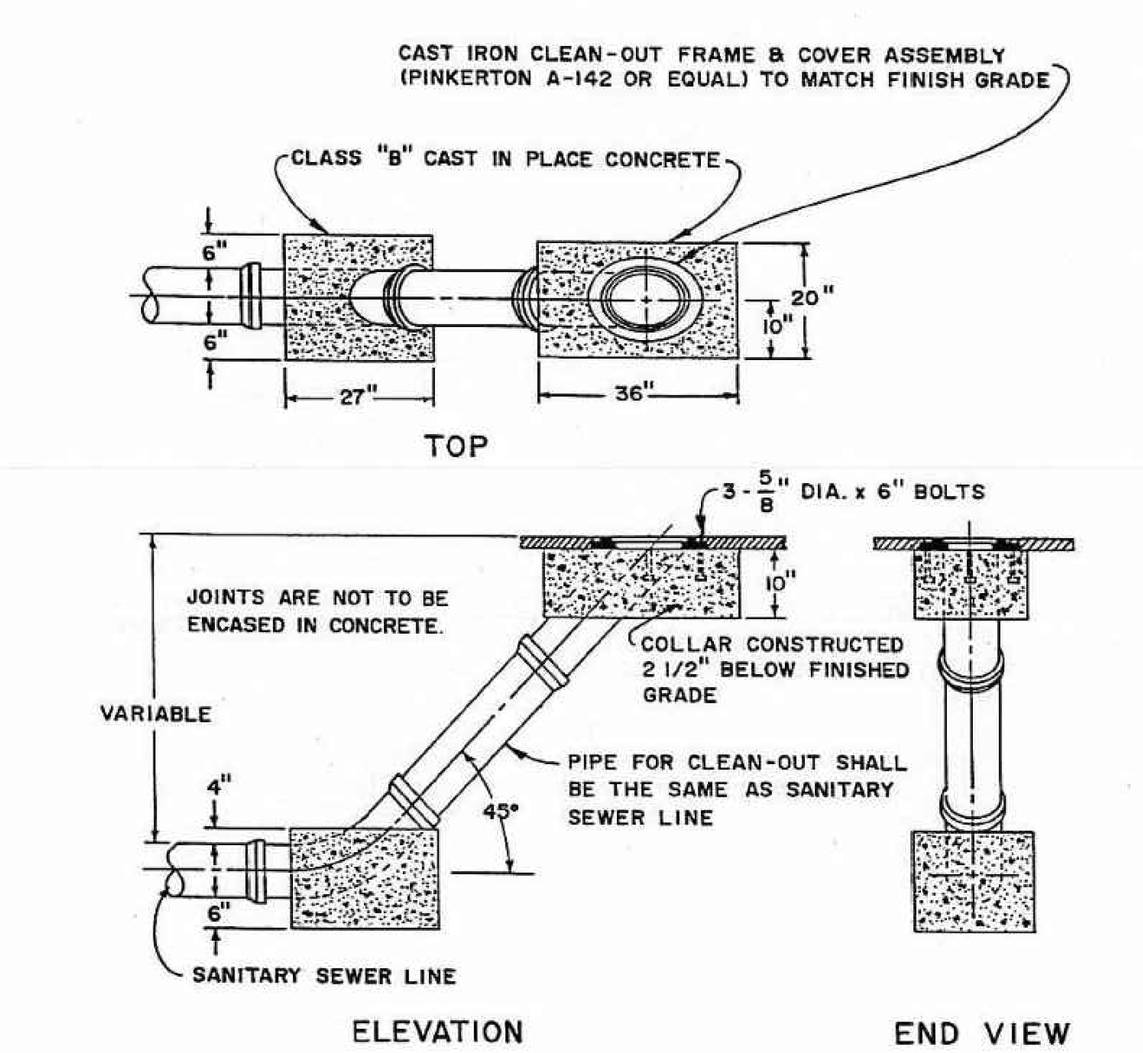
NOTES:

1. CLAY PIPE FITTINGS WITH TOP HALF BROKEN OUT IS REQUIRED FOR TROUGH.
2. TROUGHS WITHIN MANHOLE SHALL BE FULLY ACCESSIBLE.
3. MANHOLE SHALL BE CLEANED OF ALL EXCESS MATERIALS.
4. CONCRETE TROUGH CONSTRUCTED INTO BASE OF MANHOLE MAY BE USED WITH THE APPROVAL OF THE CITY ENGINEER.
5. ALL OTHER MANHOLE REQUIREMENTS AS PER STANDARD SANITARY SEWER MANHOLE DETAIL.

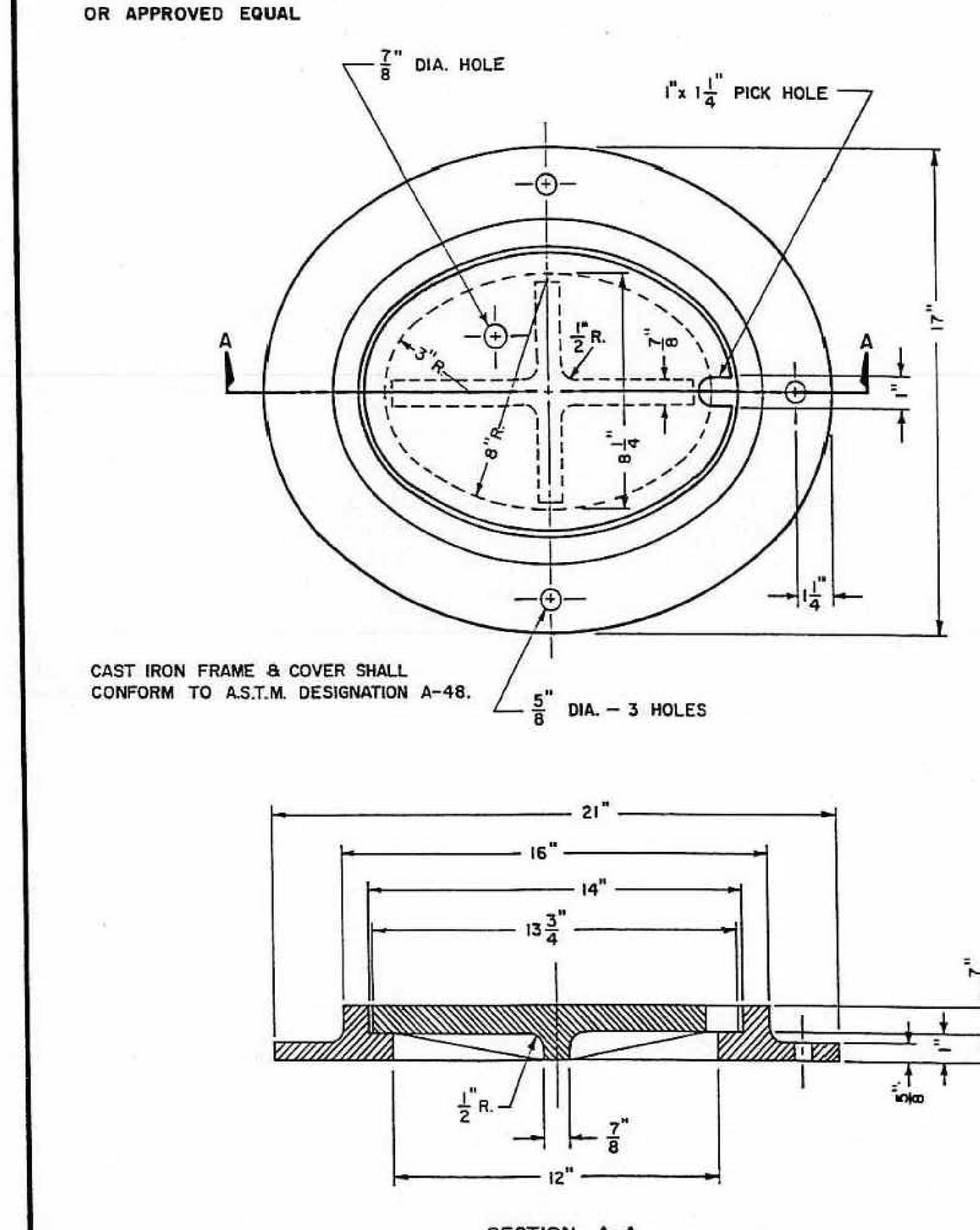
NO.	REVISED	BY	INTERSECTION FOR 24" DIA. PIPE & SMALLER	APPROVED BY: DIRECTOR OF PUBLIC WORKS	
DRAWN BY:	J. HULSEY		CITY OF MANTECA	DRAWING NO.	S-5
CHECKED BY:	J. PODESTA		DEPARTMENT OF PUBLIC WORKS	DATE: JAN. 1988	
SCALE:	NONE				



NO.	REVISED	BY	MANHOLE FRAME AND COVER ASSEMBLY	APPROVED BY: DIRECTOR OF PUBLIC WORKS	
1	MANHOLE FRAME	DRK			
DRAWN BY:	C. SABERTON		CITY OF MANTECA	DRAWING NO.	S-8
CHECKED BY:	J. PODESTA		DEPARTMENT OF PUBLIC WORKS	DATE: JAN 1988	
SCALE:	NONE				



NO.	REVISED	BY	MAIN LINE CLEAN-OUT	APPROVED BY: DIRECTOR OF PUBLIC WORKS	
DRAWN BY:	B. CANTU		CITY OF MANTECA	DRAWING NO.	S-10
CHECKED BY:	J. PODESTA		DEPARTMENT OF PUBLIC WORKS	DATE: JAN. 1988	
SCALE:	NONE				



NO.	REVISED	BY	MAIN CLEAN-OUT FRAME AND COVER ASSEMBLY	APPROVED BY: DIRECTOR OF PUBLIC WORKS	
DRAWN BY:	B. CANTU		CITY OF MANTECA	DRAWING NO.	S-11
CHECKED BY:	J. PODESTA		DEPARTMENT OF PUBLIC WORKS	DATE: JAN 1988	
SCALE:	NONE				

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED CE
DRAWN CE
CHECKED TR
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

TYPICAL DETAILS

CIVIL 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

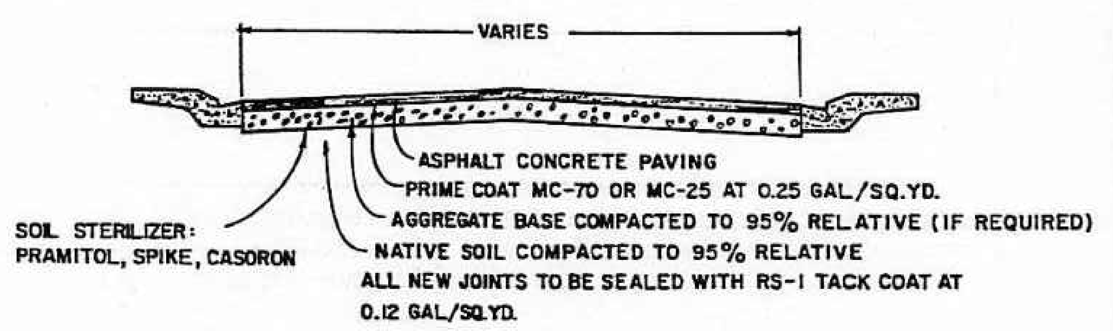
JOB NO. 202645
DRAWING NO. 00TC002
SHEET NO. 220 OF 239

LAST SAVED BY: gleal

PROJECT NO. 202645-100000 FILE NAME: 202645_00TC002.dwg

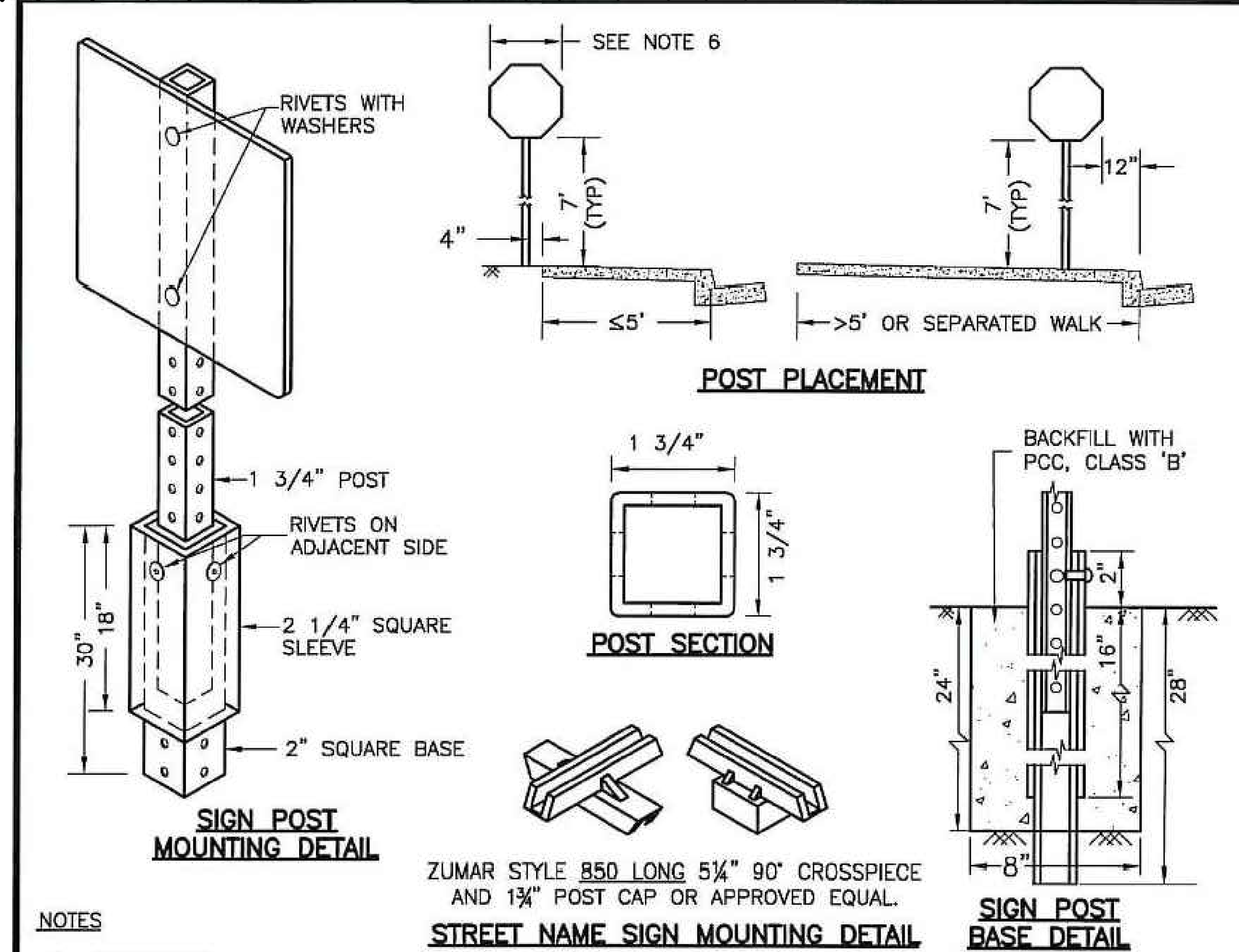
PAVEMENT DESIGN CHART

STREET NAME	TRAFFIC INDEX	SOIL R-VALUE	ADJUSTED R-VALUE	A.B. THICKNESS	A.C. THICKNESS	LIFT & THICKNESS



1. SOIL STERILIZER SHALL BE APPLIED WHEN ASPHALT CONCRETE PAVING IS PLACED DIRECTLY ON NATIVE MATERIAL ONLY.
2. PAVEMENT STRUCTURAL DESIGN SHALL BE BASED UPON "THE FLEXIBLE PAVEMENT STRUCTURAL SECTION DESIGN GUIDE FOR CALIFORNIA CITIES AND COUNTIES", AS MODIFIED IN CITY RESOLUTION NO. R5633.
3. CONSTRUCTION SHALL CONFORM WITH THE LATEST STANDARD SPECIFICATION OF THE STATE OF CALIFORNIA.
   ASPHALT CONCRETE SHALL BE TYPE "B"
   AGGREGATE BASE SHALL BE CLASS "2"
4. BASE SHALL BE WATERED AND COMPACTED PURSUANT TO STATE SPECIFICATIONS EXCEPT-95% TO 0.5 FEET BELOW FINISHED SUBGRADE-90% TO 2.5 FEET BELOW FINISHED SUBGRADE.
5. PRIME COAT SHALL BE APPLIED WHEN ASPHALT CONCRETE PAVING IS PLACED ON AGGREGATE BASE MATERIAL ONLY.

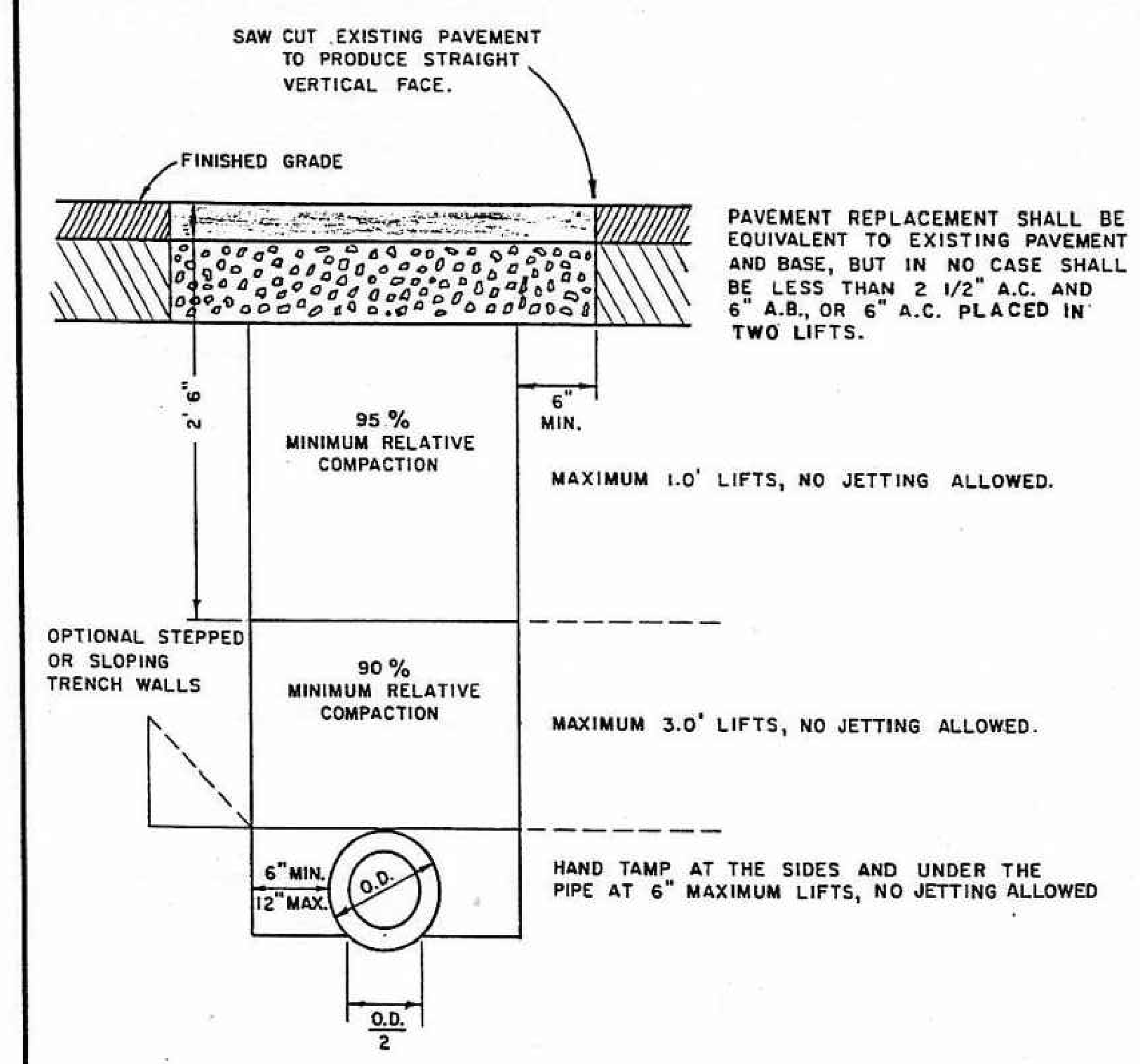
PAVEMENT DESIGN CHART AND STREET CROSS SECTION
CITY OF MANTECA — DEPARTMENT OF PUBLIC WORKS
DRAWN BY: J. HULSEY | CHECKED BY: J. PODESTA | SCALE: NONE | APPROVED BY: DIRECTOR OF PUBLIC WORKS | DRAWING NO. ST-14 | DATE: JAN. 1988



NOTES

1. MATERIALS:
   - POST – 1 3/4" SQUARE WITH ROUNDED CORNERS, 14 GA. GALV. HIGH STRENGTH RAIL STEEL ASTM A715, GRADE 60. (TELESPAR PART # 16D12-PG OR APPROVED EQUAL.) GALVANIZED POST FINISH SHALL CONFORM TO ASTM A525 G90 COATING.
   - POST BASE ANCHOR – 30" LONG X 2" SQUARE 12 GA. GALV. STEEL (TELESPAR PART # 20F12A2.5 OR APPROVED EQUAL.)
   - POST BASE SLEEVE – 18" LONG X 2 1/4" SQUARE 12 GA. GALV. STEEL (TELESPAR PART # TEL-22F12-A OR APPROVED EQUAL.)
   - SIGN FACE – SHALL BE REFLECTIVE AND PLACED ON .080" MINIMUM THICKNESS ALUMINUM WITH 3M HIGH-INTENSITY GRADE PRISMATIC REFLECTIVE SHEETING SERIES 3930 OR APPROVED EQUAL.
2. STREET NAME SIGNS SHALL BE MOUNTED ON STREET LIGHT POLES IN CONFORMANCE WITH CITY STANDARD ST-18 WHEREVER POSSIBLE.
3. STREET NAME SIGN LOCATION SUBJECT TO CITY ENGINEER APPROVAL.
4. SIGN POLES SHALL BE SET PRIOR TO NEW SIDEWALK CONSTRUCTION.
5. SIGNS SHALL CONFORM TO CALTRANS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. STOP SIGN DIMENSION:
   - TWO (2) LANE ROADWAY: 30"X30" MIN.
   - FOUR (4) LANES OR MORE: 36"X36" MIN.

