



August 17, 2021

SENT VIA: EMAIL

Stephanie White  
State Water Resources Control Board  
Division of Financial Assistance  
Financial Planning and Support Unit

**Subject: Stanislaus Regional Water Authority Regional Surface Water Supply Project  
American Iron and Steel Waiver Request**

Dear Ms. White,

We are in receipt of the Stanislaus Regional Water Authority (SRWA) State Revolving Fund (SRF) Loan Installment Sale Agreement to fund the SRWA Regional Surface Water Supply Project (Project). The SRWA Board of Directors will be considering the Agreement at its August 19, 2021 meeting.

We have recently been informed by our contractor, CH2M Hill Engineers, Inc., that certain process pipe fittings to be used in construction of the Project are not currently available and by this request, we are seeking an AIS waiver to avoid Project delays. Section 436 of P.L. 113-76, Consolidated Appropriation Act, 2014 includes the requirement for SRF loan recipients to use iron and steel products that are produced in the United States. Section 436 allows the EPA to issue waivers for multiple reasons, one of which is "iron and steel products are not produced in the U.S. in sufficient and reasonable available quantities". There is a limited number of fittings listed below that are needed to be purchased and installed prior to construction of the filter and ozone facilities which are on the critical path schedule for completion of the Project:

- Qty. 1 each 30" MJ Tee, Tyler Union, [REDACTED]
- Qty. 1 each 30" MJ 90, Tyler Union, [REDACTED]
- Qty. 2 each 36" X 20" MJ Tee, Sigma Corporation, [REDACTED]
- Qty. 1 each 36"x30" MJ Reducer, Tyler Union, [REDACTED]

CH2M Hill's subcontractor, Overaa Construction, contacted their supplier, Capital Flow Waterworks (7640 Wilbur Way #2, Sacramento, CA 95828), at the beginning of procurement authorization on August 2, 2021, and was informed of the lack of availability of these specific fittings from the three known U.S. ductile iron fitting manufacturers (Tyler Union, US Pipe, and Star Pipe Products). None of these manufacturers have domestic ductile iron fittings available; however, the necessary fittings are in stock and ready to ship from international locations. Installation of these fittings is scheduled for the end of August. With a projected lead time of 12-20 weeks for U.S.-manufactured fittings, the

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Project would be delayed incurring substantial avoidable cost to the SRWA. CH2M Hill is currently billing approximately \$6 million per month in Project expenditures; therefore the cost of the fittings compared to the potential delay cost is approximately 0.002%.

Documentation to support this waiver request are enclosed. It appears that there have been recent similar waiver requests approved by EPA for valves, fittings, and piping of various size and material, mainly due to a lack of availability.

Your expeditious review of this request would be greatly appreciated. Please let me know if there is any additional information needed to complete this waiver request.

Sincerely,



Robert L. Granberg, P.E., DBIA  
SRWA General Manager

cc: Marques Tamanaha, DWSRF Project Manager  
Lindsay Smith, West Yost Associates, SRWA Program Manager

Enclosures: 1) Letter from CapFlo Waterworks  
2) Fitting construction schedule  
3) Filter/ozone underslab drawings  
4) Process piping specifications  
5) Ductile iron data sheets

This waiver request was submitted to the EPA by the state of California. All supporting correspondence and/or documentation from contractors, suppliers or manufacturers included as a part of this waiver request was done so by the recipient to provide an appropriate level of detail and context for the submission. There may be documents with project diagrams, schedules, and supplier correspondence in formats that do not meet the Federal accessibility requirements for publication on the Agency's website. Hence, these exhibits have been omitted from this waiver publication. They are available upon request by emailing [DWSRFWaiver@epa.gov](mailto:DWSRFWaiver@epa.gov).

## AIS DE MINIMIS

**To:**



Overaa Construction  
Manuel Azevedo  
manuela@overaa.com  
PH:(510) 719-0017

**From:**



Capital Flow  
Sean Sutterer  
sean@capfloww.com  
PH: (916) 474-1625

**Date:** 8/12/21

**Project:** Regional Surface Water Supply

Description: AVAILABILITY OF AIS FITTINGS	Reviewers' Action				
	NET	MCN	R&R	R	NV

Capital Flow has been actively searching for the various fittings needed for the Filter Building under slab piping. We reached out to all known manufacturers of domestically cast fittings in the US. We reached out to Tyler Union, US Pipe, and Star Pipe Products who to our knowledge are the only ones who can domestically cast the necessary fittings. At this point the only available options for the following fittings (30" MJ Tee, 30" MJ 90, 36"x20" MJ Tee (2), 36"x30" MJ Reducer) are import. With the constantly changing inventory levels of these three domestic manufacturers, it is possible that there could be other fittings needed to be substituted with an import alternative. All efforts to supply AIS domestic fittings, pipe, and restraints will be continued, and substitutions made only when there aren't any other options. Time frames to cast new fittings could be in excess of 12-20 weeks.

Sean Sutterer  
VP of Sales

- c. Certified in accordance with ASNT SNT-TC-1A for testing procedures required for this Project.
- d. Testing Agency: Personnel performing tests shall be NDT Level II certified in accordance with ASNT SNT-TC-1A.
- e. Verification Welding Inspector: AWS QC1 Certified.
2. Welding Procedures: In accordance with ASME BPVC SEC IX (Forms QW-482 and QW-483) or AWS D1.1/D1.1M (Annex N Forms).
3. Welder Qualifications: In accordance ASME BPVC SEC IX (Form QW-484) or AWS D1.1/D1.1M (Annex N Forms).
4. Subcontractor's CWI: Certified in accordance with AWS QC1, and having prior experience with specified welding codes. Alternate welding inspector qualifications require approval by Design-Builder.
5. ~~[A: Solvent Welder For Double Wall Containment Piping: Qualified in accordance with Chapter VII of the ASME B31.3 Code, Part 9, Paragraph A328.]~~ <sup>[REV. 1]</sup>

B. Quality Assurance: Provide services of independent inspection and testing agency for welding operations.

1. Note, the presence of Design-Builder's Special Inspector or Verification CWI does not relieve Subcontractor from performing own quality control, including 100 percent visual inspection of welds.

