

Contract Documents & Technical Specifications



City of Galena, Illinois
West Side Water System
Improvements 2021

Contract A Water Distribution Improvements
Contract B Water Tower Demolition



WORKING ON TOMORROW. |

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TECHNICAL SPECIFICATIONS FOR
CITY OF GALENA, ILLINOIS
WEST SIDE WATER SYSTEM IMPROVEMENTS 2021

CONTRACT A WATER DISTRIBUTION IMPROVEMENTS
CONTRACT B WATER TOWER DEMOLITION

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|---|---|
|  | <p>I hereby certify that this Engineering Document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Illinois. For Origin Design Co. Professional Design Firm License #184-000951</p> <p><i>Christopher Becklin</i></p> <p style="text-align: right;">6/17/2021</p> |
| | <p>Christopher A. Becklin, P.E. License Number 062-071513 My license renewal date is November 30, 2021 Pages or sheets covered by this seal: Contract A Technical Specifications Contract B Technical Specifications & Plan Sheet No. C1.01</p> <p style="text-align: right;">Date</p> |

CITY OF GALENA, ILLINOIS
WEST SIDE WATER SYSTEM IMPROVEMENTS 2021

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REFERENCE DOCUMENTATION (NOT CERTIFIED BY IIW, P.C.)

1963 Franklin Street Water Tower Plan prepared by Pittsburg-Des Moines Steel Co.

CONTRACT A

WATER DISTRIBUTION IMPROVEMENTS

DIVISION 09 - FINISHES

| | |
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| High-Performance Coatings..... | 099600 |
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SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: High-performance coatings and special preparation of surfaces of the proposed process piping within the proposed pressure reducing and check valve stations/structures.

1.2 REFERENCE STANDARDS

- A. Master Painters Institute:
 - 1. MPI - Approved Products List.
 - 2. MPI - Architectural Painting Manual.
- B. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Painting Manual, Volume 2: Systems and Specifications.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP 5 - White Metal Blast Cleaning.
 - 5. SSPC-SP 6 - Commercial Blast Cleaning.
 - 6. SSPC-SP 7 - Brush-Off Blast Cleaning.
 - 7. SSPC-SP 10 - Near-White Metal Blast Cleaning.
 - 8. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer information indicating coating materials, and performance ratings.
 - 2. Include MPI - Approved Products Lists with proposed products highlighted.
- B. Samples: Submit one sample illustrating colors for selection.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Comply with indicated MPI standards.
 - 2. Products: Listed in MPI - Approved Products List.

1.5 QUALIFICATIONS

- A. Applicator: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Container Labeling: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- B. Inspection:
 - 1. Accept materials on Site in manufacturer's sealed and labeled containers.
 - 2. Inspect for damage and to verify acceptability.
- C. Store materials in ventilated area and otherwise according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.7 AMBIENT CONDITIONS

- A. Minimum Conditions: Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Subsequent Conditions: Maintain above temperature range, 24 hours before, during, and 72 hours after installation of coating.
- D. Restrict traffic from area where coating is being applied or is curing.

1.8 WARRANTY

- A. A two year warranty is applicable.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS

- A. Manufacturers:
 - 1. Sherwin-Williams Company, General Polymers.
 - 2. Tnemec Corporation.
 - 3. Substitutions: As approved by Engineer.

2.2 COMPONENTS

A. Coatings:

1. Description:
 - a. Complete multicoat systems formulated and recommended by manufacturer for intended applications and in indicated thicknesses.
 - b. Specified number of coats does not include primer or filler coat.
2. Lead content: None.
3. Chromium Content as Zinc Chromate or Strontium Chromate: None.
4. Maximum VOC Content: As required by applicable regulations.
5. Colors: As selected from manufacturer's standard colors.
 - a. Color shall be dark blue and approved by Owner.

B. High-Build Epoxy Coating:

1. Description: High-solids, two-component epoxy.
2. Exposure: Moderate.
3. Number of Coats: Two.
4. Finish: Low gloss Satin.
5. Minimum Solids Content: 56 percent by volume.
6. Minimum Dry Film Thickness Per Coat: 3 to 5 mils.
7. Primer:
 - a. Ferrous Metal: Same as Finish Coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Substrates:

1. Verify that substrate surfaces are ready to receive Work of this Section as indicated by coating manufacturer.
2. Obtain and follow manufacturer instructions for examination and testing of substrates.