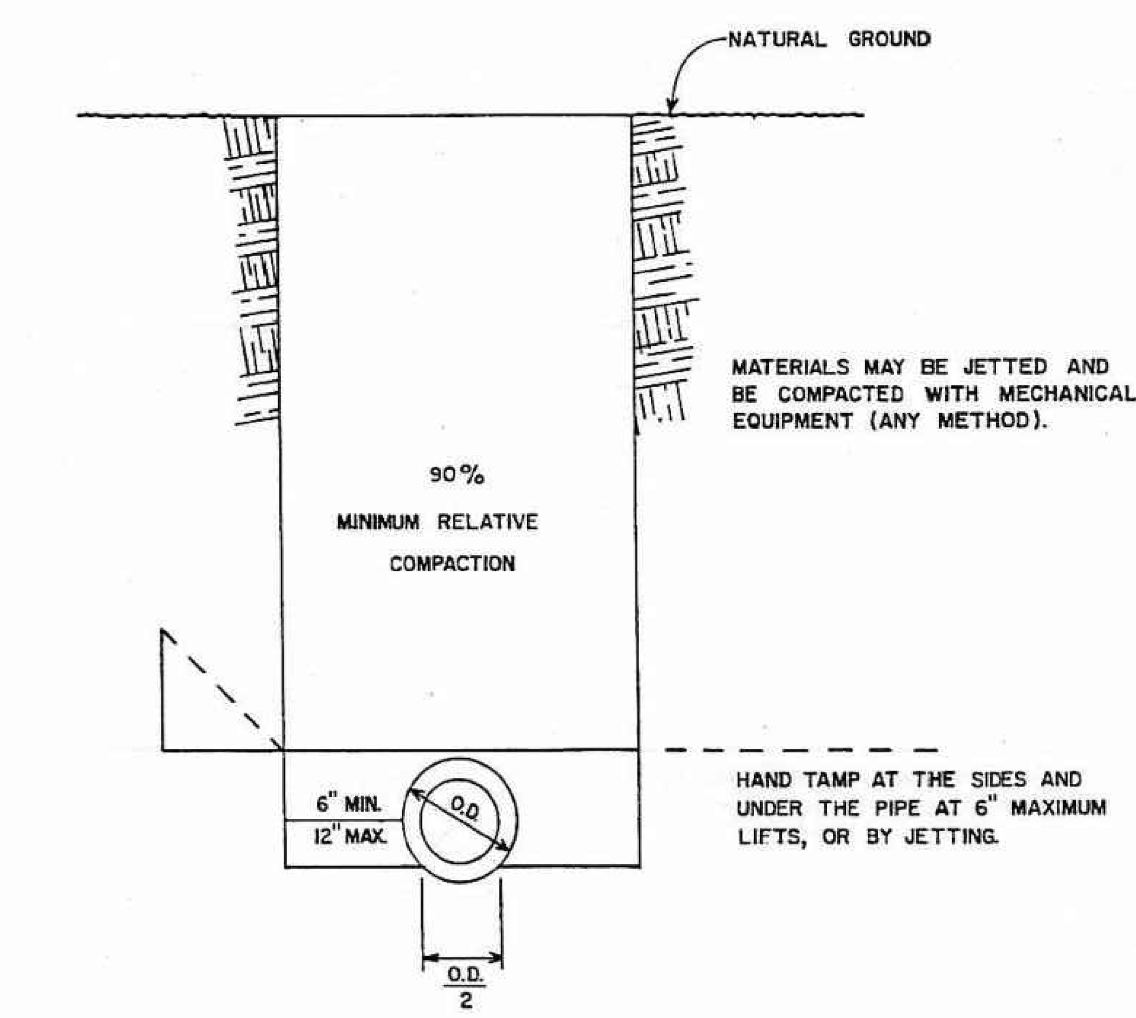
TRAFFIC, PARKING, AND STREET NAME SIGNS
CITY OF MANTECA — PUBLIC WORKS DEPARTMENT
DATE: 9-2-2009 | DRAWN BY: J.R. | CHECKED BY: M.M. | SCALE: N.T.S. | APPROVED: DIRECTOR OF PUBLIC WORKS | ST-19



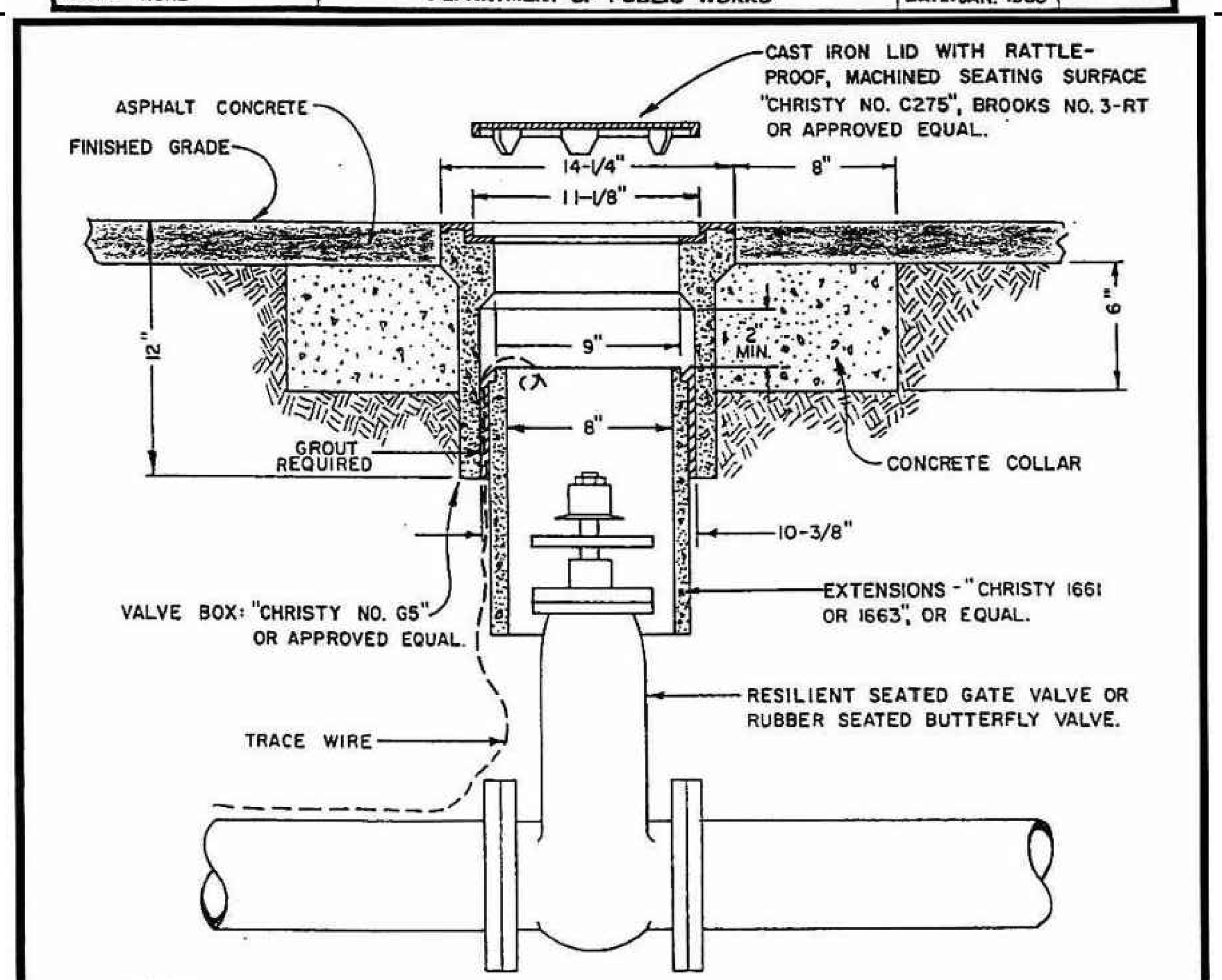
NOTES:

1. ANY AREA AT THE BOTTOM OF THE TRENCH DETERMINED TO BE UNSUITABLE BY THE ENGINEER SHALL BE REMOVED AND REPLACED WITH DRAIN ROCK (1-1/2" X 3/4" OR 2-1/2" X 1-1/2").
2. SELECTED NATIVE MATERIAL MAY BE USED IN ALL TRENCH BACKFILL ZONES AND SHALL BE FREE OF ORGANIC MATERIAL, STONES, OR LUMPS EXCEEDING 3" IN GREATEST DIMENSION.
3. COMPACTION TESTING SHALL BE REQUIRED AS DIRECTED BY THE CITY ENGINEER.

TRENCH BACKFILL IN EXISTING STREETS
CITY OF MANTECA — DEPARTMENT OF PUBLIC WORKS
DRAWN BY: A. MENOR | CHECKED BY: J. PODESTA | SCALE: NONE | APPROVED BY: DIRECTOR OF PUBLIC WORKS | DRAWING NO. U-5 | DATE: JAN. 1988



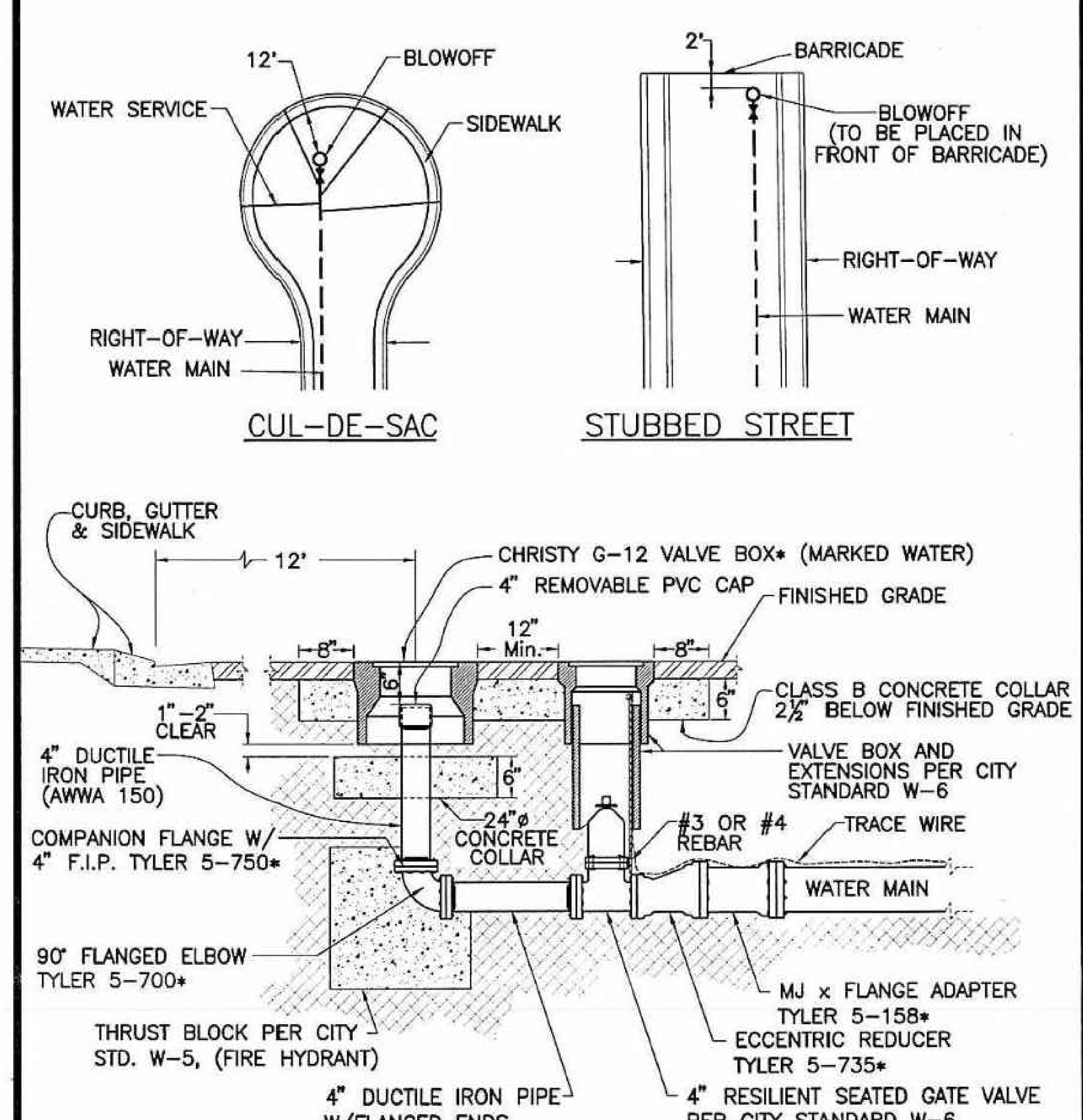
TRENCH BACKFILL OUTSIDE STREET AREAS (P.U.E.)
CITY OF MANTECA — DEPARTMENT OF PUBLIC WORKS
DRAWN BY: A. MENOR | CHECKED BY: J. PODESTA | SCALE: NONE | APPROVED BY: DIRECTOR OF PUBLIC WORKS | DRAWING NO. U-6 | DATE: JAN. 1988



NOTES:

1. VALVE BOX AND LID SHALL BE "CHRISTY NO. G5" AND "CHRISTY NO. C275", BROOKS NO. 3-RT, OR EQUALS.
2. ALL LIDS SHALL HAVE MACHINE SEATING SURFACES.
3. EXTENSIONS SHALL BE AS MANUFACTURED FOR THE VALVE BOX SUPPLIED OR A.C. PIPE OF CORRECT SIZE MAY BE USED.
4. CONCRETE COLLAR SHALL BE OF CLASS "B" CONCRETE AND SHALL BE CONSTRUCTED 2 1/2 INCHES BELOW FINISHED GRADE.
5. RESILIENT SEATED GATE VALVE SHALL BE MUELLER, KENNEDY, AMERICAN AVK CO., OR APPROVED EQUAL.
6. RESILIENT SEATED GATE VALVE SHALL HAVE A NON-RISING STEM AND CONFORM TO A.W.W.A. STANDARD C509 OF LATEST REVISION.
7. RUBBER SEATED BUTTERFLY VALVE SHALL BE DRESSER 450, MUELLER B3211 OR APPROVED EQUAL.
8. RUBBER SEATED BUTTERFLY VALVE SHALL CONFORM TO A.W.W.A. STANDARD C504 OF LATEST REVISION.
9. RUBBER SEATED BUTTERFLY VALVES SHALL BE USED FOR PIPE SIZES LARGER THAN 12 INCHES.

STANDARD VALVE BOX
CITY OF MANTECA — DEPARTMENT OF PUBLIC WORKS
REVISED: 4, OCT. 2003, JH | DRAWN BY: C. SABERTON | CHECKED BY: J. PODESTA | SCALE: NONE | APPROVED BY: DIRECTOR OF PUBLIC WORKS | DRAWING NO. W-6 | DATE: JAN. 1988



*OR APPROVED EQUAL

BELOW GRADE WATER LINE BLOW-OFF
CITY OF MANTECA — DEPARTMENT OF PUBLIC WORKS
REVISED: 1, JULY, 1999, JR | DRAWN BY: J. KOESTER | CHECKED BY: J. PODESTA | SCALE: NONE | APPROVED BY: DIRECTOR OF PUBLIC WORKS | DRAWING NO. W-7 | DATE: JAN. 1988

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED: CE | DRAWN: CE | CHECKED: TR | DATE: JANUARY 2025

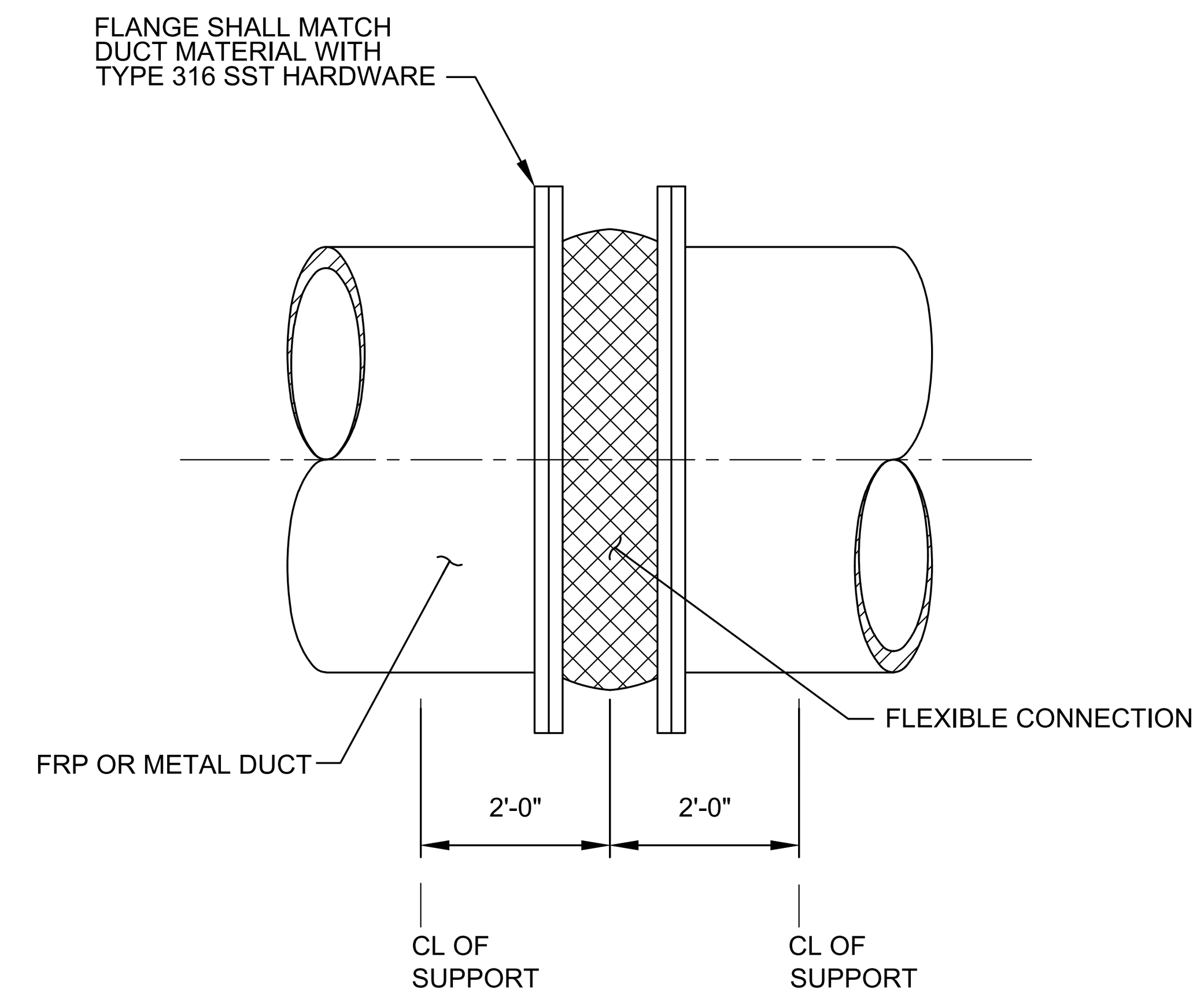
REGISTERED PROFESSIONAL ENGINEER — RYAN A. HOOK — No. 68462 — CIVIL — STATE OF CALIFORNIA

carollo®

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT
TYPICAL DETAILS
CIVIL 3

VERIFY SCALES — BAR IS ONE INCH ON ORIGINAL DRAWING — 0 — 1" — IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645 | DRAWING NO. 00TC003 | SHEET NO. 221 OF 239

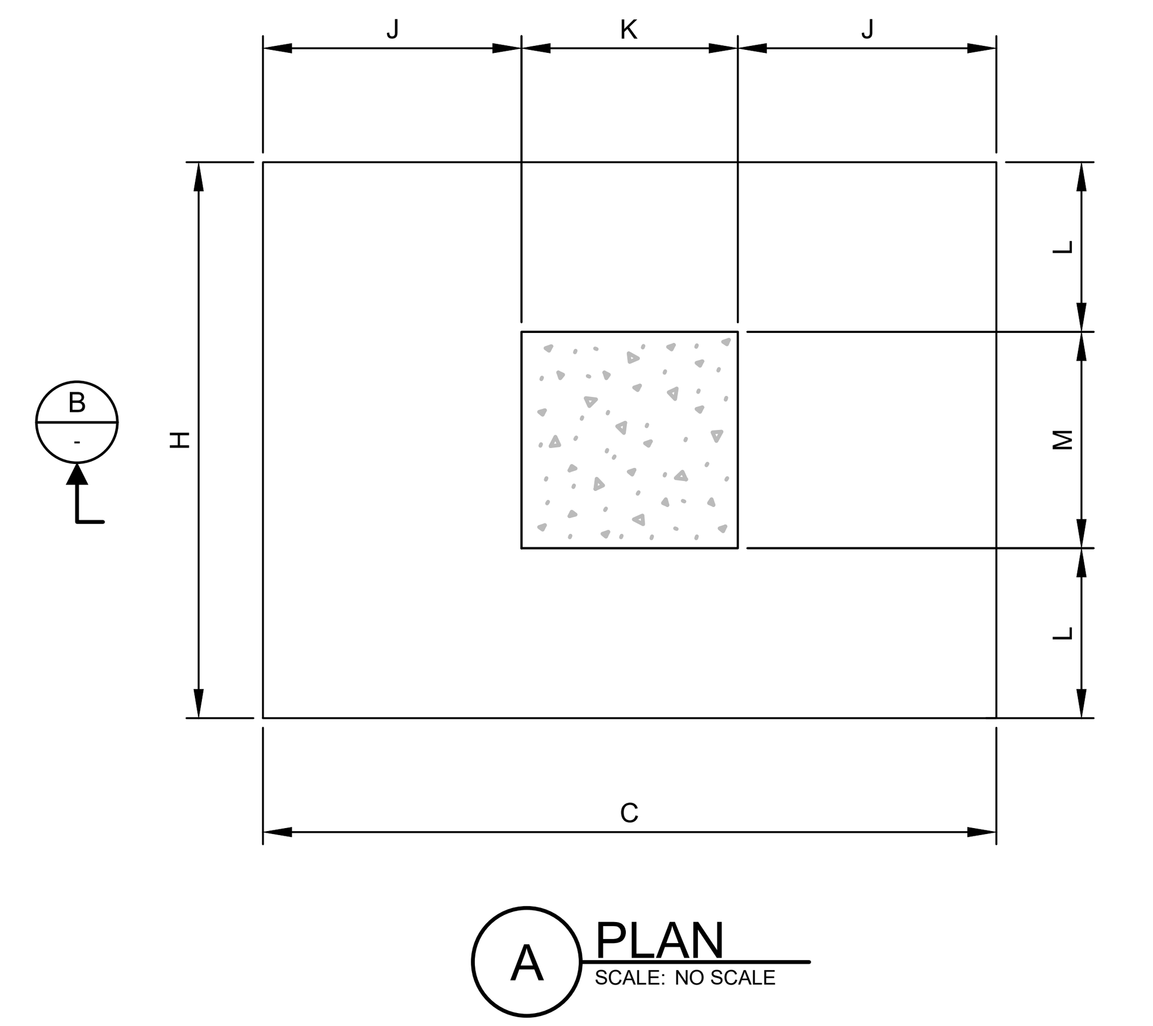


NOTE:

1. FOR FLEXIBLE CONNECTOR, TYPE FL-3 ONLY.

HA140 TYP — CONNECTION - FLEXIBLE FOR FRP OR METAL DUCT (FL-3)

5/17/18



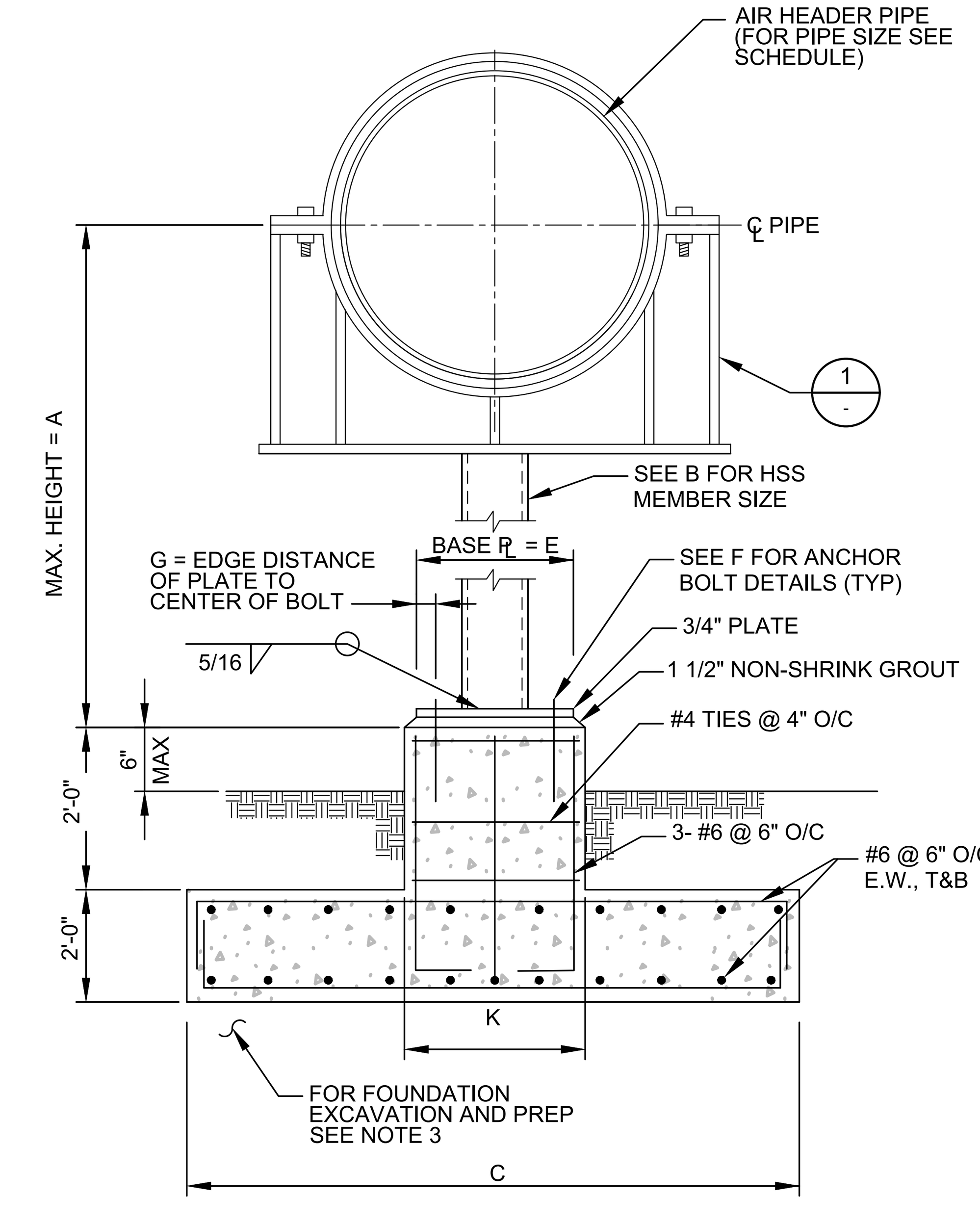
A PLAN
SCALE: NO SCALE

NOTES:

1. ALL STEEL MEMBERS, BOLTS, AND STEEL PLATES SHALL BE GALVANIZED.
2. CENTER PIPE ON CONCRETE FOUNDATION.
3. a) PROOF-ROLL THE EXPOSED EXCAVATED AREA UNTIL FIRM STABLE SOIL. REMOVE ANY SOFT OR PUMPING AREAS. GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE SHOULD OBSERVE THIS. TEST THE SUBGRADE FOR COMPACTION AND MOISTURE CONTENT.
   b) GEOTECHNICAL ENGINEER SHALL OBSERVE PRIOR TO CONCRETE PAVEMENT, COMPACT A MINIMUM OF 98% OF THE STANDARD PROCTOR, ASTM D698, TO A MOISTURE CONTENT RANGING FROM ONE PERCENTAGE POINT BELOW OPTIMUM MOISTURE TO THREE PERCENTAGE POINTS ABOVE OPTIMUM MOISTURE (-1 TO +3).