## 1.07 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 01 61 00, Common Product Requirements, and:

1. Flanges: Securely attach metal, hardboard, or wood protectors over entire gasket surface.
2. Threaded or Socket Welding Ends: Fit with metal, wood, or plastic plugs or caps.
3. Linings and Coatings: Prevent excessive drying.
4. Cold Weather Storage: Locate products to prevent coating from freezing to ground.
5. Handling: Use heavy canvas or nylon slings to lift pipe and fittings.

## PART 2 PRODUCTS

### 2.01 GENERAL

A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply ~~with the~~

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~~maximum lead content standard in accordance~~ [REV. 1] with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

~~4.B.~~ For this Project, Water for Human Consumption shall mean all process water from raw water through the plant to finished water, as well as backwash waste, filter to waste, sludge drain and recycle lines that carry water or sludge to the Backwash EQ Basins or to the Sludge Drying Beds and back to the Flow Split Structure. This designation shall also apply to chemical piping that carries chemicals injected into any of the process water streams. [REV. 1]

2.02 PIPING

A. As specified on Piping Data Sheet(s) and on Piping Schedule located on Drawings.

B. Diameters Shown:

1. Standardized Products: Nominal size.
2. Fabricated Steel Piping (Except Cement-Lined): Outside diameter, ASME B36.10M.
3. Cement-Lined Steel Pipe: Lining inside diameter.

2.03 JOINTS

A. Grooved End System:

1. Rigid type.
2. Use of flexible grooved joints allowed where shown on Drawings or with prior approval by Design-Builder.
3. Flanges: When required, furnish with grooved type flange adapters of same manufacturer as grooved end couplings.

B. Flanged Joints:

1. Flat-faced, carbon steel, or alloy flanges when mating with flat-faced cast or ductile iron flanges.
2. Higher pressure rated flanges as required to mate with equipment when equipment flange is of higher pressure rating than required for piping.

C. Threaded Joints: NPT taper pipe threads in accordance with ASME B1.20.1.

- D. Mechanical Joint Anchor Gland Follower:
1. Ductile iron anchor type, wedge action, with break-off tightening bolts.
  2. Thrust rated to 250 psi minimum.
  3. Rated operating deflection not less than:
    - a. 3 degrees for sizes through 12 inches.
    - b. 2 degrees for sizes 14 inches through 16 inches.
    - c. 1.5 degrees for sizes 18 inches through 24 inches.
    - d. 1 degree for sizes 30 inches through 48 inches.
  4. UL and FM approved.
- E. Flexible Mechanical Compression Joint Coupling:
1. Stainless steel, ASTM A276, Type 305 bands.
  2. Manufacturers:
    - a. Pipeline Products Corp.
    - b. Fernco Joint Sealer Co.
- F. Mechanical connections of high-density polyethylene pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems shall be through-flanged connections consisting of the following:
1. Polyethylene stub end thermally butt-fused to end of pipe.
  2. ASTM A240/A240M, Type 304 stainless steel backing flange, 125-pound, ASME B16.1 standard. Use insulating flanges where shown.
  3. Bolts and nuts of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer's standard. Retorque nuts after 4 hours.
  4. Gaskets as specified on Data Sheet.

#### 2.04 GASKET LUBRICANT

- A. Lubricant shall be supplied by pipe manufacturer and no substitute or "or-equal" will be allowed.

#### ~~2.05 DOUBLE WALL CONTAINMENT PIPING SYSTEM~~

- ~~A. System components shall be pre-engineered, factory fabricated, tested, and assembled such that field assembly is minimized to primarily that of straight joints. [REV. 1]~~

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2.062.05 PIPE CORROSION PROTECTION

- A. Coatings: See Section 09 90 00, Painting and Coating, for details of coating requirements.
- B. Heat Shrink Wrap:
  - 1. Type: Cross-linked polyolefin wrap or sleeve with mastic sealant.
  - 2. Manufacturer and Product: Raychem; WPC or TPS.
- C. Polyethylene Encasement (Bagging):
  - 1. Encasement Tube: Black polyethylene encasement tube, 8 mils minimum thickness, conforming to AWWA C105/A21.5, free of gels, streaks, pinholes, foreign matter, undispersed raw materials, and visible defects such as tears, blisters, and thinning at folds.
  - 2. Securing Tape: Thermoplastic tape, 8 mils minimum thickness, 1 inch wide, pressure sensitive adhesive face capable of bonding to metal, bituminous coating, and polyethylene encasement tube.
- D. Insulating Flanges, Couplings, and Unions:
  - 1. Materials:
    - a. In accordance with applicable piping material specified in Pipe Data Sheet. Complete assembly shall have ASME B31.3 working pressure rating equal to or higher than that of joint and pipeline.
    - b. Galvanically compatible with piping.
    - c. Resistant for intended exposure, operating temperatures, and products in pipeline.
  - 2. Union Type, 2 Inches and Smaller:
    - a. Screwed or solder-joint.
    - b. O-ring sealed with molded and bonded insulation to body.
  - 3. Flange Type, 2-1/2 Inches and Larger:
    - a. Flanged, complete with bolt insulators, dielectric gasket, bolts, and nuts.
    - b. Bolt insulating sleeves shall be provided full length between insulating washers.
    - c. Ensure fit-up of components of insulated flange assembly to provide a complete functioning installation.
    - d. AWWA C207 steel flanges may be drilled oversize up to 1/8-inch to accommodate insulating sleeves.
    - e. No less than minimum thread engagement in accordance with specified bolting standards will be permitted to accommodate thicknesses of required washers, flanges, and gasket.