HO110 TYP — SUPPORT FOR ROUND FRP DUCT ADJUSTABLE YARD

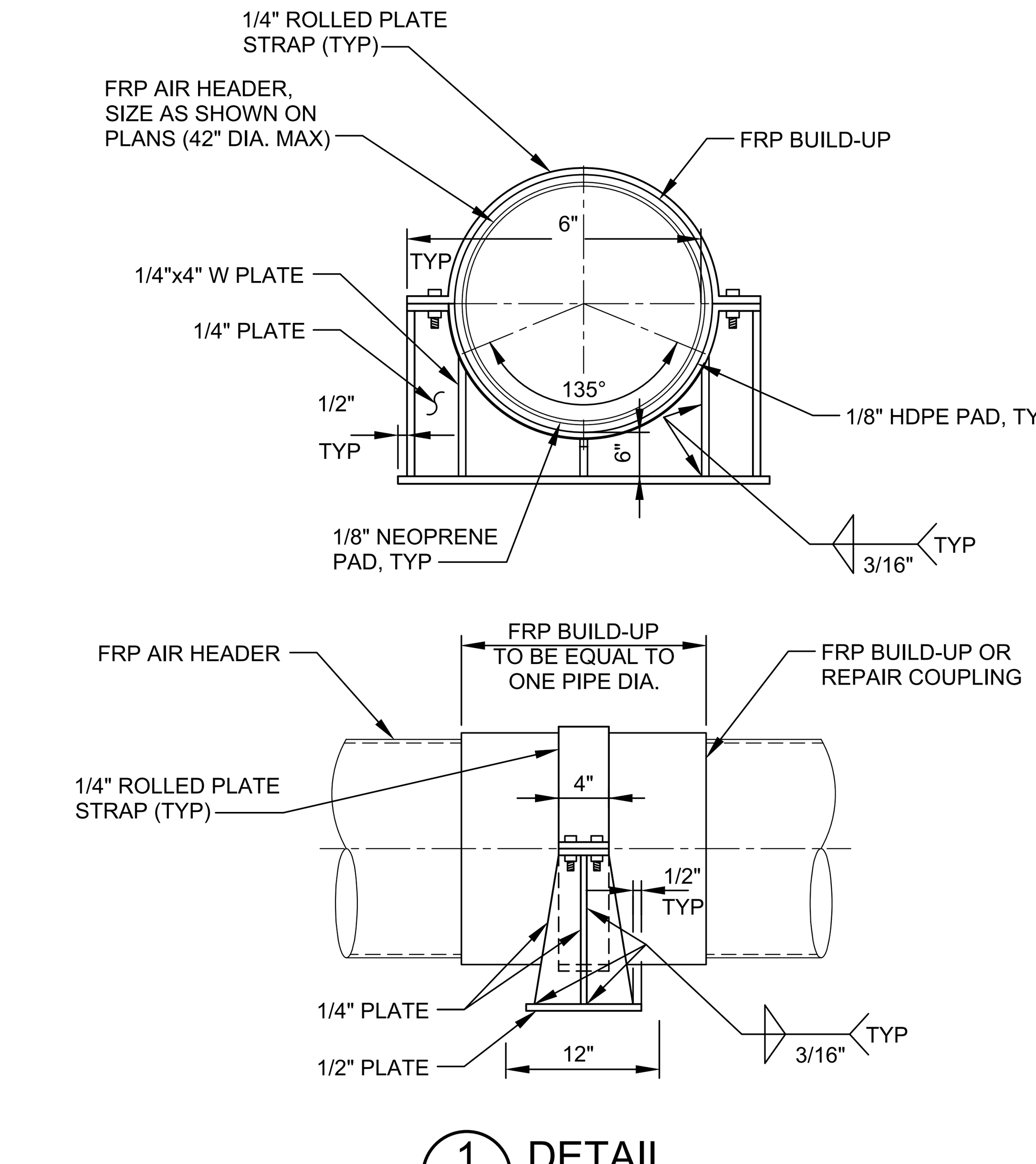
SHEET 1 OF 4 11/19/24



B SECTION
SCALE: NO SCALE

HO110 TYP — SUPPORT FOR ROUND FRP DUCT ADJUSTABLE YARD

SHEET 2 OF 4 11/19/24



1 DETAIL
SCALE: NO SCALE

NOTES:

1. ALL STEEL MEMBERS, BOLTS, AND STEEL PLATES SHALL BE GALVANIZED.

HO110 TYP — SUPPORT FOR ROUND FRP DUCT ADJUSTABLE YARD

SHEET 3 OF 4 11/19/24

PIPE SUPPORT SCHEDULE

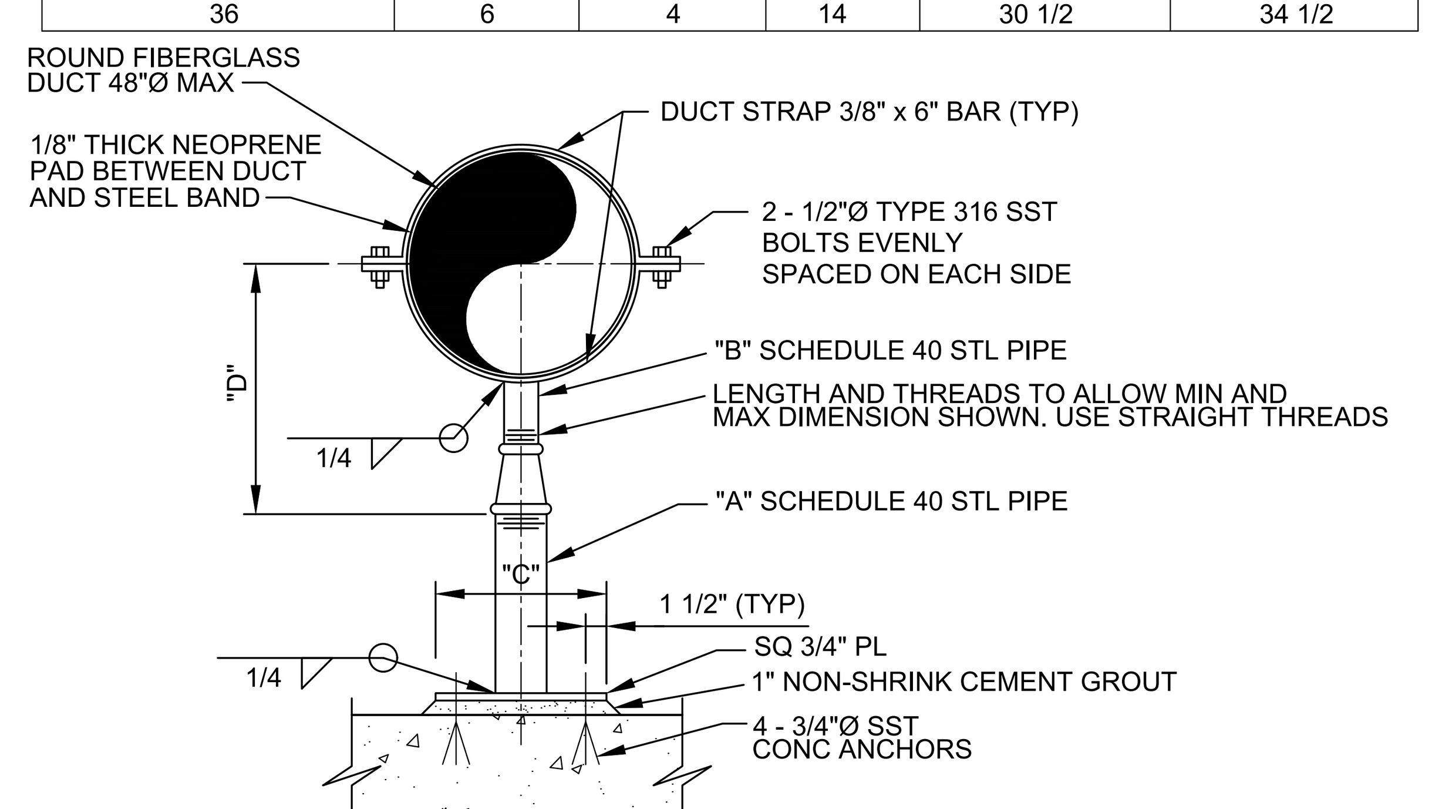
PIPE SIZE	SUPPORT SPACING	A	B	C	H	K	M	J	L	E	F	G
6"-16" Ø	20'-0" O.C.	15'-0"	HSS 8x8x1/2	4'-0"	7'-0"	1'-6"	5'-0"	1'-3"	1'-0"	1'-6" SQ	(4) 3/4" DIA. HEX HEAD ANCHOR BOLTS ASTM F1554 GR. 36 W/ 6" MIN EMBEDMENT	3" MIN
18-26" Ø	20'-0" O.C.	9'-0"	HSS 8x8x1/2	4'-0"	7'-0"	1'-6"	5'-0"	1'-3"	1'-0"	1'-6" SQ	(4) 3/4" DIA. HEX HEAD ANCHOR BOLTS ASTM F1554 GR. 36 W/ 6" MIN EMBEDMENT	3" MIN
28"-36" Ø	15'-0" O.C.	8'-0"	HSS 8x8x1/2	4'-0"	7'-0"	1'-6"	5'-0"	1'-3"	1'-0"	1'-6" SQ	(4) 3/4" DIA. HEX HEAD ANCHOR BOLTS ASTM F1554 GR. 36 W/ 6" MIN EMBEDMENT	3" MIN

HO110 TYP — SUPPORT FOR ROUND FRP DUCT ADJUSTABLE YARD

SHEET 4 OF 4 11/19/24

ADJUSTABLE PIPE SADDLE SUPPORT SCHEDULE (INCHES)

SIZE OF SUPPORTED PIPE **	PIPE SIZE "A"	PIPE SIZE "B"	"C"	"D" MINIMUM	"D" MAXIMUM
6	3	2 1/2	12	10 1/2	15 1/2
8	3	2 1/2	12	11 1/2	16 1/2
10	3	2 1/2	12	13 1/2	18 1/2
12	3	2 1/2	12	15	19 1/2
14	4	3	12	16 1/2	20 1/2
16	4	3	12	17 1/2	22 1/2
18	6	3 1/2	14	19 1/2	24
20	6	3 1/2	14	21	25 1/2
24	6	4	14	23 1/2	28 1/2
30	6	4	14	27	31 1/2
32	6	4	14	28 1/2	32 1/2
36	6	4	14	30 1/2	34 1/2

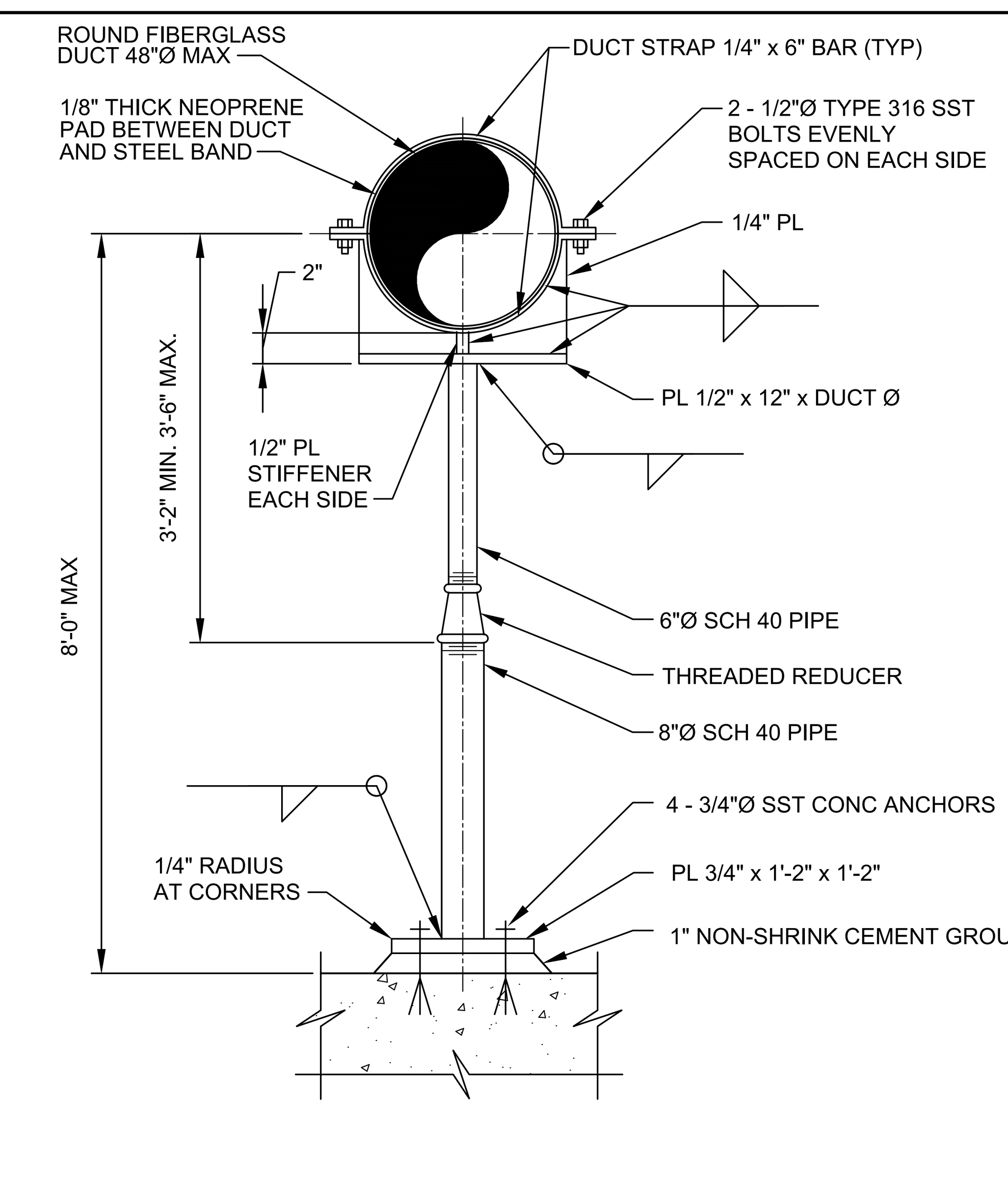


NOTES:

1. HOT-DIP GALVANIZED SUPPORT AFTER FABRICATION.
2. * = USE 2 1/2" SUPPORTS FOR PIPES LESS THEN 2 1/2"Ø.
3. ** = NOMINAL PIPE SIZE.

HO116 TYP — SUPPORT FOR ROUND FRP DUCT - ADJUSTABLE SHORT POST

2/5/19

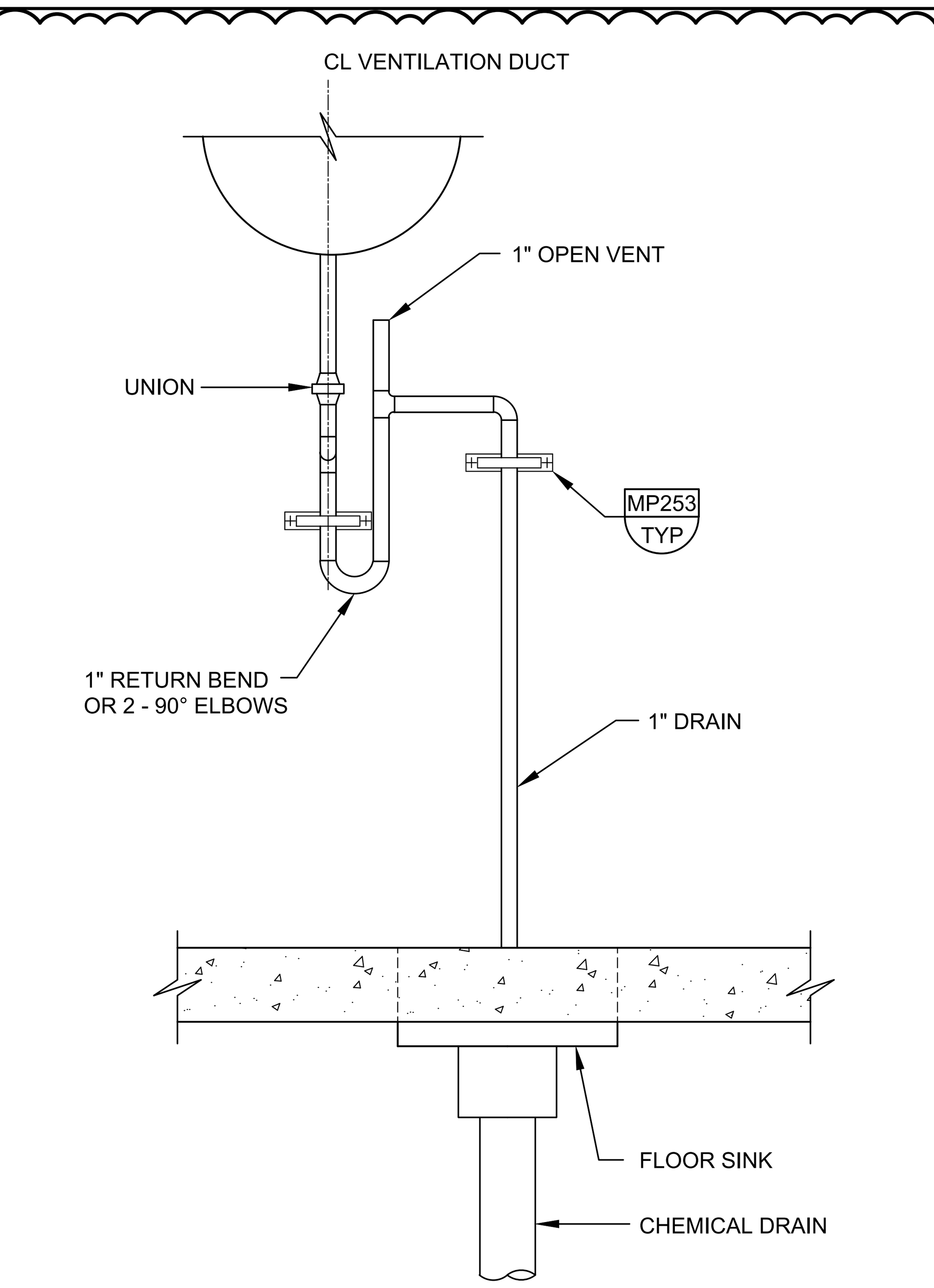


NOTES:

1. DUCT SUPPORT SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
2. MAXIMUM VERTICAL LOAD = 1000 POUNDS.

HO122 TYP — SUPPORT FOR ROUND FRP DUCT - ADJUSTABLE TALL POST

3/12/19



HO710 TYP — CONDENSATE DRAIN FOR FRP DUCT - 1" DIAMETER

12/18/2023

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED: CE
DRAWN: CE
CHECKED: WS
DATE: JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER KYLE T. LEONARD No. 86011 CIVIL STATE OF CALIFORNIA