4. Flange Insulating Kits:
  - a. Gaskets: Full-face, Type E with elastomeric sealing element. Sealing element shall be retained in a groove within retainer portion of gasket.
  - b. Insulating Sleeves: Full-length [~~D: mylar~~] [~~E: fiberglass~~ reinforced epoxy (NEMA LI-1, G-10 grade)]. [REV. 1]
  - c. Insulating Washers: [~~F: High strength phenolic~~] [~~G: Fiberglass-reinforced epoxy (NEMA LI-1, G-10 grade)~~]. [REV. 1]
  - d. Steel Washers: [~~H: Plated, hot-rolled steel~~] [~~I: Hardened steel, ASTM F436~~], [REV. 1] 1/8 inch thick.
    - 1) Flange Diameters 36 Inches or Less: Provide two washers per bolt.
    - 2) Flange Diameters Larger Than 36 Inches: Provide four washers per bolt.
5. Manufacturers and Products:
  - a. Dielectric Flanges and Unions:
    - 1) PSI, Houston, TX.
    - 2) Advance Products and Systems, Lafayette, LA.
  - b. Insulating Couplings:
    - 1) Dresser; [~~J: STAB-39~~] [~~K: —~~]. [REV. 1]
    - 2) Baker Coupling Company, Inc.; [~~L: Series 216~~] [~~M: —~~]. [REV. 1]

#### 2.072.06 THRUST BLOCKS

- A. Concrete: As specified in Section 03 30 00, Cast-in-Place Concrete.

#### 2.082.07 THRUST TIES

- A. Steel Pipe: Fabricated lugs and rods in accordance with details shown on Drawings.
- B. Buried Ductile Iron Pipe and Fittings: Unless restraint is otherwise specified or shown, conform to NFPA 24. Tie-rod attachments relying on clamp friction with pipe barrel to restrain thrust are unacceptable.

#### 2.092.08 VENT AND DRAIN VALVES

- A. Pipeline 2-Inch Diameter and Smaller: [~~A: 1/2-inch vent, 1-inch drain,~~] [~~B: \_\_\_\_\_ inch vent, \_\_\_\_\_ inch drain,~~] [REV. 1] unless shown otherwise.
- B. Pipelines 2-1/2-Inch Diameter and Larger: [~~A: 3/4-inch vent, 1-inch drain,~~] [~~B: \_\_\_\_\_ inch vent, \_\_\_\_\_ inch drain,~~] [REV. 1] unless shown otherwise.

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~~2.10~~2.09 FABRICATION

- A. Mark each pipe length on outside with the following:
  - 1. Size or diameter and class.
  - 2. Manufacturer's identification and pipe serial number.
  - 3. Location number on laying drawing.
  - 4. Date of manufacture.
- B. Code markings according to approved Shop Drawings.
- C. Shop fabricate flanged pipe in shop, not in field, and delivered to Site with flanges in place and properly faced. Threaded flanges shall be individually fitted and machine tightened on matching threaded pipe by manufacturer.

~~2.11~~2.10 FINISHES

- A. Factory prepare, prime, and finish coat in accordance with Pipe Data Sheet(s) and Piping Schedule on Drawings.<sup>[REV. 1]</sup>
- B. Galvanizing:
  - 1. Hot-dip applied, meeting requirements of ASTM A153/A153M.
  - 2. Electroplated zinc or cadmium plating is unacceptable.
  - 3. Stainless steel components may be substituted where galvanizing is specified.

**PART 3 EXECUTION**

3.01 EXAMINATION

- A. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

3.02 PREPARATION

- A. See Piping Schedule and Section 09 90 00, Painting and Coating, for additional requirements.
- B. Notify Design-Builder at least 2 weeks prior to field fabrication of pipe or fittings.

- C. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.
- D. Damaged Coatings and Linings: Repair using original coating and lining materials in accordance with manufacturer's instructions.

### 3.03 WELDING

- A. Perform in accordance with Section IX, ASME Boiler and Pressure Vessel Code and ASME B31.3 for Pressure Piping, as may be specified on Piping Data Sheets, and if recommended by piping or fitting manufacturer.
- B. Weld Identification: Keep paper record of which welder welded each joint.
- C. Pipe End Preparation:
  - 1. Machine Shaping: Preferred.
  - 2. Oxygen or Arc Cutting: Smooth to touch, true, and slag removal by chipping or grinding.
  - 3. Beveled Ends for Butt Welding: ASME B16.25.
- D. Surfaces:
  - 1. Clean and free of paint, oil, rust, scale, slag, or other material detrimental to welding.
  - 2. Clean stainless steel joints with stainless steel wire brushes or stainless steel wool prior to welding.
  - 3. Thoroughly clean each layer of deposited weld metal, including final pass, prior to deposition of each additional layer of weld metal with a power-driven wire brush.
- E. Alignment and Spacing:
  - 1. Align ends to be joined within existing commercial tolerances on diameters, wall thicknesses, and out-of-roundness.
  - 2. Root Opening of Joint: As stated in qualified welding procedure.
  - 3. Minimum Spacing of Circumferential Butt Welds: Minimum four times pipe wall thickness or 1 inch, whichever is greater.
- F. Climatic Conditions:
  - 1. Do not perform welding if there is impingement of any rain, snow, sleet, or wind exceeding 5 mph on the weld area, or if ambient temperature is below 32 degrees F.

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2. Stainless Steel and Alloy Piping: If ambient is less than 32 degrees F, local preheating to a temperature warm to the hand is required.
- G. Tack Welds: Performed by qualified welder using same procedure as for completed weld, made with electrode similar or equivalent to electrode to be used for first weld pass, and not defective. Remove those not meeting requirements prior to commencing welding procedures.
- H. Surface Defects: Chip or grind out those affecting soundness of weld.
- I. Weld Quality: Meet requirements of governing welding codes.

3.04 INSTALLATION—GENERAL

- A. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
- B. Remove foreign objects prior to assembly and installation.
- C. Flanged Joints:
  1. Install perpendicular to pipe centerline.
  2. Bolt Holes: Straddle vertical centerlines, aligned with connecting equipment flanges or as shown.
  3. Use torque-limiting wrenches to ensure uniform bearing and proper bolt tightness.
  4. Plastic Flanges: Install annular ring filler gasket at joints of raised-face flange.
  5. Grooved Joint Flange Adapters: Include stainless steel washer plates as required for mating to serrated faces and lined valves and equipment.
  6. Raised-Face Flanges: Use flat-face flange when joining with flat-faced ductile or cast iron flange.
  7. Verify compatibility of mating flange to adapter flange gasket prior to selecting grooved adapter flanging.
  8. Flange fillers are to be avoided, but if necessary, may be used to make up for small angles up to 6 degrees and for filling gaps up to 2 inches between flanges. Stacked flange fillers shall not be used.
  9. Threaded flanged joints shall be shop fabricated and delivered to Site with flanges in-place and properly faced.
  10. Manufacturer: Same as pipe manufacturer or grooved joint flange adapter manufacturer.

D. Threaded and Coupled Joints:

1. Conform to ASME B1.20.1.
2. Produce sufficient thread length to ensure full engagement when screwed home in fittings.
3. Countersink pipe ends, ream and clean chips and burrs after threading.
4. Make connections with not more than three threads exposed.
5. Lubricate male threads only with thread lubricant or tape as specified on Piping Data Sheets.

E. Grooved-End Joints:

1. Piping shall be grooved in accordance with manufacturer's latest published instructions and shall be accurately cut with tools conforming to coupling manufacturer's standards and to AWWA C606.
2. Install grooved joint couplings and gaskets in accordance with manufacturer's latest published installation instructions.

F. Soldered Joints:

1. Use only solder specified for particular service.
2. Cut pipe ends square and remove fins and burrs.
3. After thoroughly cleaning pipe and fitting of oil and grease using solvent and emery cloth, apply noncorrosive flux to the male end only.
4. Wipe excess solder from exterior of joint before hardened.
5. Before soldering, remove stems and washers from solder joint valves.

G. Brazed Joints for Refrigerant Piping:

1. Braze copper piping with silver solder complying with AWS A5.8/A5.8M.
2. Construct joints according to AWS Brazing Handbook, Chapter Pipe and Tube.
3. Inside of tubing and fittings shall be free of flux.
4. Clean parts to be joined with emery cloth and keep hot until solder has penetrated the full depth of the fitting and extra flux has been expelled.
5. Cool joints in air and remove flame marks and traces of flux.
6. During brazing operation, prevent an oxide film from forming on inside of tubing by slowly flowing dry nitrogen to expel the air.
7. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion valve bulb.

H. Pipe Connections at Concrete Structures: As specified in Article Piping Flexibility Provisions in Section 40 27 01, Process Piping Specialties.

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I. PVC and CPVC Piping:

1. Provide Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
2. Use strap wrench for tightening threaded plastic joints. Do not overtighten fittings.
3. Do not thread Schedule 40 pipe.

J. Ductile Iron Piping:

1. Cutting Pipe: Cut pipe with milling type cutter, rolling pipe cutter, or abrasive blade cutter. Do not flame cut.
2. Dressing Cut Ends:
  - a. General: As required for the type of joint to be made.
  - b. Rubber Gasketed Joints: Remove sharp edges or projections.
  - c. Push-On Joints: Bevel, as recommended by pipe manufacturer.
  - d. Flexible Couplings, Flanged Coupling Adapters, and Grooved End Pipe Couplings: As recommended by the coupling or adapter manufacturer.

K. High-Density Polyethylene Piping:

1. Join pipes, fittings, and flange connections by means of thermal butt-fusion.
2. Perform butt-fusion in accordance with pipe manufacturer's recommendations as to equipment and technique.
3. Special Precautions at Flanges: Polyethylene pipe connected to heavy fittings, manholes, and rigid structures shall be supported in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.

3.05 INSTALLATION—EXPOSED PIPING

A. Piping Runs:

1. Parallel to building or column lines and perpendicular to floor, unless shown otherwise.
2. Piping upstream and downstream of flow measuring devices shall provide straight lengths as required for accurate flow measurement.

B. Supports: As specified in Section 40 05 15, Piping Support Systems.

C. Group piping wherever practical at common elevations; install to conserve building space and not interfere with use of space and other work.