Digitally signed by Kyle Thomas Leonard

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

TYPICAL DETAILS

HVAC 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

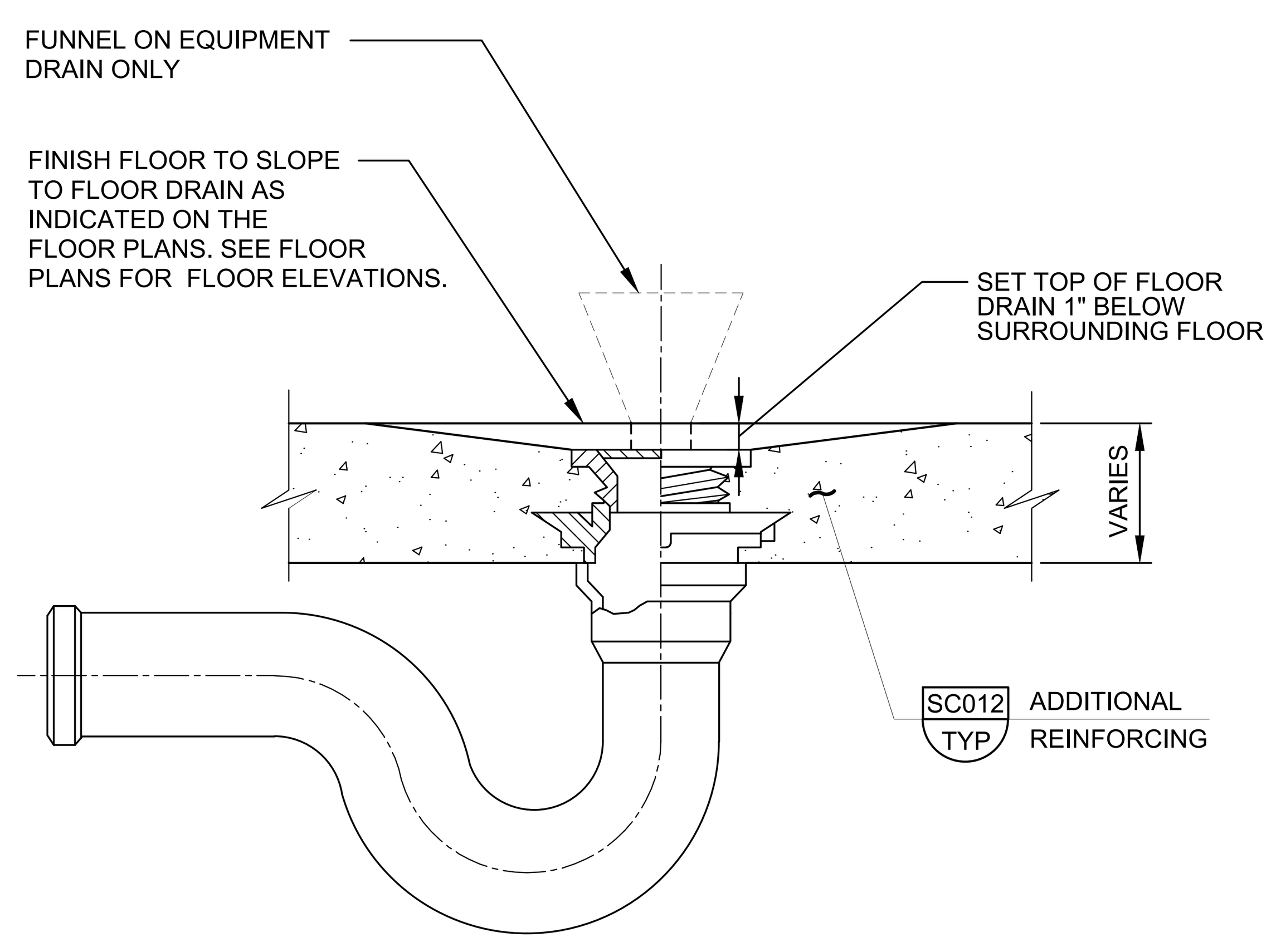
JOB NO. 202645

DRAWING NO. 00TH001

SHEET NO. 224 OF 239

PROJECT NO. 202645-100000 FILE NAME: 202645_00TH001.dwg

LAST SAVED BY: gleal

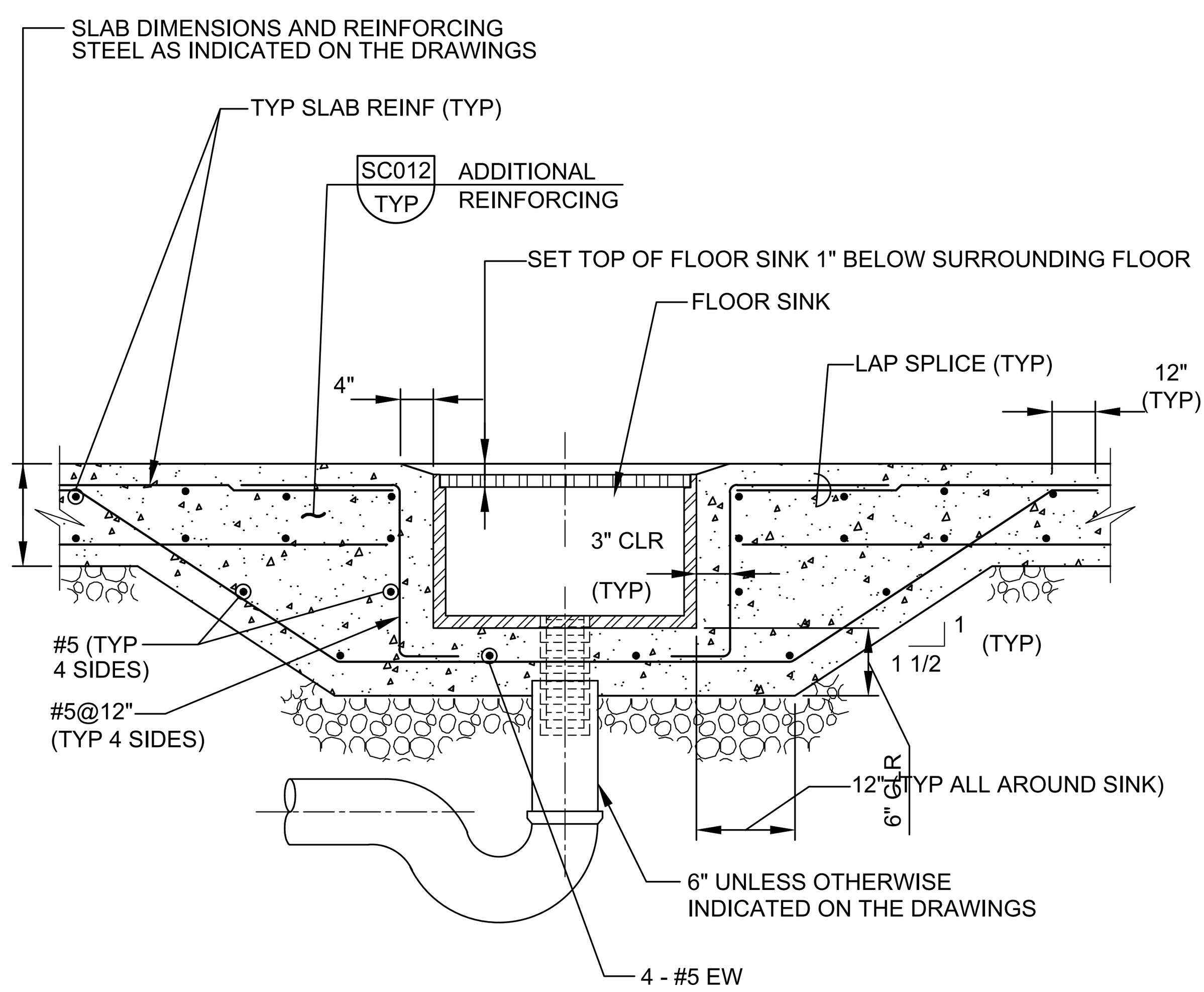


NOTE:

1. PROVIDE 12" RADIUS SLOPE TO EQUIPMENT DRAINS WHERE FLOOR DOES NOT SLOPE TO DRAIN.

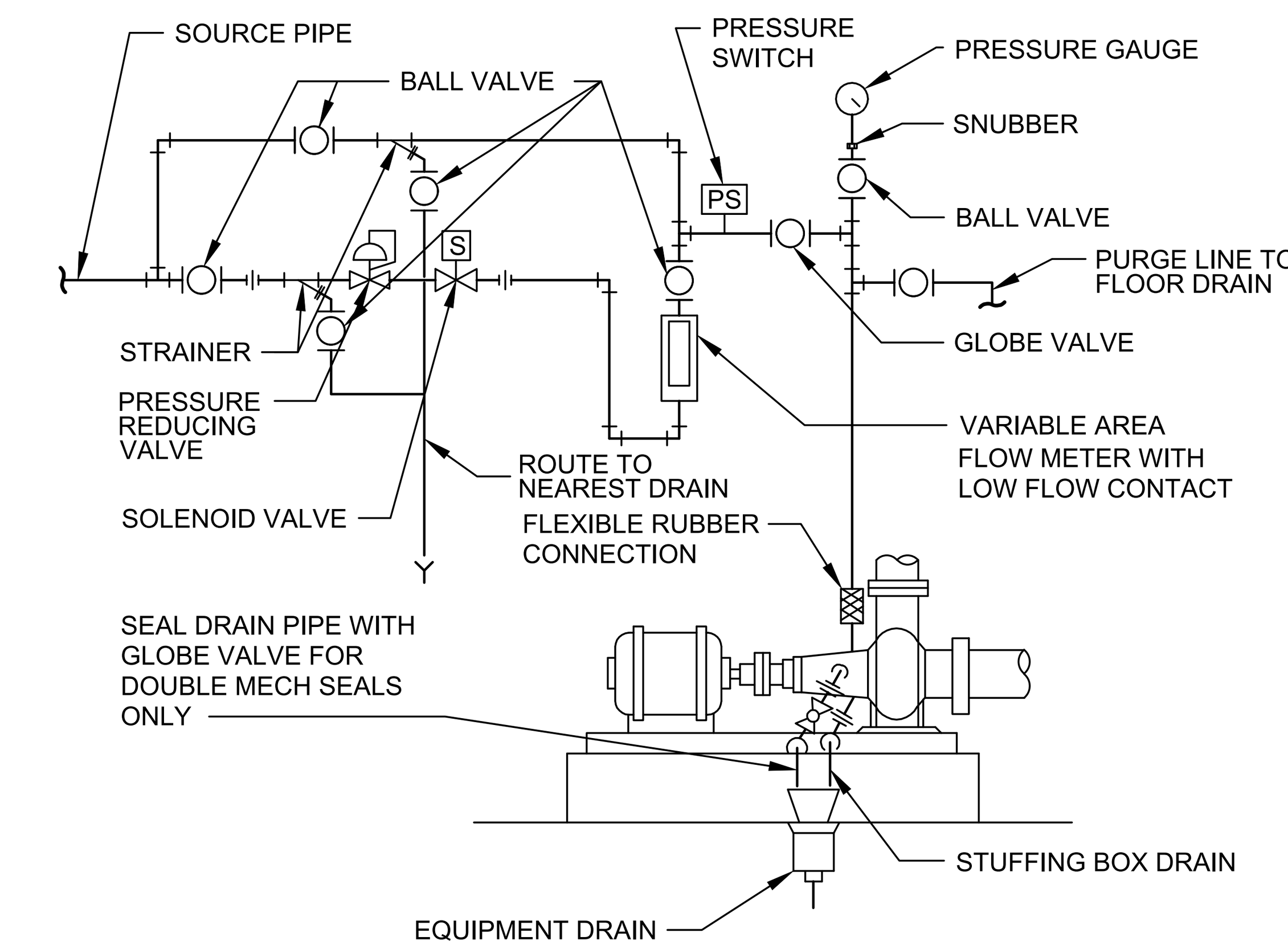
MA201 TYP DRAIN - FLOOR OR EQUIPMENT DRAIN W/ TRAP

12/18/2023



MA205 TYP DRAIN - FLOOR SINK

12/18/2023

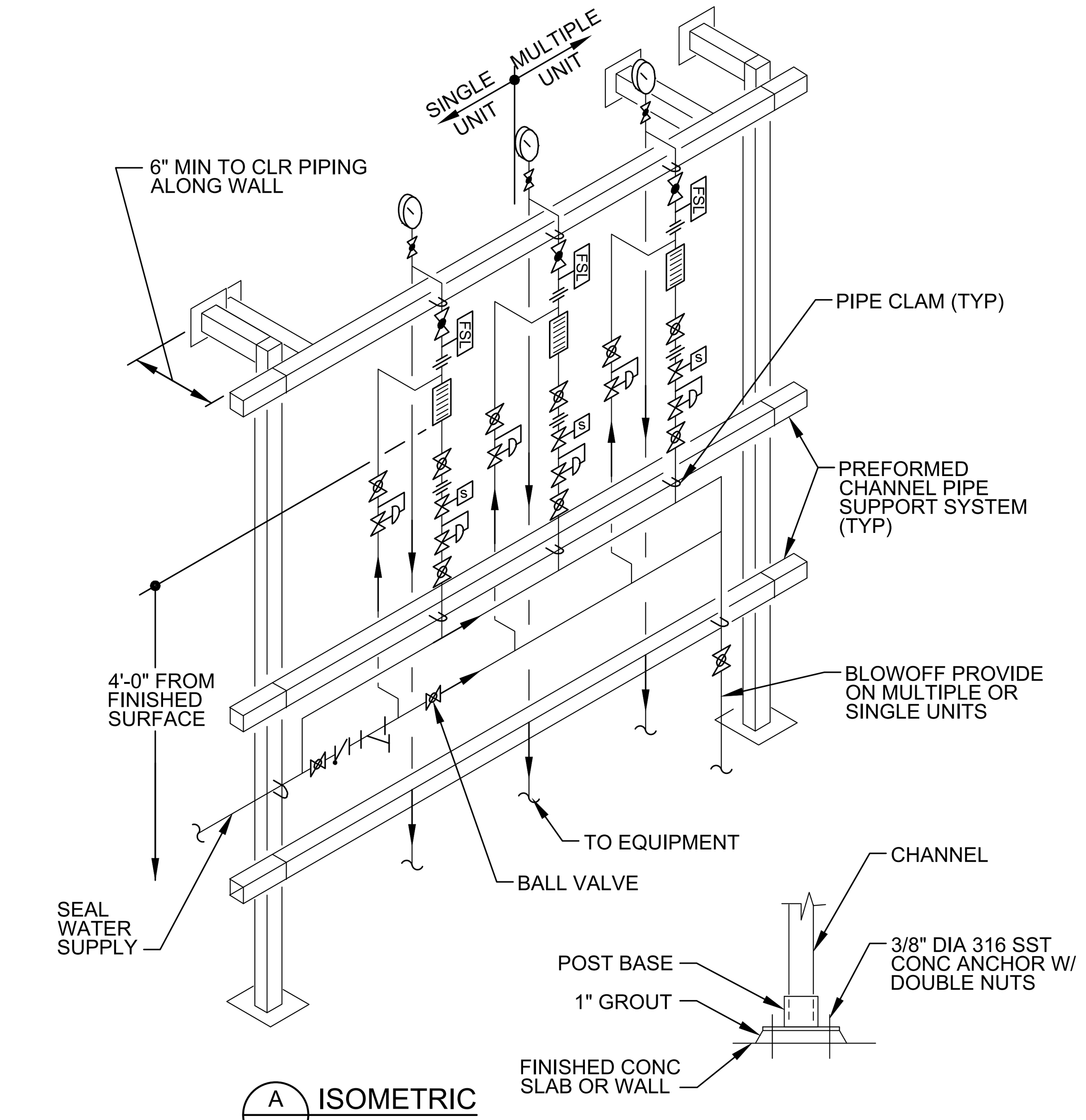


NOTES:

1. UNLESS SPECIFIED OTHERWISE, ALL PIPING VALVES, AND FITTINGS SHALL BE 1/2" 304 STAINLESS STEEL.
2. WHERE A DRIP PAN IS PROVIDED ON THE PUMP BASE, A SEPARATE DRAIN LINE TO THE EQUIPMENT DRAIN SHALL BE PROVIDED.
3. SEE P&ID AND CONTROL DESCRIPTION FOR SOLENOID VALVE OPERATION (POWER-OPEN/ POWER-CLOSE) TYPE.

MA301 TYP SEAL WATER - PIPING SCHEMATIC

06/26/23

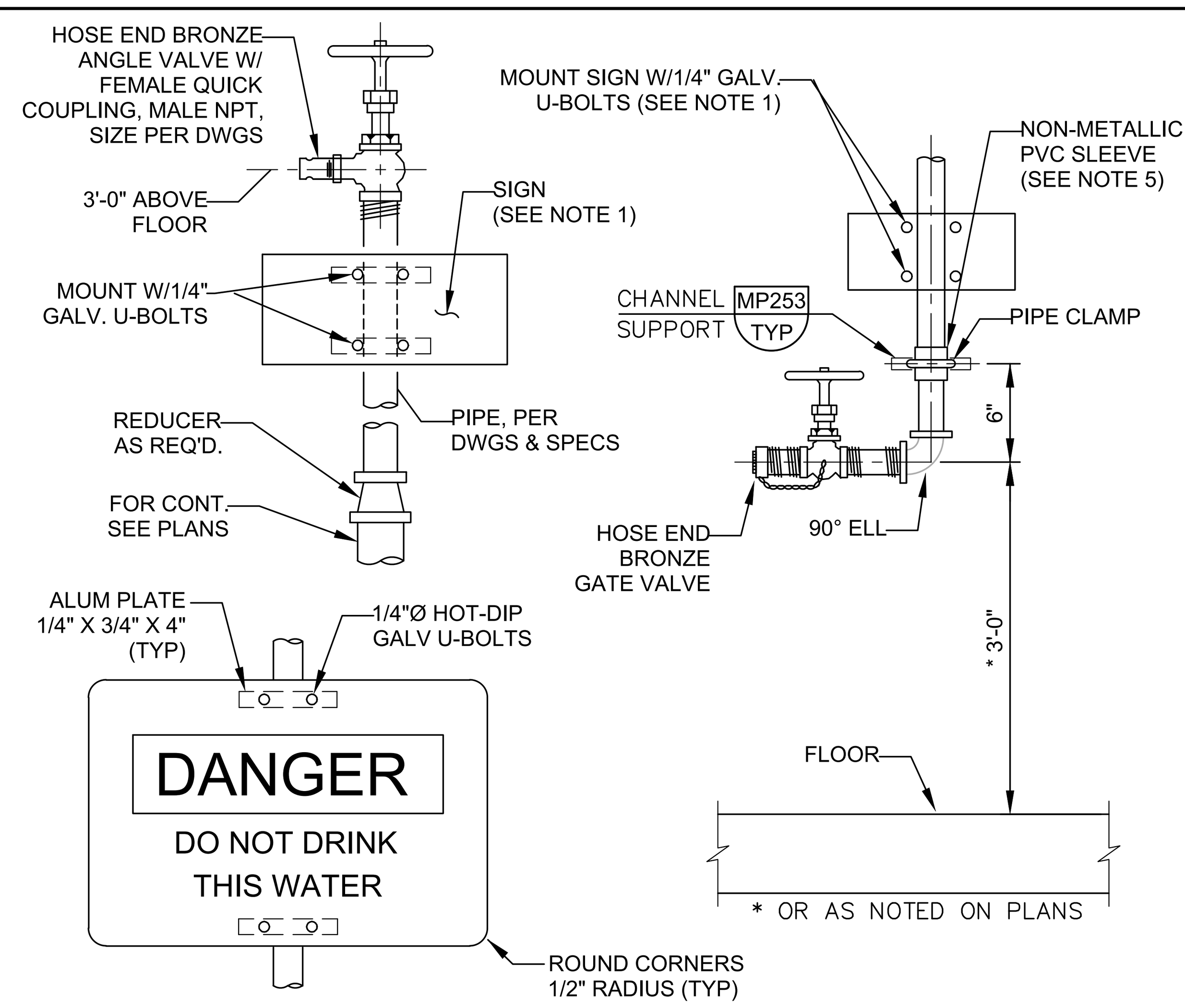


NOTE:

1. PREFORMED CHANNEL, CLAMPS, BOLTS AND NUTS SHALL BE 316 SST.

MA311 TYP ANCILLARY - SEAL & COOLING WATER - SEAL MOUNTING RACK

03/03/22



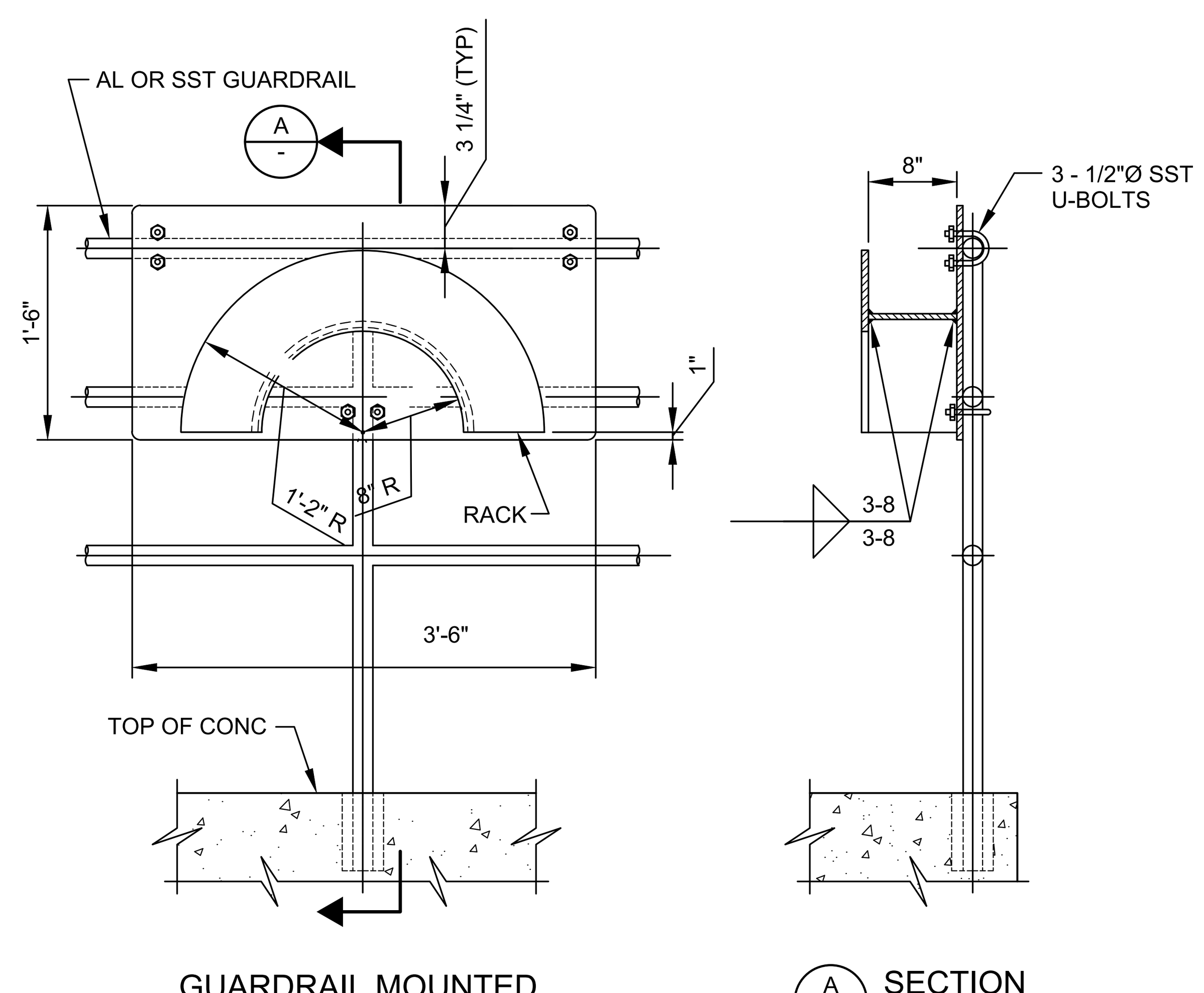
NOTES:

1. SIGN SHALL BE 3/8" THICK LAMINATED PLASTIC. PLASTIC SHALL BE TREATED TO RESIST SUNLIGHT (ULTRAVIOLET) DETERIORATION. MOUNTING: FOUR GROMMETED HOLES FOR 1/4" GALV U-BOLTS.
2. SIGN SHALL BE 7" x 10" & SHALL CONFORM TO THE SPECIFICATIONS.
3. SIGN AS SHOWN IS ROTATED 90° OFF TRUE POSITION. SIGN SHALL BE MOUNTED TO PERMIT EASY READING.
4. INSTALL HOSE RACK, MA417/TYP AT EACH HOSE VALVE.
5. SLEEVE REQUIRED FOR DISSIMILAR METALS.

MA415 TYP WASHDOWN - HOSE BIBB WITH NPW SIGN

N, S

05/03/23



NOTES:

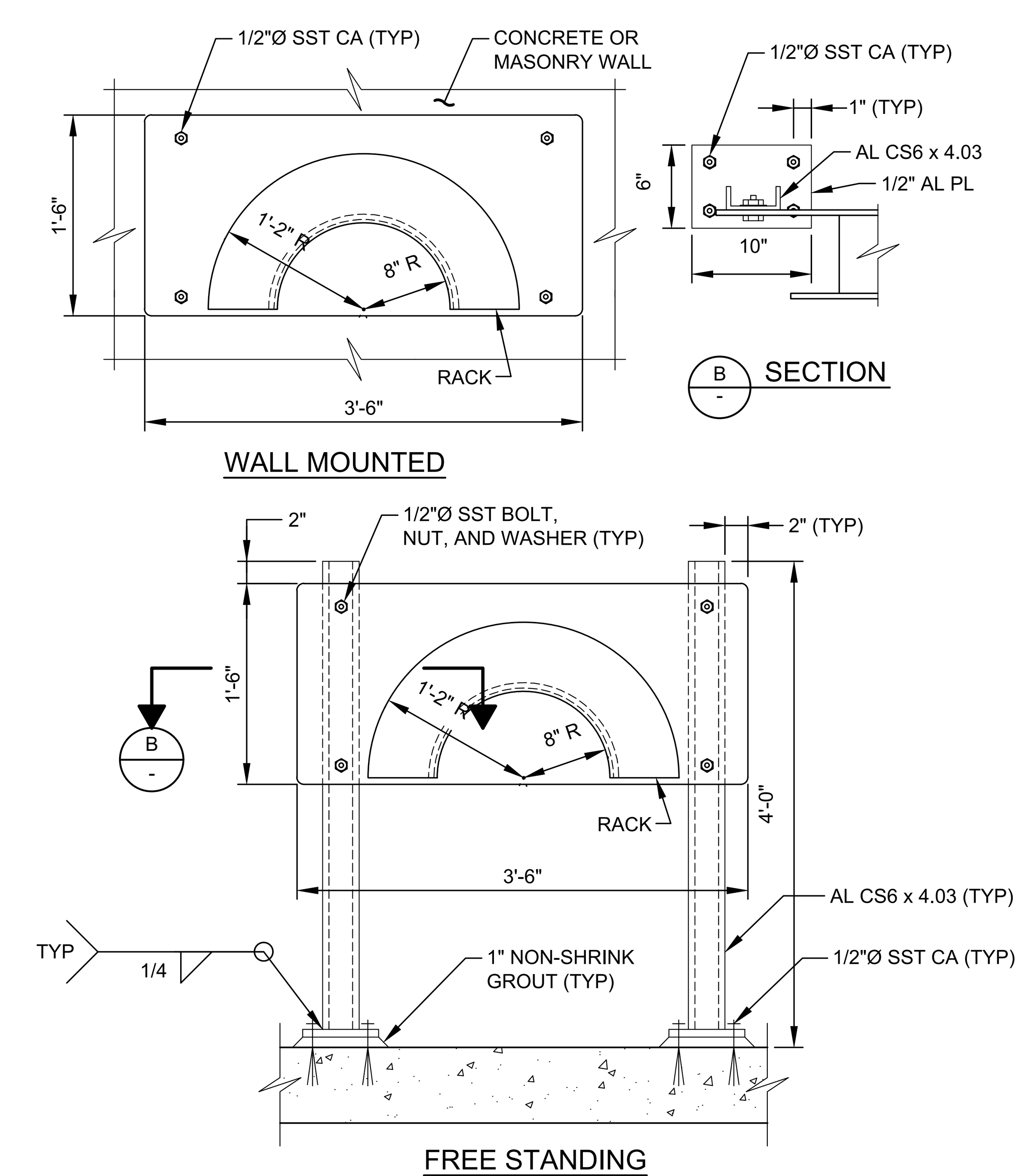
1. HOSE RACK SHALL BE FABRICATED FROM 3/16" ALUMINUM PLATE. ROUND ALL EDGES SMOOTH.
2. HOSE RACKS INSTALLED IN YARD LOCATIONS SHALL BE FREESTANDING. ANCHOR TO A 4'-6" LONG x 2'-0" WIDE x 12" DEEP CONCRETE PAD WITH #5@12" EW, T&B.
3. WALL MOUNTED HOSE RACKS ON MASONRY WALL SHALL BE FASTEN TO GROUTED CELLS.
4. PROVIDE 25' HOSE AND NOZZLE AT EACH HOSE RACK.

MA417 TYP WASHDOWN - HOSE RACK

R

SHEET 1 OF 2

12/06/24

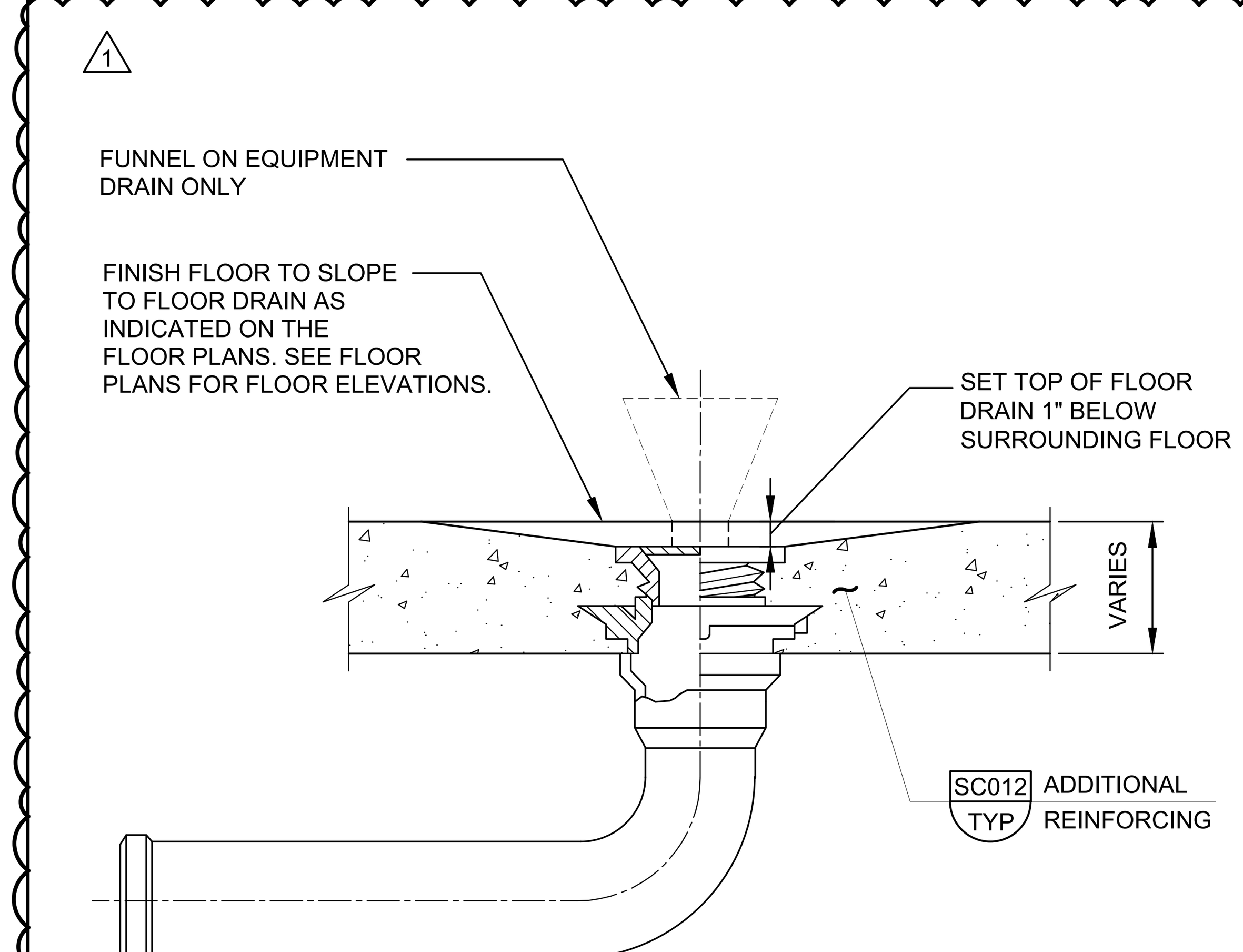


MA417 TYP WASHDOWN - HOSE RACK

S

SHEET 2 OF 2

12/01/22



NOTE:

1. PROVIDE 12" RADIUS SLOPE TO EQUIPMENT DRAINS WHERE FLOOR DOES NOT SLOPE TO DRAIN.

MA203 TYP DRAIN - FLOOR OR EQUIPMENT DRAIN W/O TRAP

12/18/2023

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED CE | DRAWN CE | CHECKED MSS | DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER KYLE T. LEONARD No. 86011 CIVIL STATE OF CALIFORNIA

Digitally signed by Kyle Thomas Leonard

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

TYPICAL DETAILS

MECHANICAL 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

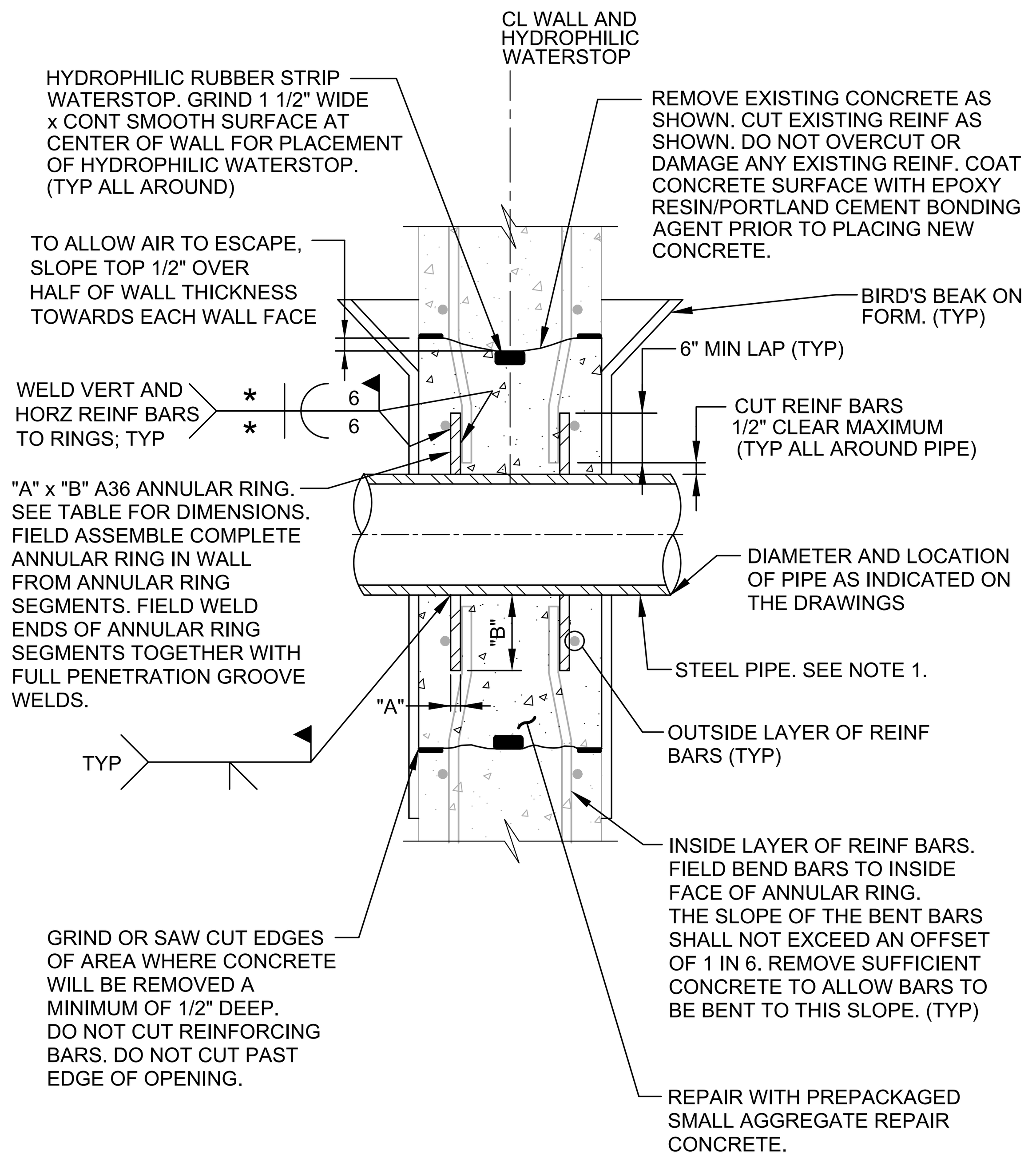
JOB NO. 202645

DRAWING NO. 00TM001

SHEET NO. 226 OF 239

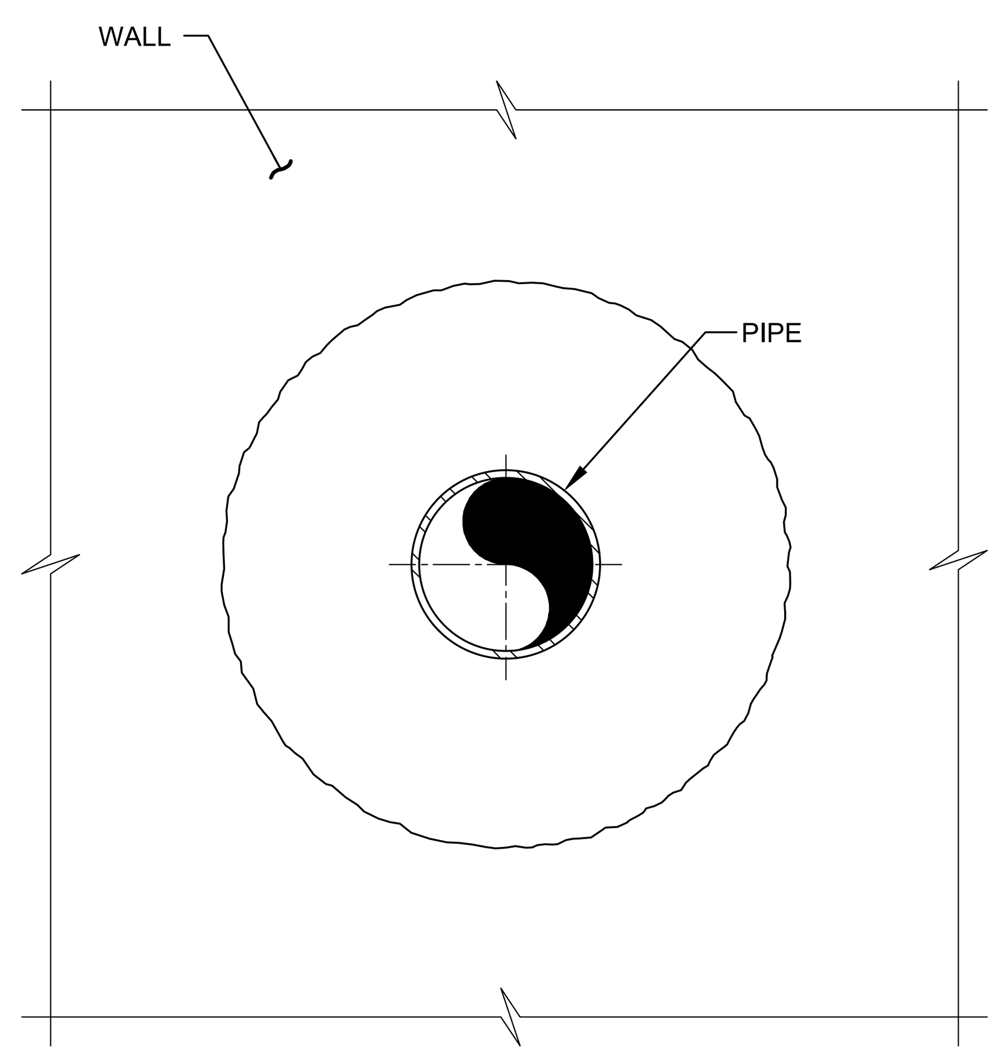
LAST SAVED BY: gleal

PROJECT NO. 202645-100000 FILE NAME: 202645_00TM001.dwg



MP532 TYP WALL PENETRATION - EXISTING CONCRETE - STEEL PIPE W/ REINF RINGS

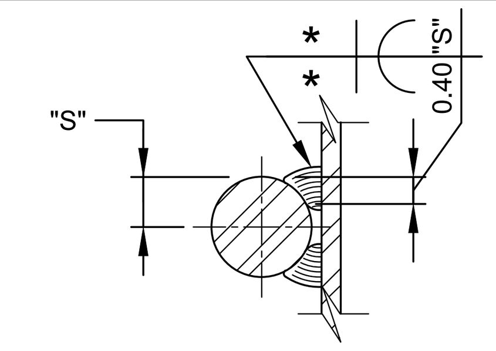
N SHEET 1 OF 3 12/01/22



ELEVATION

MP532 TYP WALL PENETRATION - EXISTING CONCRETE - STEEL PIPE W/ REINF RINGS

N SHEET 2 OF 3 12/01/22



WELDED SPLICE BAR

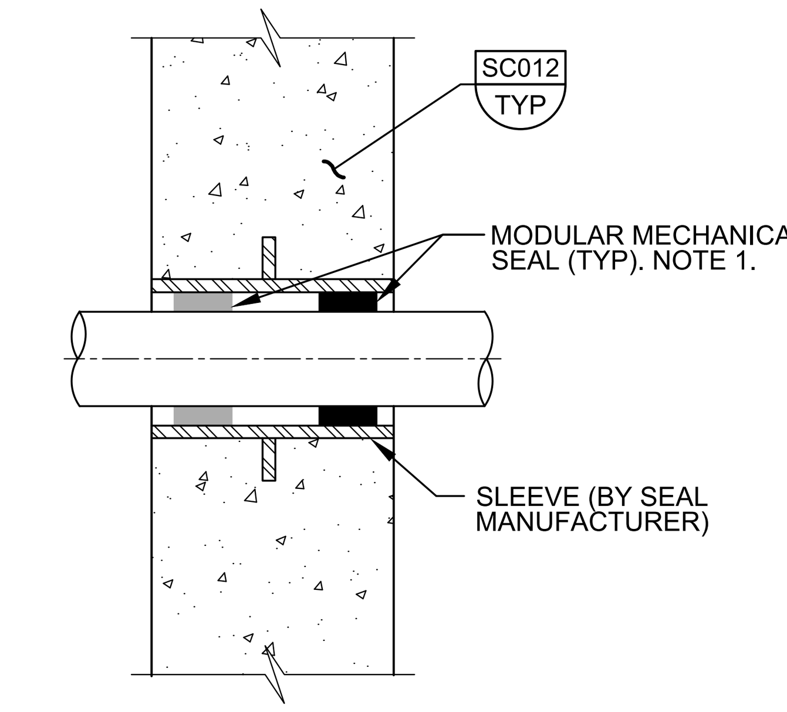
LOCATION OF PIPE PENETRATION	THICKNESS OF ANNULAR RING "A"	WIDTH OF ANNULAR RING "B"
SLUDGE BLEND TANKS 1&2	1/2"	8" (△1)

NOTES:

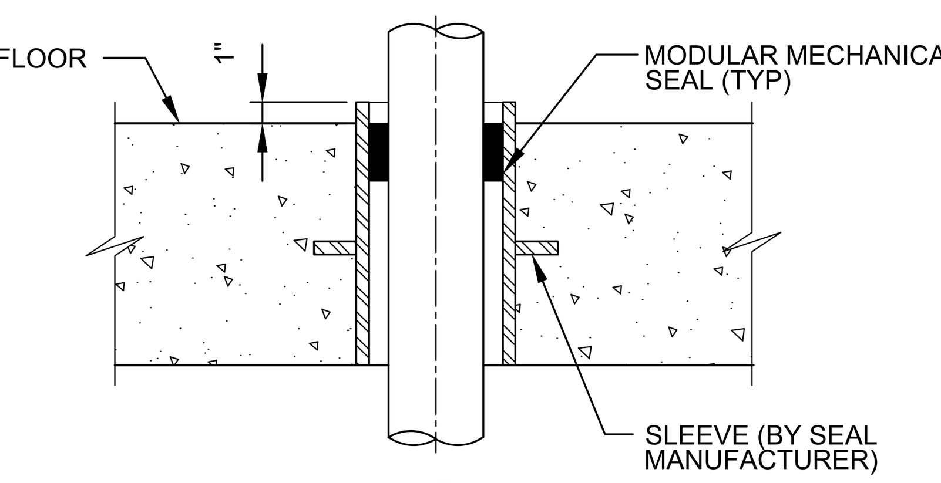
1. FIELD APPLY LINING AFTER WELDING IS COMPLETE.
2. CUT WALL REINFORCING THAT INTERFERING WITH PIPE. DO NOT CUT OR DAMAGE ANY OTHER BARS.
3. * = 0.40 "S" REINFORCING BAR RADIUS.
4. E 70 ELECTRODE FOR GRADE 40 REINF BARS; E 90 ELECTRODE FOR GRADE 60 REINF BARS.
5. SEE AWS D1.4 FOR WELDING PROCESS, PREHEAT REQUIREMENTS, AND OTHER DETAILS. SUBMIT WELDING PROCEDURE PER AWS.
6. USE FORMING WITH "BIRDS PEAK" ON BOTH WALL FACES FOR ACCESS FOR VIBRATOR AND TO ALLOW CONCRETE TO BE PLACED UNDER SLIGHT PRESSURE. AFTER FORMS ARE REMOVED, REMOVE PROJECTING CONCRETE AND FINISH TO MATCH FINISH OF EXISTING WALL.
7. WATER CURE REPAIRED CONCRETE FOR MINIMUM OF 7 DAYS. KEEP REPAIRED AREA CONTINUOUSLY WET.

MP532 TYP WALL PENETRATION - EXISTING CONCRETE - STEEL PIPE W/ REINF RINGS

N SHEET 3 OF 3 12/01/22



NEW
A - WALL PENETRATION



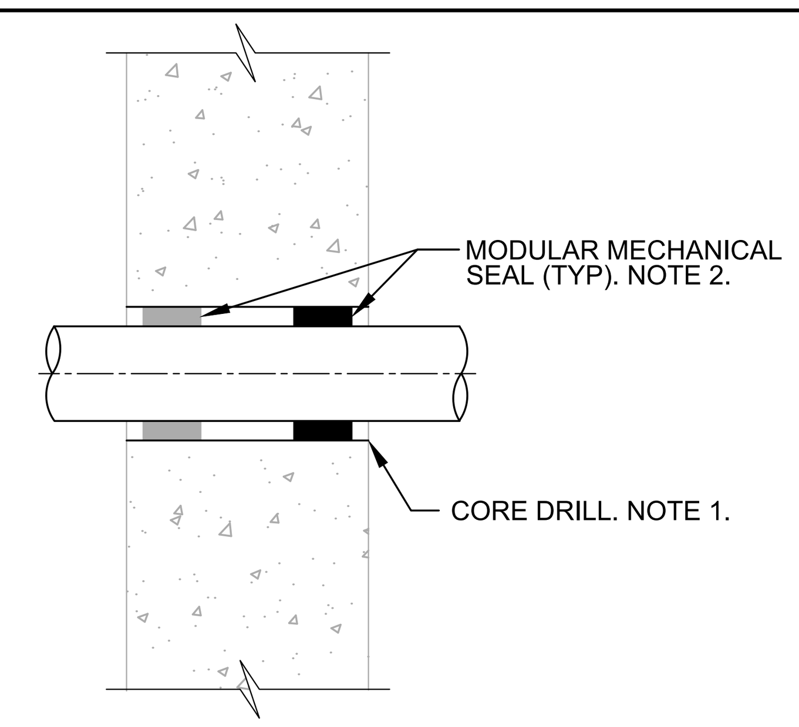
NEW
B - SLAB PENETRATION

NOTES:

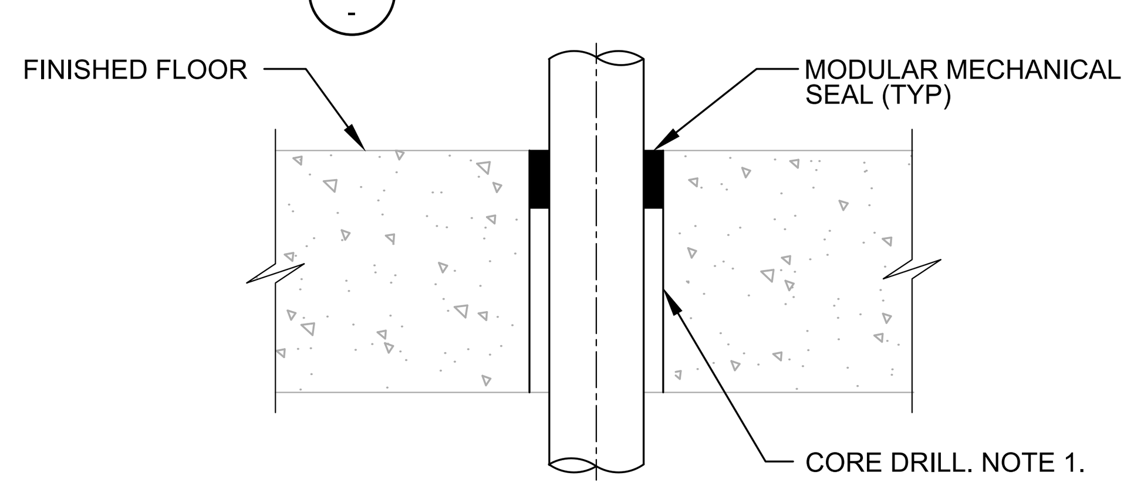
1. WALLS THICKER THAN 12" INSTALL MODULAR MECHANICAL SEAL AT BOTH ENDS OF WALL SLEEVE.