- D. Unions or Flanges: Provide at each piping connection to equipment or instrumentation on equipment side of each block valve to facilitate installation and removal.
- E. Install piping so that no load or movement in excess of that stipulated by equipment manufacturer will be imposed upon equipment connection; install to allow for contraction and expansion without stressing pipe, joints, or connected equipment.
- F. Piping clearance, unless otherwise shown:
  - 1. Over Walkway and Stairs: Minimum of 7 feet 6 inches, measured from walking surface or stair tread to lowest extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  - 2. Between Equipment or Equipment Piping and Adjacent Piping: Minimum 3 feet, measured from equipment extremity and extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  - 3. From Adjacent Work: Minimum 1 inch(es) from nearest extremity of completed piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  - 4. Do not route piping in front of or to interfere with access ways, ladders, stairs, platforms, walkways, openings, doors, or windows.
  - 5. Headroom in front of openings, doors, and windows shall not be less than the top of the opening.
  - 6. Do not install piping containing liquids or liquid vapors in transformer vaults or electrical equipment rooms.
  - 7. Do not route piping over, around, in front of, in back of, or below electrical equipment including controls, panels, switches, terminals, boxes, or other similar electrical work.

### 3.06 INSTALLATION—BURIED PIPE

- A. Joints:
  - 1. Dissimilar Buried Pipes:
    - a. Provide flexible mechanical compression joints for pressure pipe.
    - b. Provide concrete closure collar for gravity piping or as shown.
  - 2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown.

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B. Placement:

1. Keep trench dry until pipe laying and joining are completed.
2. Pipe Base and Pipe Zone: As specified in Section 31 23 23.15, Trench Backfill.
3. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
4. Measure for grade at pipe invert, not at top of pipe.
5. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
6. Prevent foreign material from entering pipe during placement.
7. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
8. Lay pipe upgrade with bell ends pointing in direction of laying.
9. Install closure sections and adapters for gravity piping at locations where pipe laying changes direction.
10. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
  - a. Shorter pipe lengths.
  - b. Special mitered joints.
  - c. Standard or special fabricated bends.
11. After joint has been made, check pipe alignment and grade.
12. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
13. Prevent uplift and floating of pipe prior to backfilling.

C. ~~[A:]~~PVC, CPVC, or HDPE Pipe Placement: [\[REV. 1\]](#)

1. Lay pipe snaking from one side of trench to other.
2. Offset: As recommended by manufacturer for maximum temperature variation between time of solvent welding and during operation.
3. Do not lay pipe when temperature is below 40 degrees F, or above 90 degrees F when exposed to direct sunlight.
4. Shield ends to be joined from direct sunlight prior to and during the laying operation.

D. Tolerances:

1. Deflection from Horizontal Line: Maximum 2 inches.
2. Deflection From Vertical Grade: Maximum 1/4 inch(es).
3. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.

4. Horizontal position of pipe centerline on alignment around curves maximum variation of 1.75 feet from position shown.
5. Pipe Cover: Minimum ~~[H: 3]~~~~[I: —]~~ feet, <sup>[REV. 1]</sup> unless otherwise shown.

### 3.07 INSTALLATION—CONCRETE ENCASED

- A. Provide concrete pipe encasement where shown on Drawings and where otherwise required. Some piping may be required to be concrete encased for pipe strength requirements that are included in the Specifications. Piping under and within the influence of buildings, utility trenches, vaults, slabs, and other structures shall be concrete encased. See details on Drawings for encasement requirements.
- B. Where concrete encased piping crosses structure construction and expansion joints, provide flexible piping joints to coincide with structure joints to prevent excessive pipe stress and breakage.

### ~~3.08 INSTALLATION—DOUBLE WALL CONTAINMENT PIPING SYSTEM~~

- ~~A. Install according to manufacturer's instructions.~~
- ~~B. Valves and equipment shall be supported independently from pipe. Anchor valves such that turning moment resulting from their operation will not be transmitted to pipe.~~
- ~~C. Centering Devices for Double Wall Containment Piping:
  - ~~1. Center and support carrier pipe within the containment pipe with centering devices. Locate not less than every [A: 9] [B: —] feet, or within 24 inches of the termination of containment pipe on fabricated pieces.~~
  - ~~2. Install centering devices such that leak detection cable (if specified) will be unrestricted and such that system maintains free drainage.~~~~
- ~~D. Following Installation and Testing:
  - ~~1. Flush clean carrier and containment piping system.~~
  - ~~2. Purge annular space of moisture with clean, dry [A: nitrogen gas] [B: air].<sup>[REV. 1]</sup>~~~~

### ~~3.09 LEAK DETECTION SYSTEM FOR DOUBLE WALL CONTAINMENT PIPING~~

- ~~A. Install in accordance with system manufacturer's instructions and recommendations.<sup>[REV. 1]</sup>~~

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3-103.08 PIPE CORROSION PROTECTION

- A. Ductile Iron Pipe:
1. Exposed: As specified in Section 09 90 00, Painting and Coating, and as shown in Piping Schedule.
  2. Buried: Wrap with polyethylene bagging.
  3. Submerged or Embedded: Coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating. If in potable water service, use NSF/ANSI 61 approved epoxy.
- B. Carbon Steel Pipe:
1. Exposed: As specified in Section 09 90 00, Painting and Coating.
  2. Buried:
    - a. Pipe: ~~{A:}~~ Wrap with tape coating system as specified in Section 09 90 00, Painting and Coating if pipe is not cement coated. ~~{B:}~~ <sup>[REV. 1]</sup>
    - b. Joints: ~~{C:}~~ Wrap with tape coating system as specified in Section 09 90 00, Painting and Coating, or heat shrink wrap as specified herein, if pipe is not cement coated. ~~{D:}~~ <sup>[REV. 1]</sup>
  3. Submerged or Embedded: Shop coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating. If in potable water service, use NSF/ANSI 61 approved epoxy.
- C. Copper Pipe:
1. Exposed: As specified in Section 09 90 00, Painting and Coating.
  2. Buried:
    - a. Pipe and Joints: ~~{A:}~~ Wrap with tape coating system as specified in Section 09 90 00, Painting and Coating. ~~{B:}~~ <sup>[REV. 1]</sup>
    - b. ~~Joints:~~ ~~{B:}~~ <sup>[REV. 1]</sup>
- D. PVC and CPVC Pipe, Exposed: As specified in Section 09 90 00, Painting and Coating.
- E. Stainless Steel Pipe: Welded pipe shall be pickled and passivated after assembly.
- F. Piping Accessories:
1. Exposed:
    - a. Field paint black and galvanized steel, brass, copper, and bronze piping components as specified in Section 09 90 00, Painting and Coating, as applicable to base metal material.

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- b. Accessories include, but are not limited to, pipe hangers, supports, expansion joints, pipe guides, flexible couplings, vent and drain valves, and fasteners.
- 2. Buried:
  - a. Ferrous Metal and Stainless Steel Components: Coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating.
  - b. Bolts, Nuts, and Similar Items: Coat with bituminous paint.
  - c. Flexible Couplings and Similar Items: Wrap with heat shrink wrap ~~{B: or coat with cement}~~.<sup>[REV. 1]</sup>
  - d. Buried Valves and Similar Elements on Wrapped Pipelines: Coat with bituminous paint and wrap entire valve in polyethylene encasement.
  - e. Cement-Coated Pipelines: Cement coat appurtenances ~~{C: same as pipe}~~~~{D: —}~~.<sup>[REV. 1]</sup>
- G. Polyethylene Encasement: Install in accordance with AWWA C105/A21.5 and manufacturer's instructions.
- H. Tape Coating System: As specified in Section 09 90 00, Painting and Coating.
- I. Heat Shrink Wrap: Apply in accordance with manufacturer's instructions to surfaces that are cleaned, prepared, and primed.
- J. Insulating Flanges, Couplings, and Unions:
  - 1. Applications:
    - a. Dissimilar metal piping connections.
    - b. Cathodically protected piping penetration to ~~{A: buildings}~~ ~~{B: and watertight structures}~~~~{C: —}~~.<sup>[REV. 1]</sup>
    - c. ~~{D: Submerged to unsubmerged metallic piping connections.}~~<sup>[REV. 1]</sup>
    - ~~d. — {E: Connections to existing metallic pipe.}~~<sup>[REV. 1]</sup>
    - ~~e.d.~~ Where required for electrically insulated connection.
  - 2. Pipe Installation:
    - a. ~~{F: Insulating joints connecting immersed piping to nonimmersed piping shall be installed above maximum water surface elevation.}~~<sup>[REV. 1]</sup>
    - b. Submerged carbon steel, ductile iron, or galvanized piping in reinforced concrete shall be isolated from the concrete reinforcement steel.
    - c. Align and install insulating joints as shown on the Drawings and according to manufacturer's recommendations. Bolt lubricants that contain graphite or other metallic or electrically conductive

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components that can interfere with the insulating capabilities of the completed flange shall not be used.

- K. Pipe Bonding for Buried Piping: As specified in Section ~~[A:26 42 01, Pipe Bonding and Test Stations]~~~~[B:—]~~, [REV. 1]
- L. Cathodic Protection for Buried Piping: As specified in Section [A: 26 42 020, Galvanic Anode Cathodic Protection System]~~[B:—]~~, [REV. 1] and as shown.

3.113.09 THRUST RESTRAINT

- A. Location:
  - 1. Buried Piping: Where shown and where required to restrain force developed at pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist because of hydrostatic testing and normal operating pressure.
  - 2. Exposed Piping: At all joints in piping.
- B. Thrust Ties:
  - 1. Steel Pipe: Attach with ~~[A:lugs fabricated in accordance with details shown on Drawings]~~~~[B: joint harness specified in Section 40 27 01, Process Piping Specialties]~~, [REV. 1]
  - 2. Ductile Iron Pipe: Attach with socket clamps anchored against grooved joint coupling or flange.
  - 3. Flanged Coupling Adapters: For exposed installations, install manufacturer's anchor studs through coupling sleeve or use dismantling joints.
- C. Mechanical Joint Valve Restraint in Proprietary Restrained Joint Piping: Install pipe joint manufacturer's adapter gland follower and pipe end retainer, or mechanical joint anchor gland follower.
- D. Thrust Blocking:
  - 1. Place between undisturbed ground and fitting to be anchored.
  - 2. Quantity of Concrete: Sufficient to cover bearing area on pipe and provide required soil bearing area as shown.
  - 3. Place blocking so that pipe and fitting joints will be accessible for repairs.
  - 4. Place concrete in accordance with Section 03 30 00, Cast-in-Place Concrete.

3.123.10 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS

- A. Application and Installation: As specified in Section 40 27 01, Process Piping Specialties.

3.133.11 BRANCH CONNECTIONS

- A. Do not install branch connections smaller than 1/2-inch nominal pipe size, including instrument connections, unless shown otherwise.
- B. When line of lower pressure connects to a line of higher pressure, requirements of Piping Data Sheet for higher pressure rating prevails up to and including first block valve in the line carrying the lower pressure, unless otherwise shown.
- C. Threaded Pipe Tap Connections:
  - 1. Ductile Iron Piping: Connect only with service saddle or at tapping boss of a fitting, valve body, or equipment casting.
  - 2. Welded Steel or Alloy Piping: Connect only with welded threadolet or half-coupling as specified on Piping Data Sheet.
  - 3. Limitations: Threaded taps in pipe barrel are unacceptable.