MP544 TYP WALL PENETRATION - CAST-IN SLEEVE W/ BARRIER SEALS

SHEET 1 OF 2 02/13/24



EXISTING
A - WALL PENETRATION



EXISTING
B - SLAB PENETRATION

NOTES:

1. CORE DRILL DIAMETER, PROCEDURES, AND POST -DRILLING SURFACE PREPARATION PER MODULAR MECHANICAL SEAL MANUFACTURER'S RECOMMENDATIONS FOR SPECIFIC PIPE OD.
2. WALLS 12" OR THICKER INSTALL MODULAR MECHANICAL SEAL AT BOTH ENDS OF PENETRATION.

MP544 TYP WALL PENETRATION - CAST-IN SLEEVE W/ BARRIER SEALS

SHEET 2 OF 2 02/13/24

REV	DATE	BY	DESCRIPTION
1	2/26/25	KTL	CHANGED PER ADDENDUM 3

DESIGNED CE
DRAWN CE
CHECKED MSS
DATE JANUARY 2025

REGISTERED PROFESSIONAL ENGINEER KYLE T. LEONARD No. 86011 CIVIL STATE OF CALIFORNIA

Digitally signed by Kyle Thomas Leonard
Contact Info: Carollo Engineers, Inc.
Date: 2025.02.27 10:58:55-08'00'

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO. 3 PROJECT

TYPICAL DETAILS

MECHANICAL 7

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00TM007
SHEET NO. 232 OF 239

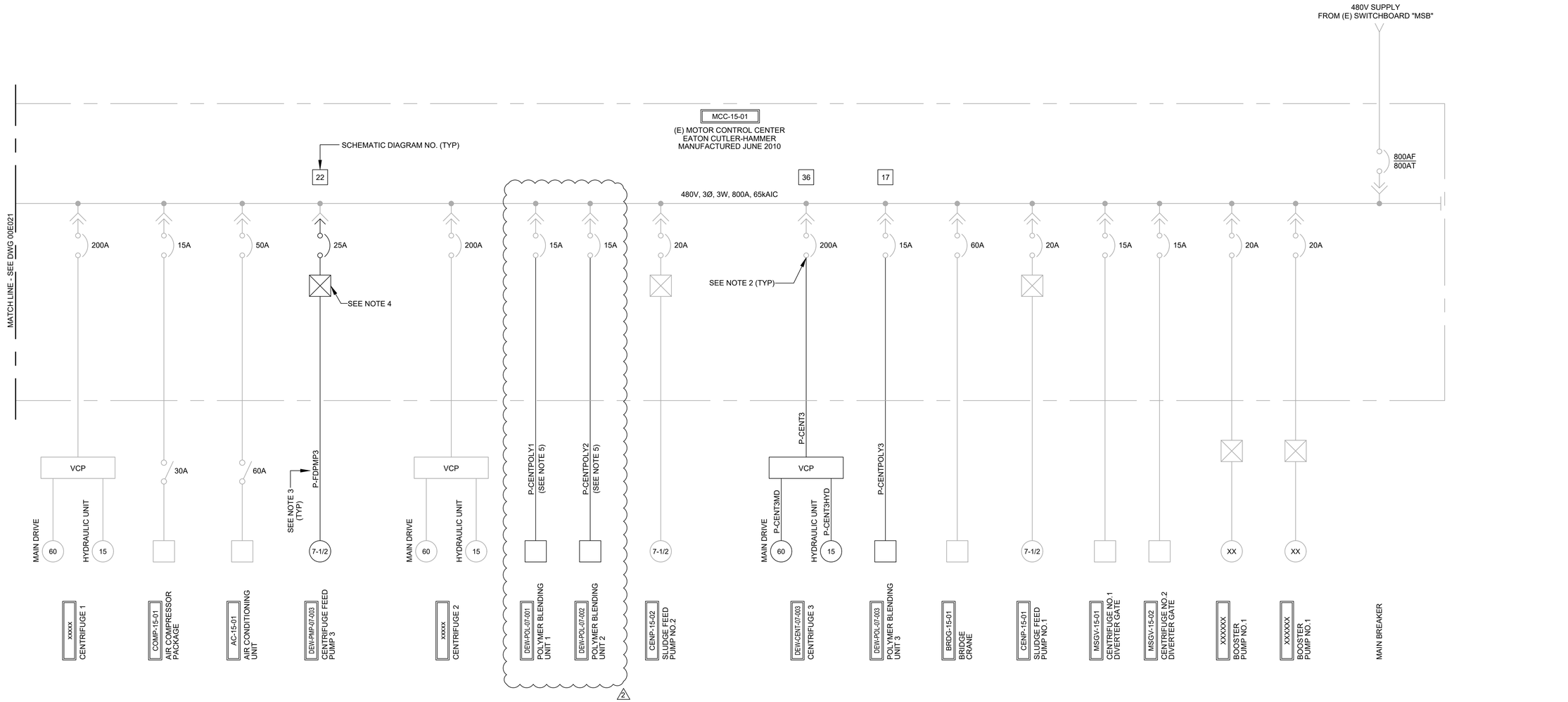
LAST SAVED BY: gleal

PROJECT NO. 202645-100000 FILE NAME: 202645_00TM007.dwg

NOTES

1. SEE SPECIFICATION SECTION 01140 FOR ADDITIONAL CONSTRUCTION SEQUENCING REQUIREMENTS AND WORK CONSTRAINTS.
2. CONNECT NEW FIELD CONDUCTORS TO EXISTING MOTOR CONTROL CENTER.
3. CIRCUIT NUMBER IS INDICATED. SEE CIRCUIT SCHEDULES ON DRAWINGS 00E051 THRU 00E054 FOR NEW CONDUCTOR REQUIREMENTS.
4. PROVIDE "HEAVY DUTY" RATED VARIABLE FREQUENCY DRIVE, RATED FOR USE WITH A CONSTANT-TORQUE LOAD.
5. DISCONNECT AND REMOVE EXISTING POLYMER DILUTION UNIT POWER CONDUCTORS AND REPLACE WITH NEW BLENDING UNIT POWER CONDUCTORS.

△2



Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	REVISION PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

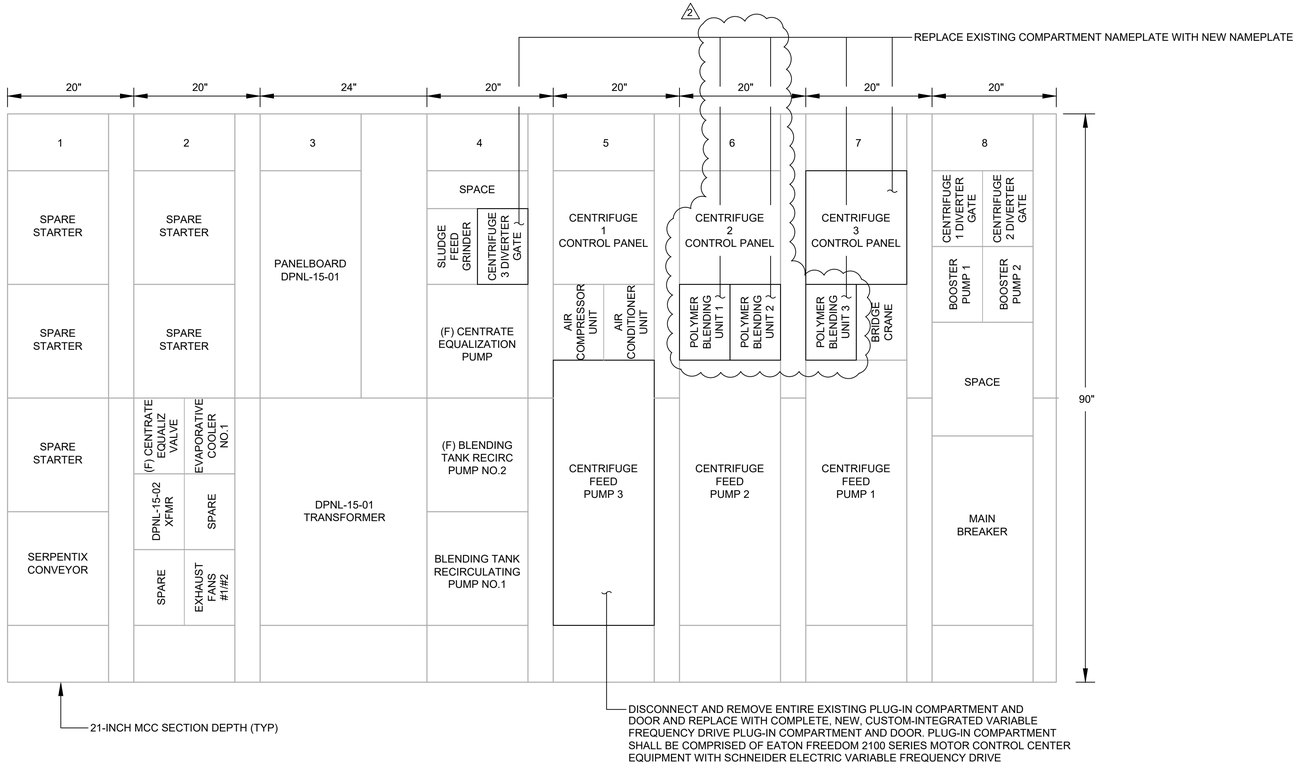
carollo®

CITY OF MANTECA, CALIFORNIA
Manteca
the family city
INCORPORATED MAY 25, 1918

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
EXISTING MCC-15-01 SINGLE LINE DIAGRAM - MODIFICATIONS 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E022
SHEET NO. 100 OF 239



FRONT ELEVATION - EXISTING MOTOR CONTROL CENTER MCC-15-01

NO SCALE

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	REVISION PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT

ELECTRICAL

EXISTING MCC-15-01 FRONT ELEVATION - MODIFICATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E023
SHEET NO. 101 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E023.dwg

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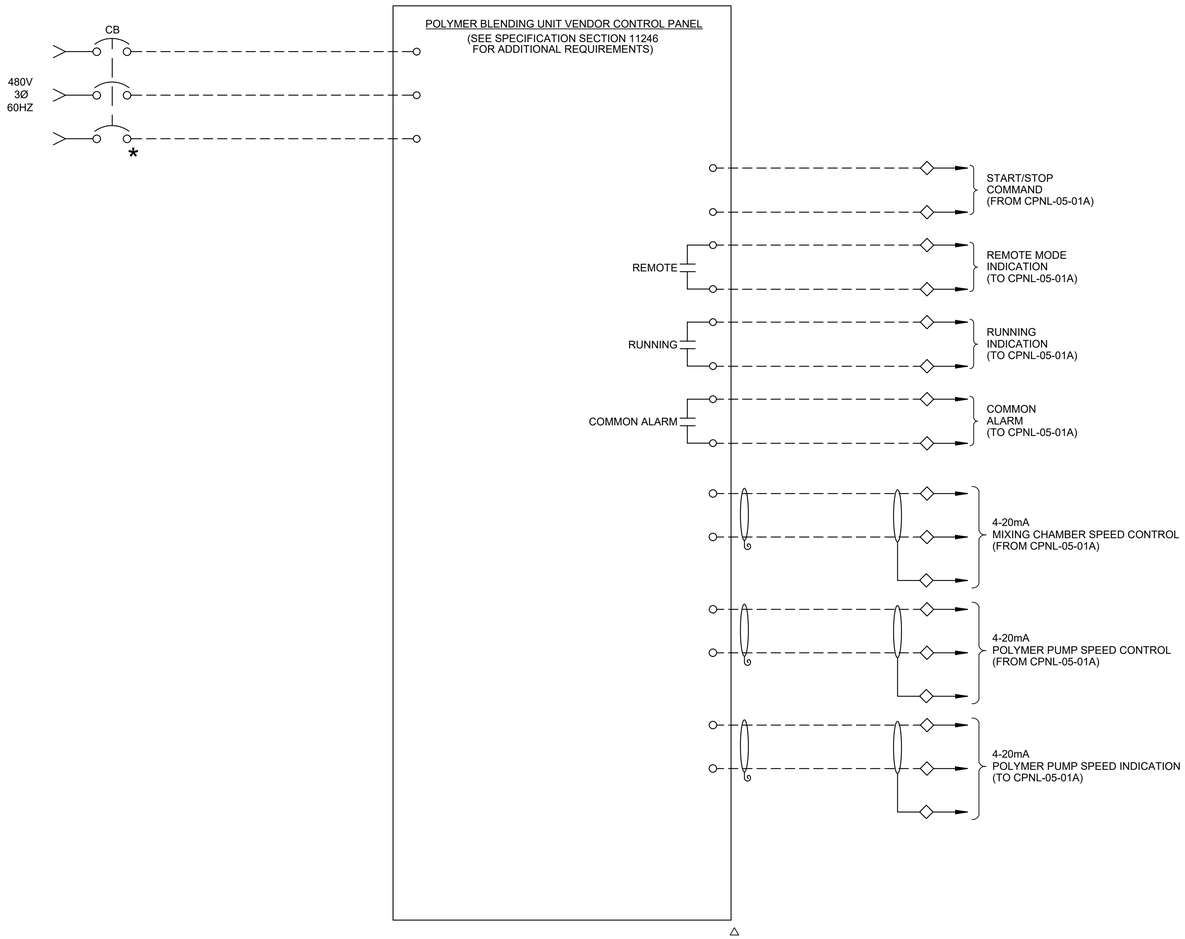
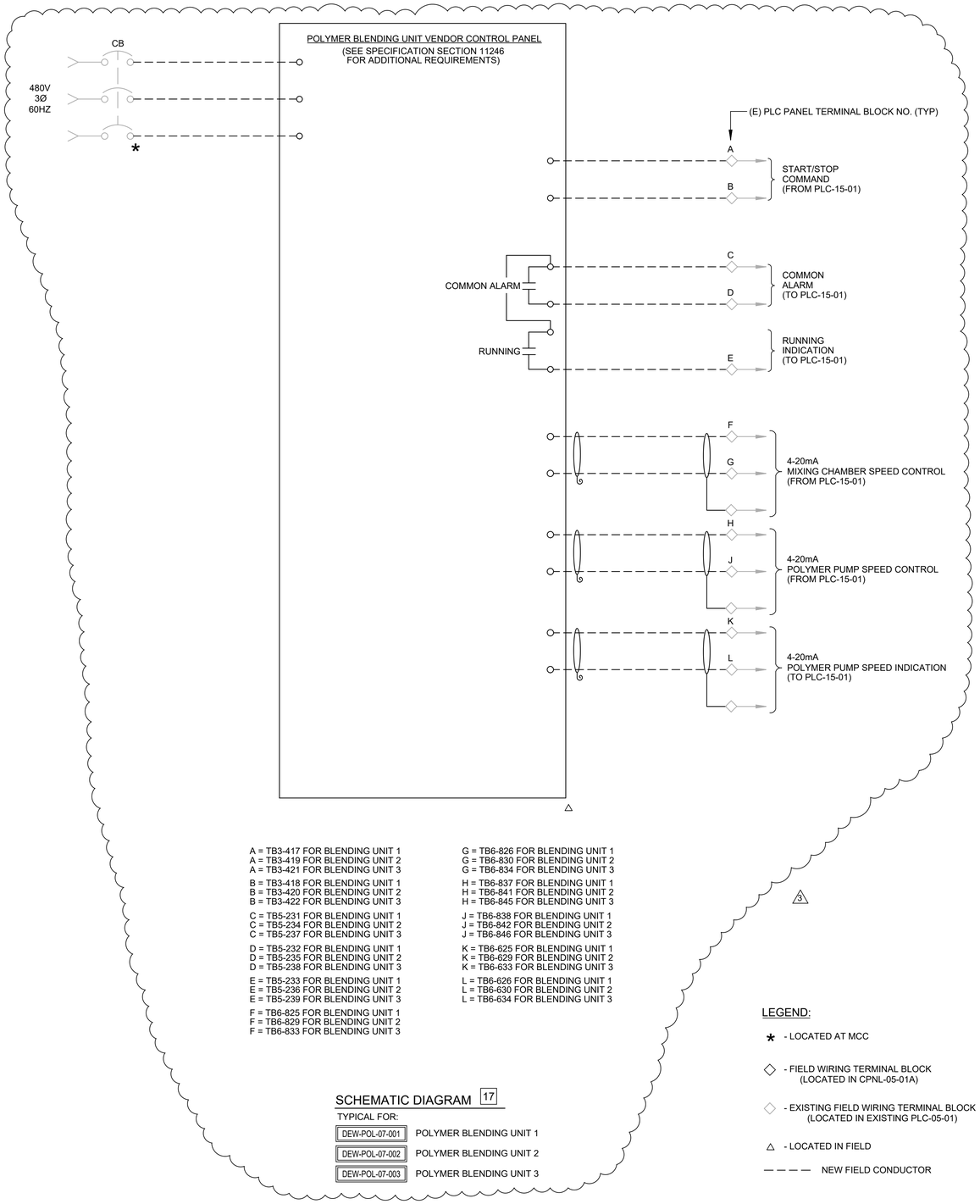


SCHEMATIC DIAGRAM 16

TYPICAL FOR:

THK-POL-07-001	POLYMER BLENDING UNIT 1
THK-POL-07-002	POLYMER BLENDING UNIT 2
THK-POL-07-003	POLYMER BLENDING UNIT 3



A = TB3-417 FOR BLENDING UNIT 1
A = TB3-419 FOR BLENDING UNIT 2
A = TB3-421 FOR BLENDING UNIT 3

B = TB3-418 FOR BLENDING UNIT 1
B = TB3-420 FOR BLENDING UNIT 2
B = TB3-422 FOR BLENDING UNIT 3

C = TB5-231 FOR BLENDING UNIT 1
C = TB5-234 FOR BLENDING UNIT 2
C = TB5-237 FOR BLENDING UNIT 3

D = TB5-232 FOR BLENDING UNIT 1
D = TB5-235 FOR BLENDING UNIT 2
D = TB5-238 FOR BLENDING UNIT 3

E = TB5-233 FOR BLENDING UNIT 1
E = TB5-236 FOR BLENDING UNIT 2
E = TB5-239 FOR BLENDING UNIT 3

F = TB6-825 FOR BLENDING UNIT 1
F = TB6-829 FOR BLENDING UNIT 2
F = TB6-833 FOR BLENDING UNIT 3

G = TB6-826 FOR BLENDING UNIT 1
G = TB6-830 FOR BLENDING UNIT 2
G = TB6-834 FOR BLENDING UNIT 3

H = TB6-837 FOR BLENDING UNIT 1
H = TB6-841 FOR BLENDING UNIT 2
H = TB6-845 FOR BLENDING UNIT 3

J = TB6-838 FOR BLENDING UNIT 1
J = TB6-842 FOR BLENDING UNIT 2
J = TB6-846 FOR BLENDING UNIT 3

K = TB6-625 FOR BLENDING UNIT 1
K = TB6-629 FOR BLENDING UNIT 2
K = TB6-633 FOR BLENDING UNIT 3

L = TB6-626 FOR BLENDING UNIT 1
L = TB6-630 FOR BLENDING UNIT 2
L = TB6-634 FOR BLENDING UNIT 3

LEGEND:

- ✱ - LOCATED AT MCC
- ◇ - FIELD WIRING TERMINAL BLOCK (LOCATED IN CPNL-05-01A)
- ◇ - EXISTING FIELD WIRING TERMINAL BLOCK (LOCATED IN EXISTING PLC-05-01)
- △ - LOCATED IN FIELD
- – – – – NEW FIELD CONDUCTOR

SCHEMATIC DIAGRAM 17

TYPICAL FOR:

DEW-POL-07-001	POLYMER BLENDING UNIT 1
DEW-POL-07-002	POLYMER BLENDING UNIT 2
DEW-POL-07-003	POLYMER BLENDING UNIT 3

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
3	2/27/25	TB	REVISION PER ADDENDUM 3
2	2/18/25	TB	DRAWING RE-ISSUED PER ADDENDUM 2
1	2/13/25	TB	DRAWING ADDED PER ADDENDUM 1

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT

ELECTRICAL

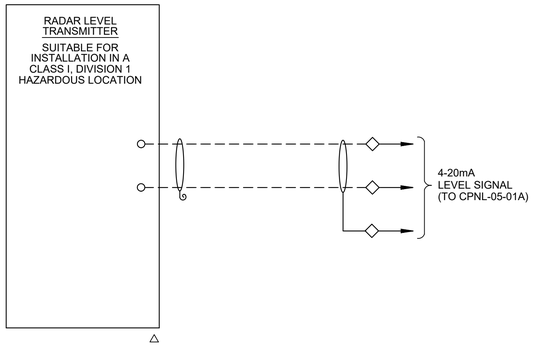
CONTROL SCHEMATICS 9

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E039
SHEET NO. 112 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E039.dwg

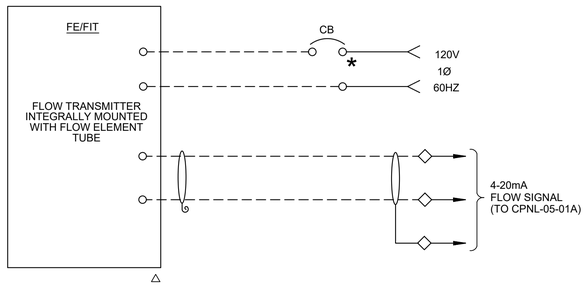
PLOT DATE: 2/27/2025 12:05:28 AM
USER: BEI
COLOR TABLE:CAROLLO_STD_F_V1703.CTB
PLOT SCALE:1:1
PAGE SETUP: ----
LAST SAVED BY: tbeecher



SCHEMATIC DIAGRAM 23

TYPICAL FOR:

LIT-07-011	BLEND TANK 1 LEVEL TRANSMITTER
LIT-07-012	BLEND TANK 2 LEVEL TRANSMITTER



SCHEMATIC DIAGRAM 25

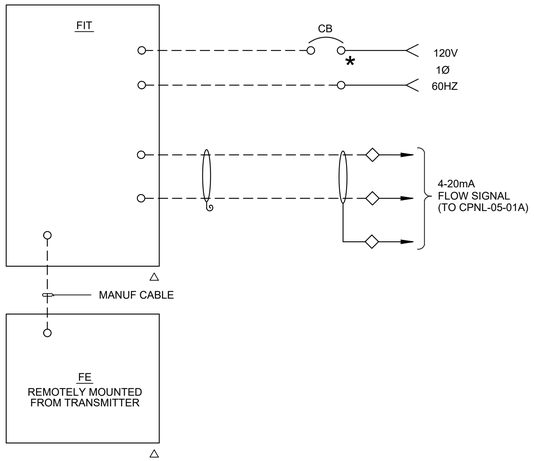
TYPICAL FOR:

FIT-07-021	BLENDED SLUDGE FEED FLOWMETER	FIT-07-041	POLYMER SKID 1 DILUTION WATER FLOWMETER
FIT-07-031	RDT 1 FLOWMETER	FIT-07-042	POLYMER SKID 2 DILUTION WATER FLOWMETER
FIT-07-032	RDT 2 FLOWMETER	FIT-07-043	POLYMER SKID 3 DILUTION WATER FLOWMETER
FIT-07-033	RDT 3 FLOWMETER		

SCHEMATIC DIAGRAM 27

TYPICAL FOR:

PIT-07-001	RDT FEED PUMP 1 DISCHARGE PRESSURE TRANSMITTER	PIT-07-021	POLYMER SKID 1 INLET PRESSURE TRANSMITTER
PIT-07-002	RDT FEED PUMP 2 DISCHARGE PRESSURE TRANSMITTER	PIT-07-022	POLYMER SKID 1 OUTLET PRESSURE TRANSMITTER
PIT-07-003	RDT FEED PUMP 3 DISCHARGE PRESSURE TRANSMITTER	PIT-07-031	POLYMER SKID 2 INLET PRESSURE TRANSMITTER
PIT-07-011	TSP 1 DISCHARGE PRESSURE TRANSMITTER	PIT-07-032	POLYMER SKID 2 OUTLET PRESSURE TRANSMITTER
PIT-07-012	TSP 2 DISCHARGE PRESSURE TRANSMITTER	PIT-07-041	POLYMER SKID 3 INLET PRESSURE TRANSMITTER
PIT-07-013	TSP 3 DISCHARGE PRESSURE TRANSMITTER	PIT-07-042	POLYMER SKID 3 OUTLET PRESSURE TRANSMITTER



SCHEMATIC DIAGRAM 24

TYPICAL FOR:

FIT-07-001	BLEND TANK 1 FLOWMETER
FIT-07-002	BLEND TANK 2 FLOWMETER

SCHEMATIC DIAGRAM 26

TYPICAL FOR:

FIT-07-051	CENTRIFUGE 3 INLET FLOWMETER

A= TB6-621 FOR PIT-07-702
A= TB6-637 FOR PIT-07-061
A= TB6-641 FOR PIT-07-062
A= TB6-645 FOR PIT-07-063
A= TB6-657 FOR PIT-07-064
A= TB6-681 FOR PIT-07-065
A= TB6-685 FOR PIT-07-066

B= TB6-622 FOR PIT-07-702
B= TB6-638 FOR PIT-07-061
B= TB6-642 FOR PIT-07-062
B= TB6-646 FOR PIT-07-063
B= TB6-658 FOR PIT-07-064
B= TB6-682 FOR PIT-07-065
B= TB6-686 FOR PIT-07-066

SCHEMATIC DIAGRAM 28

TYPICAL FOR:

PIT-07-702	CENTRIFUGE 3 FEED PUMP DISCHARGE PRESSURE TRANSMITTER
PIT-07-061	POLYMER SKID 1 INLET PRESSURE TRANSMITTER
PIT-07-062	POLYMER SKID 1 OUTLET PRESSURE TRANSMITTER
PIT-07-063	POLYMER SKID 2 INLET PRESSURE TRANSMITTER
PIT-07-064	POLYMER SKID 2 OUTLET PRESSURE TRANSMITTER
PIT-07-065	POLYMER SKID 3 INLET PRESSURE TRANSMITTER
PIT-07-066	POLYMER SKID 3 OUTLET PRESSURE TRANSMITTER

△2

LEGEND:

- ✱ - LOCATED AT PANELBOARD
- ◇ - FIELD WIRING TERMINAL BLOCK (LOCATED IN CPNL-05-01A)
- ◇ - EXISTING FIELD WIRING TERMINAL BLOCK (LOCATED IN EXISTING PLC-05-01)
- △ - LOCATED IN FIELD
- NEW FIELD CONDUCTOR

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	REVISION PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
CONTROL SCHEMATICS 15

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E045
SHEET NO. 118 OF 239

CB
480V
3Ø
60HZ
*

CENTRIFUGE VENDOR CONTROL PANEL
(SEE SPECIFICATION SECTION 11358
FOR ADDITIONAL REQUIREMENTS)

ETHERNET TCP/IP (CAT-6)
TO ETHERNET (E) SWITCH AT PLC-05-01
ETHERNET COMMUNICATION

PROGRAMMED SIGNALS TO PLANT SCADA:
REFER TO SPECIFICATION SECTION 11358
FOR REQUIRED SIGNALS TO/FROM PLANT SCADA

CB
480V
3Ø
60HZ
*

DIVERTER GATE △

CENTRIFUGE SKID

MOT
MOTOR HTR △
MOTOR TSH △
MAIN DRIVE

CENTRIFUGE JUNCTION TERMINAL BOX

GREASE SYSTEM POWER

SOLENOID VALVES

BEARING TEMPERATURES

BOWL SPEED PICKUP

SCROLL SPEED PICKUP

VIBRATION SENSOR

SOLIDS END BEARING TEMP

LIQUID END BEARING TEMP

△

CONTINUED BELOW LEFT

HYDRAULIC UNIT

MOT
MOTOR HTR △
MOTOR TSH △
HYDRAULIC UNIT

HYDRAULIC JUNCTION TERMINAL BOX

MONITORING SIGNALS

HYDRAULIC OIL PRESSURE

HYDRAULIC OIL VALVE POSITION

△

EMERGENCY STOP
(UPPER LEVEL)
△

EMERGENCY STOP
(LOWER LEVEL)
△

△

CONTINUED ABOVE RIGHT

LEGEND:

* - LOCATED AT MCC

◇ - EXISTING FIELD WIRING TERMINAL BLOCK (LOCATED IN EXISTING PLC-05-01)

△ - LOCATED IN FIELD

– – – – NEW FIELD CONDUCTOR

SCHEMATIC DIAGRAM 36

TYPICAL FOR:
DEW-CENT-07-003 CENTRIFUGE 3

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	REVISION PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
CONTROL SCHEMATICS 17

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E047
SHEET NO. 120 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E047.dwg

POWER CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	CONDUCTOR TYPE
P-VLV011	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	19	XHHW-2
P-VLV011A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-011	19	XHHW-2
P-VLV012	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	20	XHHW-2
P-VLV012A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-012	20	XHHW-2
P-VLV021	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	19	XHHW-2
P-VLV021A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-021	19	XHHW-2
P-VLV022	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	20	XHHW-2
P-VLV022A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-022	20	XHHW-2
P-VLV031	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	19	XHHW-2
P-VLV031A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-031	19	XHHW-2
P-VLV032	3#12, 1#12GND	MCC-E	DISCONNECT SWITCH	20	XHHW-2
P-VLV032A	3#12, 1#12GND	DISCONNECT SWITCH	THK-VAL-07-032	20	XHHW-2
P-FIT001	2#12, 1#12GND	PNL-LPE1	FIT-07-001	24	XHHW-2
P-FIT002	2#12, 1#12GND	PNL-LPE1	FIT-07-002	24	XHHW-2
P-FIT021	2#12, 1#12GND	PNL-LPE1	FIT-07-021	25	XHHW-2
P-FIT031	2#12, 1#12GND	PNL-LPE1	FIT-07-031	25	XHHW-2
P-FIT032	2#12, 1#12GND	PNL-LPE1	FIT-07-032	25	XHHW-2
P-FIT033	2#12, 1#12GND	PNL-LPE1	FIT-07-033	25	XHHW-2
P-FIT041	2#12, 1#12GND	PNL-LPE1	FIT-07-041	25	XHHW-2
P-FIT042	2#12, 1#12GND	PNL-LPE1	FIT-07-042	25	XHHW-2
P-FIT043	2#12, 1#12GND	PNL-LPE1	FIT-07-043	25	XHHW-2
P-AIT001	2#12, 1#12GND	PNL-LPE1	AIT-07-001	29	XHHW-2
P-AIT002	2#12, 1#12GND	PNL-LPE1	AIT-07-002	29	XHHW-2
P-AIT003	2#12, 1#12GND	PNL-LPE1	AIT-07-003	29	XHHW-2
P-AIT011	2#12, 1#12GND	PNL-LPE1	AIT-07-011	29	XHHW-2
P-AIT012	2#12, 1#12GND	PNL-LPE1	AIT-07-012	29	XHHW-2
P-AIT013	2#12, 1#12GND	PNL-LPE1	AIT-07-013	29	XHHW-2
P-CENTPOLY1	3#12, 1#12GND	MCC-15-01	DEW-POL-07-001	17	XHHW-2
P-CENTPOLY2	3#12, 1#12GND	MCC-15-01	DEW-POL-07-002	17	XHHW-2
P-CENTPOLY3	3#12, 1#12GND	MCC-15-01	DEW-POL-07-003	17	XHHW-2
P-CENT3MOV1	2#12, 1#12GND	DPNL-15-02	DISCONNECT SWITCH	21	XHHW-2
P-CENT3MOV1A	2#12, 1#12GND	DISCONNECT SWITCH	DEW-VAL-07-031	21	XHHW-2
P-CENT3MOV2	2#12, 1#12GND	DPNL-15-02	DISCONNECT SWITCH	21	XHHW-2
P-CENT3MOV2A	2#12, 1#12GND	DISCONNECT SWITCH	DEW-VAL-07-032	21	XHHW-2
P-FDPMP3	3#12, 1#12GND	MCC-15-01	DEW-PMP-07-003	22	XHHW-2
P-FIT051	2#12, 1#12GND	PNL-15-02	FIT-07-051	26	XHHW-2

3

3

CONTROL / SIGNAL CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	SIGNAL DESCRIPTION	
C-RDT3	4#14, 1#14GND	CPNL-05-01A	RDT 3 TERMINAL BOX	11	RDT 3 - RIO SIGNALS	
C-RDT3A	2#12, 16#14, 1#12GND	THK-VCP-07-003	RDT 3 TERMINAL BOX	11	RDT 3 - FIELD CONTROL SIGNALS	
C-RDT3B	2#14, 1#14GND	RDT 3 TERMINAL BOX	HOPPER LSHH TB	11	RDT 3 - HOPPER HIGH-HIGH LEVEL FLOAT SWITCH	
C-RDT3C	2#12, 1#12GND	RDT 3 TERMINAL BOX	HOPPER SV	11	RDT 3 - HOPPER 3W SOLENOID VALVE	
S-RDT3	CAT-6	CPNL-05-01A	THK-VCP-07-003	11	RDT 3 - VCP COMMUNICATION	
S-LIT003	1#16 TSP	CPNL-05-01A	LIT-07-003	11	RDT 3 - HOPPER LEVEL TRANSMITTER	
C-GRD1	8#14, 1#14GND	CPNL-05-01A	SLB-GRD-07-001 VCP	12	BLENDED SLUDGE GRINDER 1 - RIO SIGNALS	
C-GRD2	8#14, 1#14GND	CPNL-05-01A	SLB-GRD-07-002 VCP	12	BLENDED SLUDGE GRINDER 2 - RIO SIGNALS	
C-TSP1	10#14, 1#14GND	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 1 - RIO SIGNALS	SEE NOTE 4
C-TSP1A	2#14, 1#14GND	MCC-E	THK-PMP-07-011	15	THICKENED SLUDGE PUMP 1 - MOTOR TEMPERATURE SWITCHES	
C-TSP1B	2#14, 1#14GND	MCC-E	THK-PMP-07-011	15	THICKENED SLUDGE PUMP 1 - MOTOR SPACE HEATER	
C-TSP1C	2#14, 1#14GND	MCC-E	LOS STATION	15	THICKENED SLUDGE PUMP 1 - LOCAL LOCKOUT-STOP	
C-TSP1D	4#14, 1#14GND	MCC-E	PROTECTION MODULE	15	THICKENED SLUDGE PUMP 1 - PUMP STATOR PROTECTION MODULE	
C-TSP1E	2#14, 1#14GND	MCC-E	PSH	15	THICKENED SLUDGE PUMP 1 - DISCHARGE HIGH PRESSURE SWITCH	
C-TSP1F	2#14, 1#14GND	MCC-E	SEAL WATER FSL	15	THICKENED SLUDGE PUMP 1 - SEAL WATER FLOW SWITCH	
C-TSP1G	2#12, 1#12GND	MCC-E	SEAL WATER SV	15	THICKENED SLUDGE PUMP 1 - SEAL WATER SOLENOID VALVE	
C-TSP1H	2#14, 1#14GND	MCC-E	CHECK VALVE ZS	15	THICKENED SLUDGE PUMP 1 - CHECK VALVE POSITION SWITCH	
S-TSP1	CAT-6	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 1 - VFD COMMUNICATION	SEE NOTE 4
C-TSP2	10#14, 1#14GND	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 2 - RIO SIGNALS	SEE NOTE 4
C-TSP2A	2#14, 1#14GND	MCC-E	THK-PMP-07-012	15	THICKENED SLUDGE PUMP 2 - MOTOR TEMPERATURE SWITCHES	
C-TSP2B	2#14, 1#14GND	MCC-E	THK-PMP-07-012	15	THICKENED SLUDGE PUMP 2 - MOTOR SPACE HEATER	
C-TSP2C	2#14, 1#14GND	MCC-E	LOS STATION	15	THICKENED SLUDGE PUMP 2 - LOCAL LOCKOUT-STOP	
C-TSP2D	4#14, 1#14GND	MCC-E	PROTECTION MODULE	15	THICKENED SLUDGE PUMP 2 - PUMP STATOR PROTECTION MODULE	
C-TSP2E	2#14, 1#14GND	MCC-E	PSH	15	THICKENED SLUDGE PUMP 2 - DISCHARGE HIGH PRESSURE SWITCH	
C-TSP2F	2#14, 1#14GND	MCC-E	SEAL WATER FSL	15	THICKENED SLUDGE PUMP 2 - SEAL WATER FLOW SWITCH	
C-TSP2G	2#12, 1#12GND	MCC-E	SEAL WATER SV	15	THICKENED SLUDGE PUMP 2 - SEAL WATER SOLENOID VALVE	
C-TSP2H	2#14, 1#14GND	MCC-E	CHECK VALVE ZS	15	THICKENED SLUDGE PUMP 2 - CHECK VALVE POSITION SWITCH	
S-TSP2	CAT-6	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 2 - VFD COMMUNICATION	SEE NOTE 4
C-TSP3	10#14, 1#14GND	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 3 - RIO SIGNALS	SEE NOTE 4
C-TSP3A	2#14, 1#14GND	MCC-E	THK-PMP-07-013	15	THICKENED SLUDGE PUMP 3 - MOTOR TEMPERATURE SWITCHES	
C-TSP3B	2#14, 1#14GND	MCC-E	THK-PMP-07-013	15	THICKENED SLUDGE PUMP 3 - MOTOR SPACE HEATER	
C-TSP3C	2#14, 1#14GND	MCC-E	LOS STATION	15	THICKENED SLUDGE PUMP 3 - LOCAL LOCKOUT-STOP	
C-TSP3D	4#14, 1#14GND	MCC-E	PROTECTION MODULE	15	THICKENED SLUDGE PUMP 3 - PUMP STATOR PROTECTION MODULE	
C-TSP3E	2#14, 1#14GND	MCC-E	PSH	15	THICKENED SLUDGE PUMP 3 - DISCHARGE HIGH PRESSURE SWITCH	
C-TSP3F	2#14, 1#14GND	MCC-E	SEAL WATER FSL	15	THICKENED SLUDGE PUMP 3 - SEAL WATER FLOW SWITCH	
C-TSP3G	2#12, 1#12GND	MCC-E	SEAL WATER SV	15	THICKENED SLUDGE PUMP 3 - SEAL WATER SOLENOID VALVE	
C-TSP3H	2#14, 1#14GND	MCC-E	CHECK VALVE ZS	15	THICKENED SLUDGE PUMP 3 - CHECK VALVE POSITION SWITCH	
S-TSP3	CAT-6	MCC-E	CPNL-05-01A	15	THICKENED SLUDGE PUMP 3 - VFD COMMUNICATION	SEE NOTE 4

NOTES:

1. NEW CONDUIT REQUIREMENTS ARE NOT INCLUDED IN THE CIRCUIT SCHEDULES. REFER TO THE ELECTRICAL PLAN DRAWINGS FOR NEW CONDUIT REQUIREMENTS.
2. TEMPORARY CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS AND SINGLE LINE DIAGRAMS FOR TEMPORARY CONDUCTOR REQUIREMENTS.
3. NEW LIGHTING AND CONVENIENCE RECEPTACLE CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS FOR LIGHTING AND CONVENIENCE RECEPTACLE NEW CONDUCTOR REQUIREMENTS.
4. ROUTED WITHIN NEW MCC-E WIREWAY.

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
3	2/27/25	TB	REVISION PER ADDENDUM 3
2	2/18/25	TB	DRAWING RE-ISSUED PER ADDENDUM 2
1	2/13/25	TB	DRAWING ADDED PER ADDENDUM 1

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
CIRCUIT SCHEDULES 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E052
SHEET NO. 122 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E052.dwg

CONTROL / SIGNAL CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	SIGNAL DESCRIPTION
C-POLY1	8#14, 1#14GND	CPNL-05-01A	THK-POL-07-001	16	POLYMER BLENDING UNIT 1 - DISCRETE RIO SIGNALS
S-POLY1	3 - 1#16TSP	CPNL-05-01A	THK-POL-07-001	16	POLYMER BLENDING UNIT 1 - ANALOG RIO SIGNALS
C-POLY2	8#14, 1#14GND	CPNL-05-01A	THK-POL-07-002	16	POLYMER BLENDING UNIT 2 - DISCRETE RIO SIGNALS
S-POLY2	3 - 1#16TSP	CPNL-05-01A	THK-POL-07-002	16	POLYMER BLENDING UNIT 2 - ANALOG RIO SIGNALS
C-POLY3	8#14, 1#14GND	CPNL-05-01A	THK-POL-07-003	16	POLYMER BLENDING UNIT 3 - DISCRETE RIO SIGNALS
S-POLY3	3 - 1#16TSP	CPNL-05-01A	THK-POL-07-003	16	POLYMER BLENDING UNIT 3 - ANALOG RIO SIGNALS
S-SCRUB	CAT-6	CPNL-05-01A	FAR-VCP-07-021	18	BTF AND CARBON SCRUBBER - VCP COMMUNICATION
S-SCRUBAIT	1#16 TSP	FAR-VCP-07-021	pH ANALYZER	18	BTF AND CARBON SCRUBBER - pH ANALYZER
S-SCRUBFIT	1#16 TSP	FAR-VCP-07-021	DOSING FLOWMETER	18	BTF AND CARBON SCRUBBER - DOSING FLOWMETER
C-SCRUBMOV	3#14, 1#14GND	FAR-VCP-07-021	SCRUBBER MOV	18	BTF AND CARBON SCRUBBER - MOTORIZED VALVE CONTROL
C-BTFFLOATS	6#14, 1#14GND	FAR-VCP-07-021	FLOAT TERMINAL BOX	18	BTF AND CARBON SCRUBBER - BTF FLOAT SWITCHES
C-NUTFLOATS	4#14, 1#14GND	FAR-VCP-07-021	FLOAT TERMINAL BOX	18	BTF AND CARBON SCRUBBER - NUTRIENT SOLUTION TANK FLOAT SWITCHES
C-FAN1	4#14, 1#14GND	FAR-VCP-07-021	FAR-FAN-07-001	18	BTF AND CARBON SCRUBBER - ODOR SCRUBBER FAN 1 MOTOR TSH/HEATER
C-FAN2	4#14, 1#14GND	FAR-VCP-07-021	FAR-FAN-07-002	18	BTF AND CARBON SCRUBBER - ODOR SCRUBBER FAN 2 MOTOR TSH/HEATER
C-BTFPMP	4#14, 1#14GND	FAR-VCP-07-021	FAR-PMP-07-031	18	BTF AND CARBON SCRUBBER - BTF CIRC PUMP 2 MOTOR TSH/HEATER
C-DOSEPMP	4#14, 1#14GND	FAR-VCP-07-021	FAR-PMP-07-032	18	BTF AND CARBON SCRUBBER - NUT DOSING PUMP 2 MOTOR TSH/HEATER
C-VLV011	8#14, 1#14GND	CPNL-05-01A	THK-VAL-07-011	19	RDT 1 MOTORIZED VALVE 1 - DISCRETE RIO SIGNALS
S-VLV011	2 - 1#16 TSP	CPNL-05-01A	THK-VAL-07-011	19	RDT 1 MOTORIZED VALVE 1 - ANALOG RIO SIGNALS
C-VLV012	11#14, 1#14GND	CPNL-05-01A	THK-VAL-07-012	20	RDT 1 MOTORIZED VALVE 2 - RIO SIGNALS
C-VLV021	8#14, 1#14GND	CPNL-05-01A	THK-VAL-07-021	19	RDT 2 MOTORIZED VALVE 1 - DISCRETE RIO SIGNALS
S-VLV021	2 - 1#16 TSP	CPNL-05-01A	THK-VAL-07-021	19	RDT 2 MOTORIZED VALVE 1 - ANALOG RIO SIGNALS
C-VLV022	11#14, 1#14GND	CPNL-05-01A	THK-VAL-07-022	20	RDT 2 MOTORIZED VALVE 2 - RIO SIGNALS
C-VLV031	8#14, 1#14GND	CPNL-05-01A	THK-VAL-07-031	19	RDT 3 MOTORIZED VALVE 1 - DISCRETE RIO SIGNALS
S-VLV031	2 - 1#16 TSP	CPNL-05-01A	THK-VAL-07-031	19	RDT 3 MOTORIZED VALVE 1 - ANALOG RIO SIGNALS
C-VLV032	11#14, 1#14GND	CPNL-05-01A	THK-VAL-07-032	20	RDT 3 MOTORIZED VALVE 2 - RIO SIGNALS
S-LIT011	1#16 TSP	CPNL-05-01A	LIT-07-011	23	BLEND TANK 1 - LEVEL
S-LIT012	1#16 TSP	CPNL-05-01A	LIT-07-012	23	BLEND TANK 2 - LEVEL
S-FIT001	1#16 TSP	CPNL-05-01A	FIT-07-001	24	BLEND TANK 1 - FLOW
S-FIT002	1#16 TSP	CPNL-05-01A	FIT-07-002	24	BLEND TANK 2 - FLOW
S-FIT021	1#16 TSP	CPNL-05-01A	FIT-07-021	25	BLENDED SLUDGE FEED - FLOW
S-FIT031	1#16 TSP	CPNL-05-01A	FIT-07-031	25	RDT 1 - FLOW
S-FIT032	1#16 TSP	CPNL-05-01A	FIT-07-032	25	RDT 2 - FLOW
S-FIT033	1#16 TSP	CPNL-05-01A	FIT-07-033	25	RDT 3 - FLOW
S-FIT041	1#16 TSP	CPNL-05-01A	FIT-07-041	25	POLYMER SKID 1 DILUTION WATER - FLOW
S-FIT042	1#16 TSP	CPNL-05-01A	FIT-07-042	25	POLYMER SKID 2 DILUTION WATER - FLOW
S-FIT043	1#16 TSP	CPNL-05-01A	FIT-07-043	25	POLYMER SKID 3 DILUTION WATER - FLOW
S-FIT051	1#16 TSP	PLC-15-01	FIT-07-051	26	CENTRIFUGE 3 - INLET FLOW
S-PIT061	1#16 TSP	PLC-15-01	PIT-07-061	28	POLYMER SKID 1 - INLET PRESSURE
S-PIT062	1#16 TSP	PLC-15-01	PIT-07-062	28	POLYMER SKID 1 - OUTLET PRESSURE
S-PIT063	1#16 TSP	PLC-15-01	PIT-07-063	28	POLYMER SKID 2 - INLET PRESSURE
S-PIT064	1#16 TSP	PLC-15-01	PIT-07-064	28	POLYMER SKID 2 - OUTLET PRESSURE