3.143.12 VENTS AND DRAINS

- A. Vents and drains at high and low points in piping required for completed system may or may not be shown. Install vents on high points and drains on low points of pipelines [~~A: only where shown~~] [~~B: as shown~~] [~~C: at all low and high point locations~~]. <sup>[REV. 1]</sup>

3.153.13 [~~A:~~] INSULATION

- A. See Section 40 42 13, Process Piping Insulation. <sup>[REV. 1]</sup>

3.163.14 [~~A:~~] HEAT TRACING

- A. See Section 40 05 33, Pipe Heat Tracing. <sup>[REV. 1]</sup>

3.173.15 [~~A:~~] DISINFECTION

- A. See Section 33 13 00, Disinfecting of Water Utility Distribution. <sup>[REV. 1]</sup>

3.183.16 FIELD FINISHING

- A. Notify Design-Builder at least 3 days prior to start of surface preparation or coating application work.

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- B. As specified in Section ~~[A: 09 90 00, Painting and Coating]~~~~[B: 09 90 04, Painting (Short Form)]~~.<sup>[REV. 1]</sup>

~~3.193.17~~ PIPE IDENTIFICATION

- A. Labels for exposed pipe as specified in Section ~~[A: 10 14 00, Signage] and marking tape for buried pipe as specified in Section ~~[B: 31 23 23.15, Trench Backfill]~~ ~~[C: 09 90 00, Painting and Coating]~~ ~~[D: 09 90 04, Painting (Short Form)]~~. Color coding of labels and color coding of pipe coating as shown in the Piping Schedule on Drawings.~~<sup>[REV. 1]</sup>

~~3.203.18~~ FIELD QUALITY CONTROL

- A. Pressure Leakage Testing: As specified in Section 40 80 01, Process Piping Leakage Testing.
- B. Minimum Duties of Welding Inspector:
1. Job material verification and storage.
  2. Qualification of welders.
  3. Certify conformance with approved welding procedures.
  4. Maintenance of records and preparation of reports in a timely manner.
  5. Notification to Design-Builder of unsatisfactory weld performance within 24 hours of weld test failure.
- C. Required Weld Examinations:
1. Perform examinations in accordance with Piping Code ~~[A: , ASME B31.1]~~~~[B: , ASME B31.3]~~~~[C: for Normal Fluid Service]~~ ~~[D: , except that]~~ ~~[E: 5]~~ ~~[F: —]~~ ~~[G: percent of circumferential butt welds shall be random radiographed]~~.<sup>[REV. 1]</sup>
  2. Perform examinations for every pipe thickness and for each welding procedure, progressively, for piping covered by this section.
  3. Examine at least one of each type and position of weld made by each welder or welding operator.
  4. For each weld found to be defective under the acceptance standards or limitations on imperfections contained in the applicable Piping Code, examine two additional welds made by the same welder that produced the defective weld. Such additional examinations are in addition to the minimum required above. Examine, progressively, two additional welds for each tracer examination found to be unsatisfactory.
- ~~D:— [A: Test containment piping leak detection system in accordance with system manufacturer's instructions and recommendations to verify proper operation.]~~<sup>[REV. 1]</sup>

3.21 — ~~[A: MANUFACTURER'S SERVICES~~

~~A.D. Provide manufacturer's representative at Site [B: in accordance with Section 01 43 33, Manufacturers' Field Services,] to assist with unloading of the double wall containment piping system, system tests, containment pipe joint closure, installation and testing of leak detection system, and training of [C: Agency's] [D: —] personnel in operation and maintenance of leak detection system. Manufacturer's representative shall complete a Manufacturer's Certificate of Proper Installation. Inspection and examination practices shall be according to ASME B31.3 for Normal Fluid Service.~~ <sup>[REV. 1]</sup>

3.223.19 CLEANING

- A. Following assembly and testing, and prior to ~~[A: disinfection and]~~ <sup>[REV. 1]</sup> final acceptance, flush pipelines, except as stated below, with water at 2.5 fps minimum flushing velocity until foreign matter is removed.
- B. Blow clean of loose debris ~~[A: plant process air,] [B: natural gas,] [C: dry chlorine gas or liquid,] [D: and] instrument air~~ lines with compressed air at ~~[E: 4,000] [F: —]~~ fpm; do not flush with water. <sup>[REV. 1]</sup>
- ~~C. Immediately after cleaning [A: dry chlorine gas or liquid,] [B: —,] [C: and] [D: —,] service piping, dry to minus 40 degrees F dew point with dry compressed instrument air or compressed commercial grade nitrogen.~~ <sup>[REV. 1]</sup>
- ~~D.C.~~ If impractical to flush large diameter pipe at 2.5 fps or blow at ~~[A: 4,000] [B: —]~~ fpm <sup>[REV. 1]</sup> velocity, clean in-place from inside by brushing and sweeping, then flush or blow line at lower velocity.
- ~~E.D.~~ Insert cone strainers in flushing connections to attached equipment and leave in-place until cleaning is complete.
- ~~F.E.~~ Remove accumulated debris through drains 2 inches and larger or by removing spools and valves from piping.

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3.233.20 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are a part of this Specification:
1. Data Sheets.

Number	Title
40 27 00.01	Cement-Mortar-Lined Ductile Iron Pipe and Fittings
<del>40 27 00.02</del>	<del>Carbon Steel Pipe and Fittings—Special Service</del> <sup>[REV. 1]</sup>
40 27 00.03	Carbon Steel Pipe and Fittings—General Service
40 27 00.07	Galvanized Steel Pipe and Malleable Iron Fittings
40 27 00.08	Stainless Steel Pipe and Fittings—General Service
<del>40 27 00.09</del>	<del>Stainless Steel Pipe and Fittings—Special Service</del> <sup>[REV. 1]</sup>
40 27 00.10	Polyvinyl Chloride (PVC) Pipe and Fittings
40 27 00.11	Chlorinated Polyvinyl Chloride (CPVC) Pipe and Fittings
40 27 00.13	Copper and Copper Alloy Pipe, Tubing, and Fittings
40 27 00.15	Double Wall Containment Piping
<del>40 27 00.16</del>	<del>Cross-Linked Polyethylene Tube and Fittings</del> <sup>[REV. 1]</sup>
<del>40 27 00.21</del>	<del>High Density Polyethylene (HDPE) Pressure Pipe and Fittings</del> <sup>[REV. 1]</sup>

**END OF SECTION**

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<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
General	<p>Materials in contact with potable water shall conform to NSF 61 acceptance.</p> <p>Pipe manufacturer shall submit certification that source manufacturing facility has been producing ductile iron pipe of specified diameters, dimensions, and standards for a period of not less than 10 years. Testing of pipe required by AWWA C151/A21.51 shall be conducted in testing and laboratory facilities located in the USA and operating under USA laws and regulations. Pipe shall be handled during manufacture and shipped without nesting (without insertion of one pipe inside another).</p>
Pipe	<p>Buried Liquid Service Using Mechanical or Proprietary Restrained Joints: AWWA C111/A21.11, and AWWA C151/A21.51, pressure class conforming to Table 5 and Table 7 for Type 4 trench, 250 psi minimum working pressure. Follower glands shall be ductile iron.</p> <p>Exposed Pipe Using Grooved End and Flange Joints: AWWA C115/A21.15, thickness Class 53 minimum, 250 psi minimum working pressure.</p>
Lining	<p>Cement-mortar and manufacturer's standard seal coat: AWWA C104/A21.4.</p>
Fittings	<p>Lined and coated same as pipe.</p> <p>Mechanical: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53 ductile iron, 250 psi minimum working pressure. Follower glands shall be ductile iron.</p> <p>Proprietary Restrained: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53, ductile iron, 250 psi minimum working pressure. Restraint shall be achieved with removable metal elements fitted between a welded bar on the pipe barrel and the inside of the joint bell or fitting sizes smaller than 16 inches may be mechanical joint, restrained by anchor gland followers, ductile iron anchor type, wedge action, with break-off tightening bolts. Assembled joints shall be rated for deflection in operation at rated pressure. Rated deflection shall be not less than 1-1/2 degrees for 36-inch and smaller pipe. Rated deflection shall be not less than 1/2 degree for 42-inch and larger pipe. Clow Corp., American Cast Iron Pipe Co., U.S. Pipe. Restrained joints relying on metal teeth molded into the gasket to prevent joint separation under pressure will not be accepted.</p>

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<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
	<p>Grooved End: AWWA C606 and AWWA C110/A21.10, ductile iron, 250 psi minimum working pressure; Victaulic.</p> <p>Flange: AWWA C110/A21.10 ductile iron, faced and drilled, Class 125 flat face. Gray cast iron will not be allowed.</p>
Joints	<p>Mechanical: 250 psi minimum working pressure.</p> <p>Proprietary Restrained: 150 psi minimum working pressure. Clow Corp., Super-Lock; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring; U.S. Pipe, TR Flex.</p> <p>Grooved End: Rigid type radius cut conforming to AWWA C606, 250 psi minimum working pressure; Victaulic.</p> <p>Flange: Dimensions per AWWA C110/A21.10 flat face, ductile iron, threaded conforming to AWWA C115/A21.15. Gray cast iron will not be allowed.</p> <p>Branch connections 3 inches and smaller shall be made with service saddles as specified in Section 40 27 01, Process Piping Specialties.</p>
Couplings	<p>Grooved End: 250 psi minimum working pressure, malleable iron per ASTM A47/A47M or ductile iron per ASTM A536; Victaulic.</p> <p>Grooved End Adapter Flanges: 250 psi minimum working pressure, malleable iron per ASTM A47/A47M or ductile iron per ASTM A536; Victaulic.</p>
Bolting	<p>Mechanical, Proprietary Restrained, and Grooved End Joints: Manufacturer's standard.</p> <p>Flanged: ASTM A307, Grade B carbon steel heavy hex head or stud bolts, ASTM A563, Grade A carbon steel heavy hex head nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Stud bolts are not allowed when bolting to tapped flanges. Torque bolts per gasket manufacturer recommendations.</p> <p>Flanged Joints in Sumps, Wet Wells, and Submerged and Wetted Installations: Type 316 stainless steel, ASTM A320/A320M, Grade B8M heavy hex head or stud bolts; ASTM A194/A194M, Grade 8M heavy hex nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Stud bolts are not allowed when bolting to tapped flanges. Torque bolts per gasket manufacturer recommendations.</p>

<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
Gaskets	<p>General: Gaskets in contact with the process water (from raw water through the treatment process to finished water) shall be NSF ANSI 61 certified.</p> <p>Mechanical and Proprietary Restrained Joints; Water and Sewage Service: Halogenated butyl or EPDM, Shore A hardness durometer 60, conforming to AWWA C111/A21.11.</p> <p>Grooved End Joints: Halogenated butyl conforming to ASTM D2000 and AWWA C606.</p> <p>Flanged, Water and Sewage Services: 1/8-inch-thick, homogeneous black rubber (EPDM), hardness 60-80 (Shore A), rated to 275 degrees F, conforming to ASME B16.21 and ASTM D2000.</p> <p>Full face for flat-faced flanges, flat-ring type for raised-face flanges. Blind flanges shall be epoxy-lined in accordance with the system specified above.</p> <p>Gasket pressure rating to equal or exceed the system hydrostatic test pressure.</p>
Joint Lubricant	Manufacturer's standard.

**END OF SECTION**