3

CONTROL / SIGNAL CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	SIGNAL DESCRIPTION
S-PIT001	1#16 TSP	CPNL-05-01A	PIT-07-001	27	RDT FEED PUMP 1 - DISCHARGE PRESSURE
S-PIT002	1#16 TSP	CPNL-05-01A	PIT-07-002	27	RDT FEED PUMP 2 - DISCHARGE PRESSURE
S-PIT003	1#16 TSP	CPNL-05-01A	PIT-07-003	27	RDT FEED PUMP 3 - DISCHARGE PRESSURE
S-PIT011	1#16 TSP	CPNL-05-01A	PIT-07-011	27	THICKENED SLUDGE PUIMP 1 - DISCHARGE PRESSURE
S-PIT012	1#16 TSP	CPNL-05-01A	PIT-07-012	27	THICKENED SLUDGE PUIMP 2 - DISCHARGE PRESSURE
S-PIT013	1#16 TSP	CPNL-05-01A	PIT-07-013	27	THICKENED SLUDGE PUIMP 3 - DISCHARGE PRESSURE
S-PIT021	1#16 TSP	CPNL-05-01A	PIT-07-021	27	POLYMER SKID 1 - INLET PRESSURE
S-PIT022	1#16 TSP	CPNL-05-01A	PIT-07-022	27	POLYMER SKID 1 - OUTLET PRESSURE
S-PIT031	1#16 TSP	CPNL-05-01A	PIT-07-031	27	POLYMER SKID 2 - INLET PRESSURE
S-PIT032	1#16 TSP	CPNL-05-01A	PIT-07-032	27	POLYMER SKID 2 - OUTLET PRESSURE
S-PIT041	1#16 TSP	CPNL-05-01A	PIT-07-041	27	POLYMER SKID 3 - INLET PRESSURE
S-PIT042	1#16 TSP	CPNL-05-01A	PIT-07-042	27	POLYMER SKID 3 - OUTLET PRESSURE
S-AIT001	1#16 TSP	CPNL-05-01A	AIT-07-001	29	RDT 1 - SLUDGE DENSITY METER
S-AIT002	1#16 TSP	CPNL-05-01A	AIT-07-002	29	RDT 2 - SLUDGE DENSITY METER
S-AIT003	1#16 TSP	CPNL-05-01A	AIT-07-003	29	RDT 3 - SLUDGE DENSITY METER
S-AIT011	1#16 TSP	CPNL-05-01A	AIT-07-011	29	THICKENED SLUDGE PUMP 1 - SLUDGE DENSITY METER
S-AIT012	1#16 TSP	CPNL-05-01A	AIT-07-012	29	THICKENED SLUDGE PUMP 2 - SLUDGE DENSITY METER
S-AIT013	1#16 TSP	CPNL-05-01A	AIT-07-013	29	THICKENED SLUDGE PUMP 3 - SLUDGE DENSITY METER
C-RDT1HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-001	30	RDT 1 - HOT WATER SOLENOID VALVE
C-RDT2HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-002	30	RDT 2 - HOT WATER SOLENOID VALVE
C-RDT3HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-003	30	RDT 3 - HOT WATER SOLENOID VALVE
C-TSP1HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-011	30	THICKENED SLUDGE PUMP 1 - HOT WATER SOLENOID VALVE
C-TSP2HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-012	30	THICKENED SLUDGE PUMP 2 - HOT WATER SOLENOID VALVE
C-TSP3HWSV	2#14, 1#14GND	CPNL-05-01A	THK-SV-07-013	30	THICKENED SLUDGE PUMP 3 - HOT WATER SOLENOID VALVE
C-CENTPOLY1	5#14, 1#14GND	PLC-15-01	DEW-POL-07-001	17	POLYMER BLENDING UNIT 1 - DISCRETE PLC SIGNALS
S-CENTPOLY1	3 - 1#16 TSP	PLC-15-01	DEW-POL-07-001	17	POLYMER BLENDING UNIT 1 - ANALOG PLC SIGNALS
C-CENTPOLY2	5#14, 1#14GND	PLC-15-01	DEW-POL-07-002	17	POLYMER BLENDING UNIT 2 - DISCRETE PLC SIGNALS
S-CENTPOLY2	3 - 1#16 TSP	PLC-15-01	DEW-POL-07-002	17	POLYMER BLENDING UNIT 2 - ANALOG PLC SIGNALS
C-CENTPOLY3	5#14, 1#14GND	PLC-15-01	DEW-POL-07-003	17	POLYMER BLENDING UNIT 3 - DISCRETE PLC SIGNALS
S-CENTPOLY3	3 - 1#16 TSP	PLC-15-01	DEW-POL-07-003	17	POLYMER BLENDING UNIT 3 - ANALOG PLC SIGNALS
C-CENT3MOV1	8#14, 1#14GND	PLC-15-01	DEW-VAL-07-031	21	CENTRIFUGE 3 MOTORIZED VALVE 1 - PLC SIGNALS
C-CENT3MOV2	8#14, 1#14GND	PLC-15-01	DEW-VAL-07-032	21	CENTRIFUGE 3 MOTORIZED VALVE 2 - PLC SIGNALS
C-FDPMP3	5#14, 1#14GND	MCC-15-01	PLC-15-01	22	CENTRIFUGE FEED PUMP 3 - PLC SIGNALS
C-FDPMP3A	2#14, 1#14GND	MCC-15-01	DEW-PMP-07-003	22	CENTRIFUGE FEED PUMP 3 - MOTOR TEMPERATURE SWITCHES
C-FDPMP3B	2#14, 1#14GND	MCC-15-01	DEW-PMP-07-003	22	CENTRIFUGE FEED PUMP 3 - MOTOR SPACE HEATER
C-FDPMP3C	2#14, 1#14GND	MCC-15-01	LOS STATION	22	CENTRIFUGE FEED PUMP 3 - LOCAL LOCKOUT-STOP
C-FDPMP3D	4#14, 1#14GND	MCC-15-01	PROTECTION MODULE	22	CENTRIFUGE FEED PUMP 3 - PUMP STATOR PROTECTION MODULE
C-FDPMP3E	2#14, 1#14GND	MCC-15-01	PSH	22	CENTRIFUGE FEED PUMP 3 - DISCHARGE HIGH PRESSURE SWITCH
C-FDPMP3F	2#14, 1#14GND	MCC-15-01	SEAL WATER FSL	22	CENTRIFUGE FEED PUMP 3 - SEAL WATER FLOW SWITCH
C-FDPMP3G	2#12, 1#12GND	MCC-15-01	SEAL WATER SV	22	CENTRIFUGE FEED PUMP 3 - SEAL WATER SOLENOID VALVE
S-FDPMP3	CAT-6	MCC-15-01	PLC-15-01	22	CENTRIFUGE FEED PUMP 3 - VFD COMMUNICATION
S-PIT065	1#16 TSP	PLC-15-01	PIT-07-065	28	POLYMER SKID 3 - INLET PRESSURE
S-PIT066	1#16 TSP	PLC-15-01	PIT-07-066	28	POLYMER SKID 3 - OUTLET PRESSURE

3

NOTES:

1. NEW CONDUIT REQUIREMENTS ARE NOT INCLUDED IN THE CIRCUIT SCHEDULES. REFER TO THE ELECTRICAL PLAN DRAWINGS FOR NEW CONDUIT REQUIREMENTS.
2. TEMPORARY CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS AND SINGLE LINE DIAGRAMS FOR TEMPORARY CONDUCTOR REQUIREMENTS.
3. NEW LIGHTING AND CONVENIENCE RECEPTACLE CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS FOR LIGHTING AND CONVENIENCE RECEPTACLE NEW CONDUCTOR REQUIREMENTS.

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
3	2/27/25	TB	REVISION PER ADDENDUM 3
2	2/18/25	TB	DRAWING RE-ISSUED PER ADDENDUM 2
1	2/13/25	TB	DRAWING ADDED PER ADDENDUM 1

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
CIRCUIT SCHEDULES 3

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E053
SHEET NO. 123 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E053.dwg

PLOT DATE: 2/27/2025 12:49:50 AM
USER: BEI
COLOR TABLE:CAROLLO_STD_F_V1703.CTB
PLOT SCALE:1:1
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LAST SAVED BY: tbeecher

POWER CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	CONDUCTOR TYPE
P-VLVPNL	2#12, 1#12GND	PNL-LPE1	SLB-VCP-07-011	32	XHHW-2
P-COMP1	3#10, 1#10GND	MCC-07-001	DISCONNECT SWITCH	33	XHHW-2
P-COMP1A	3#10, 1#10GND	DISCONNECT SWITCH	DIG-CMP-07-591	33	XHHW-2
P-COMP2	3#10, 1#10GND	MCC-07-001	DISCONNECT SWITCH	33	XHHW-2
P-COMP2A	3#10, 1#10GND	DISCONNECT SWITCH	DIG-CMP-07-592	33	XHHW-2
P-TOTE1	2#12, 1#12GND	PNL-LPE1	WIT-07-001	34	XHHW-2
P-TOTE2	2#12, 1#12GND	PNL-LPE1	WIT-07-002	34	XHHW-2
P-TOTE3	2#12, 1#12GND	PNL-LPE1	WIT-07-003	34	XHHW-2
P-DRYER1	2#12, 1#12GND	DIG-BKP-07-001	DIG-DRY-07-591	35	XHHW-2
P-DRYER2	2#12, 1#12GND	DIG-BKP-07-001	DIG-DRY-07-592	35	XHHW-2
P-CENT3	3#4/0, 1#6GND	MCC-15-01	DEW-VCP-07-031	36	XHHW-2
P-CENT3MD	3#2, 4#14, 1#6GND	DEW-VCP-07-031	CENT 3 MAIN DRV MTR	36	XHHW-2
P-CENT3HYD	3#10, 4#14, 1#10GND	DEW-VCP-07-031	CENT 3 HYD MOTOR	36	XHHW-2
P-DIVGT3	3#12, 1#12GND	MCC-15-01	DEW-DG-07-003	36	XHHW-2

CONTROL / SIGNAL CIRCUITS

CIRCUIT NO.	WIRE/CABLE REQUIREMENTS	FROM:	TO:	SCHEMATIC DIAGRAM NO.	SIGNAL DESCRIPTION
C-EWFSH	2#14, 1#14GND	CPNL-05-01A	THK-EEWS-07-001	31	EMERGENCY EYEWASH AND SHOWER - ACTIVATION FLOW SWITCH
C-VLVPNL	4#14, 1#14GND	CPNL-05-01A	SLB-VCP-07-011	32	VALVE MODULE PANEL - RIO SIGNALS
C-COMP1	4#14, 1#14GND	DIG-PLC-07-005	DIG-CMP-07-591	33	AIR COMPRESSOR 1 - PLC SIGNALS
C-COMP2	4#14, 1#14GND	DIG-PLC-07-005	DIG-CMP-07-592	33	AIR COMPRESSOR 2 - PLC SIGNALS
S-TOTE1	1#16TSP	CPNL-05-01A	WIT-07-001	34	POLYMER TOTE 1 - WEIGHT INDICATION
S-TOTE2	1#16TSP	CPNL-05-01A	WIT-07-002	34	POLYMER TOTE 2 - WEIGHT INDICATION
S-TOTE3	1#16TSP	CPNL-05-01A	WIT-07-003	34	POLYMER TOTE 3 - WEIGHT INDICATION
C-DRYER1	8#14, 1#14GND	DIG-PLC-07-005	DIG-DRY-07-591	35	AIR DRYER 1 - PLC SIGNALS
C-DRYER2	8#14, 1#14GND	DIG-PLC-07-005	DIG-DRY-07-592	35	AIR DRYER 1 - PLC SIGNALS
S-FD3PIT	1#16 TSP	PLC-15-01	PIT-07-702	28	CENTRIFUGE 3 FEED PUMP - DISCHARGE PRESSURE INDICATION
C-CENT3	4#14, 6#12, 1#12GND	DEW-VCP-07-031	CENT 3 JUNCTION BOX	36	CENTRIFUGE 3 - DISCRETE SIGNALS AND AUXILIARY SYSTEM POWER
S-CENT3	2 - 1#16TR, 5 - 1#16TSP	DEW-VCP-07-031	CENT 3 JUNCTION BOX	36	CENTRIFUGE 3 - ANALOG SIGNALS AND TEMPERATURE MONITORING
S-CENT3A	CAT-6	DEW-VCP-07-031	PLC-15-01	36	CENTRIFUGE 3 - PLANT PLC COMMUNICATION
C-HYD3	4#14, 1#14GND	DEW-VCP-07-031	HYD UNIT 3 J-BOX	36	CENT 3 HYD UNIT - DISCRETE SIGNALS
S-HYD3	2 - 1#16TSP	DEW-VCP-07-031	HYD UNIT 3 J-BOX	36	CENT 3 HYD UNIT - ANALOG SIGNALS
C-DIVGT3	6#14, 1#14GND	DEW-VCP-07-031	DEW-DG-07-003	36	CENTRIFUGE 3 DIVERTER GATE - DISCRETE SIGNALS
C-LCS3	2#14, 1#14GND	DEW-VCP-07-031	E-STOP (LOWER)	36	CENTRIFUGE 3 - EMERGENCY STOP (LOWER LEVEL)
C-LCS3A	2#14, 1#14GND	DEW-VCP-07-031	E-STOP (UPPER)	36	CENTRIFUGE 3 - EMERGENCY STOP (UPPER LEVEL)
C-CENT3SV1	2#12, 1#12GND	DEW-LCP-07-031	SOLENOID VALVE	36	CENTRIFUGE 3 - CENTRIFUGE FLUSHING SOLENOID VALVE
C-CENT3SV2	2#12, 1#12GND	DEW-LCP-07-031	SOLENOID VALVE	36	CENTRIFUGE 3 - DIVERTER GATE FLUSHING SOLENOID VALVE
C-CENT3SV3	2#12, 1#12GND	DEW-LCP-07-031	SOLENOID VALVE	36	CENTRIFUGE 3 - CENTRATE CHUTE FLUSHING SOLENOID VALVE
C-CENT3SV4	2#12, 1#12GND	DEW-LCP-07-031	SOLENOID VALVE	36	CENTRIFUGE 3 - HYDRAULIC BACKDRIVE COOLING SOLENOID VALVE

2

NOTES:

1. NEW CONDUIT REQUIREMENTS ARE NOT INCLUDED IN THE CIRCUIT SCHEDULES. REFER TO THE ELECTRICAL PLAN DRAWINGS FOR NEW CONDUIT REQUIREMENTS.
2. TEMPORARY CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS AND SINGLE LINE DIAGRAMS FOR TEMPORARY CONDUCTOR REQUIREMENTS.
3. NEW LIGHTING AND CONVENIENCE RECEPTACLE CONDUCTOR REQUIREMENTS ARE NOT INCLUDED ON THE CIRCUIT SCHEDULES. REFER TO PLAN DRAWINGS FOR LIGHTING AND CONVENIENCE RECEPTACLE NEW CONDUCTOR REQUIREMENTS.

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	REVISION PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

carollo

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
ELECTRICAL
CIRCUIT SCHEDULES 4

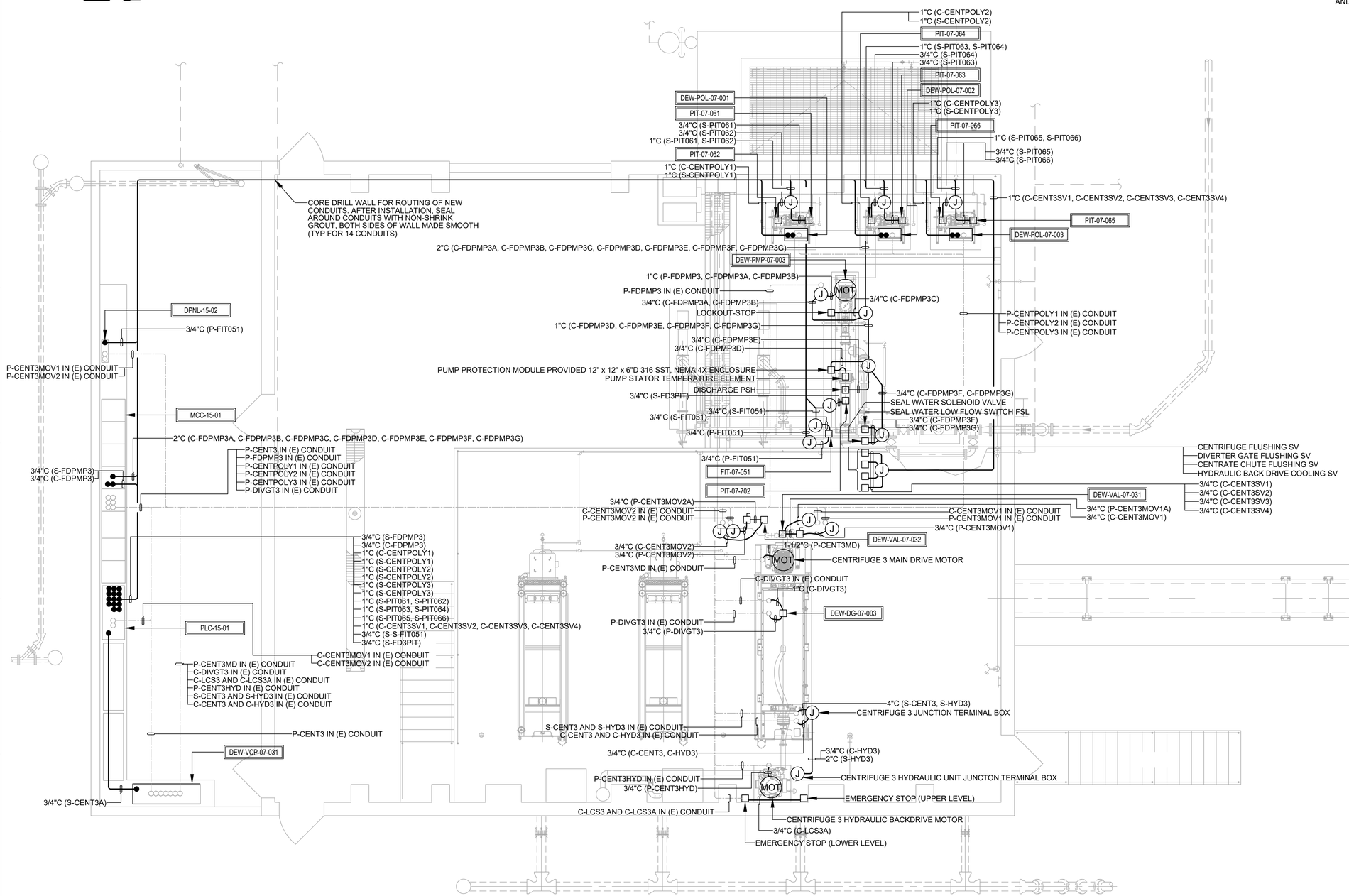
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 00E054
SHEET NO. 124 OF 239

PROJECT NO. 202645 FILE NAME: 202645_00E054.dwg

NOTES:

1. SEE SPECIFICATION SECTION 01140 FOR ADDITIONAL CONSTRUCTION SEQUENCING REQUIREMENTS AND WORK CONSTRAINTS.



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FILE: 202645_07E401

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	DRAWING RE-ISSUED PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER
TODD A. BEECHER
E014712
Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA
2/13/2025

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT

ELECTRICAL

DEWATERING FACILITY
POWER AND CONTROL PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 07E401
SHEET NO. 145 OF 239

LAST SAVED BY: tbeecher

PROJECT NO. 202645-100000 FILE NAME: 202645_07E401.dwg

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	DRAWING RE-ISSUED PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA 2/13/2025

carollo®

CITY OF MANTECA

WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT

INSTRUMENTATION

P&ID: CENTRIFUGE 3

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 07N071
SHEET NO. 210 OF 239

PROJECT NO. 202645 FILE NAME: 202645_07N071.dwg

PLOT DATE: 2/26/2025 11:16:09 PM USER: BEI COLOR TABLE:CAROLLO_STD_F_V1703.CTB PLOT SCALE:1:1 PAGE SETUP: ---- LAST SAVED BY: tbeecher

(E) PLC-15-01 / PLANT SCADA

FIELD

MIXING CHAMBER SPEED 0-100% SC 716A
POLYMER PUMP SPEED 0-100% SC 716B
SS HS 716
SC YL 716 RUNNING
SI 716 PUMP SPEED 0-100%
YA 716 ALARM
PI 714 0-100 PSIG
PI 715 0-100 PSIG

MIXING CHAMBER SPEED 0-100% SC 713A
POLYMER PUMP SPEED 0-100% SC 713B
SS HS 713
SC YL 713 RUNNING
SI 713 PUMP SPEED 0-100%
YA 713 ALARM
PI 711 0-100 PSIG
PI 712 0-100 PSIG

MIXING CHAMBER SPEED 0-100% SC 710A
POLYMER PUMP SPEED 0-100% SC 710B
SS HS 710
SC YL 710 RUNNING
SI 710 PUMP SPEED 0-100%
YA 710 ALARM
PI 708 0-100 PSIG
PI 709 0-100 PSIG

FROM RECLAIMED WATER PUMPS (E) 1-1/2" 3W 1-1/2" 3W 1-1/2" 3W
PIT
PIT-07-065 PIT 714
PIT-07-066 PIT 715
480V
FROM EXISTING POLYMER TOTE (E) 2" POL 2" POL
POLYMER SKID
2" POS
07N071 A
DEW-POL-07-003
POLYMER BLENDING UNIT 3
POLYMER SKID VENDOR PACKAGE (SEE SPECIFICATION SECTION 11246 FOR ADDITIONAL REQUIREMENTS) - TYP

1-1/2" 3W
PIT-07-063 PIT 711
PIT-07-064 PIT 712
480V
2" POL
2" POL
POLYMER SKID
2" POS
(E) 2" POS
2" POS
DEW-POL-07-002
POLYMER BLENDING UNIT 2
POLYMER SKID VENDOR PACKAGE (SEE SPECIFICATION SECTION 11246 FOR ADDITIONAL REQUIREMENTS) - TYP

1-1/2" 3W
PIT-07-061 PIT 708
PIT-07-062 PIT 709
480V
2" POL
POLYMER SKID
2" POS
(E) 2" POS
2" POS
DEW-POL-07-001
POLYMER BLENDING UNIT 1
POLYMER SKID VENDOR PACKAGE (SEE SPECIFICATION SECTION 11246 FOR ADDITIONAL REQUIREMENTS) - TYP

Beecher Engineering, Inc.

REV	DATE	BY	DESCRIPTION
2	2/27/25	TB	DRAWING RE-ISSUED PER ADDENDUM 3
1	2/18/25	TB	DRAWING ADDED PER ADDENDUM 2

DESIGNED TB
DRAWN BEI
CHECKED BEI
DATE FEBRUARY 2025

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA 2/13/2025

carollo

Manteca CITY OF MANTECA, CALIFORNIA Manteca the family city INCORPORATED MAY 25, 1918

CITY OF MANTECA
WQCF SLUDGE THICKENER AND DEWATERING UNIT NO.3 PROJECT
INSTRUMENTATION
P&ID: POLYMER DILUTION UNIT 3

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 202645
DRAWING NO. 07N072
SHEET NO. 211 OF 239

PROJECT NO. 202645 FILE NAME: 202645_07N072.dwg