3.2 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings; if removal is not possible, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Existing Painted and Sealed Surfaces:

1. Strip existing paint and coatings from surface.

E. Ferrous Metal:

1. Solvent clean.
2. Remove loose rust, loose mill scale, and other foreign substances.

3. Hand Tools: Comply with SSPC-SP 2.
4. Power Tools: Comply with SSPC-SP 3.
5. Blasting: Comply with SSPC-SP 6.

3.3 APPLICATION

- A. Comply with MPI - Architectural Painting Manual.
- B. Apply primer to each surface, unless specifically not required by coating manufacturer.
- C. Apply coatings to specified thicknesses.
- D. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish.
- E. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.4 FIELD QUALITY CONTROL

- A. Inspecting and Testing: Comply with MPI - Architectural Painting Manual.

3.5 CLEANING

- A. Collect waste material that may constitute fire hazard, place in closed metal containers, and remove daily from Site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.6 PROTECTION

- A. Protect adjacent surfaces and materials not receiving coating from overspray.
- B. Mask when necessary to provide adequate protection and repair damage.

3.7 ATTACHMENTS

- A. Non-Galvanized Interior Ferrous Metal Pipe, Valves, and Fittings inside pressure reducing stations and check valve station.
 1. High-Build Epoxy Coating.

END OF SECTION 099600

DIVISION 40 - PROCESS INTERCONNECTIONS

| | |
|---|-----------|
| Hangers and Supports for Process Piping | 400507 |
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| Thermoplastic Process Pipe | 400531 |
| Common Requirements for Process Valves..... | 400551 |
| Ball Valves..... | 400563 |
| Butterfly Valves | 400564 |
| Swing Check Valves | 400565.23 |
| Pressure-Regulating Valves | 400567.36 |
| Pressure and Differential Pressure Gauges | 407313 |

SECTION 400507 - HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe hangers and supports for the proposed process piping within the pressure reducing and check valves stations/structures.

1.2 REFERENCE STANDARDS

A. American Welding Society:

1. AWS D1.1/D1.1M - Structural Welding Code - Steel.

B. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
3. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
4. ASTM A576 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.

C. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacturer, Selection, Application, and Installation.

1.3 COORDINATION

- ##### A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and as indicated on Drawings.

1.4 SUBMITTALS

- ##### A. Product Data: Submit manufacturer information, including load capacity.

- ##### B. Shop Drawings: Indicate system layout with location, including critical dimensions, sizes, hanger and support locations, and details of trapeze hangers, anchors, and guides.

- ##### C. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements and United States Environmental Protection Agency AIS guidelines in the contract documents for product requirements

1.5 DELIVERY, STORAGE, AND HANDLING

- ##### A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.6 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Standon Adjustable Pipe Supports
 - a. Saddle or Flange Supports
 - 2. Substitutions: Shall receive approval for use on the project in accordance with the plans and specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field dimensions as indicated on Shop Drawings.

3.2 INSTALLATION

- A. Do not drill or cut structural members.
- B. Pipe Hangers and Supports:
 - 1. Support horizontal piping as indicated on Drawings.
 - 2. Minimum Vertical Adjustment: 1-1/2 inches.
 - 3. Supports:
 - a. Independently of equipment.
 - b. Riser Piping: Independent of connected horizontal piping.
 - 4. Anchorage: Pipe supports shall be adequately anchored to the floor of the structure per manufacturer recommendations.

END OF SECTION 400507

SECTION 400512 - BRASS PROCESS PIPE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the following for the brass piping and tubing within the pressure reducing and check valve stations/structures:
 - 1. Brass pipe.
 - 2. Brass tube.
 - 3. Fittings.

1.2 REFERENCE STANDARDS

- A. ASME International:
 - 1. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV.
- B. ASTM International:
 - 1. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
 - 2. ASTM B135 - Standard Specification for Seamless Brass Tube.
- C. NSF International:
 - 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer information regarding pipe materials, tube materials, and fittings.
- B. Shop Drawings: Indicate layout of piping systems, including equipment, critical dimensions, sizes, and materials list.
- C. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements in the Contract Documents and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of piping, valves and other appurtenances, connections, and top of pipe elevations.

1.5 QUALITY ASSURANCE

- A. Permanently mark each length of pipe with manufacturer's name or trademark and indicate conformance to standards.
- B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
- C. Perform Work according to Illinois EPA standards.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Protect piping and appurtenances by storing off ground.
 - 3. Provide additional protection according to manufacturer instructions.

1.7 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 BRASS PIPE AND FITTINGS

- A. Pipe: Comply with ASTM B43.
- B. Tube: Comply with ASTM B135.
- C. Fittings:
 - 1. Material: Cast bronze.
 - 2. Comply with ASME B16.23.
 - 3. Joints: Mechanical compression or threaded.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field dimensions are as indicated on Shop Drawings.
- B. Inspect existing flanges for nonstandard bolt hole configurations or design, and verify that new pipe and flange mate properly.

3.2 PREPARATION

- A. Thoroughly clean pipe, tube, and fittings before installation.

3.3 INSTALLATION

- A. Comply with ASME B31.3.
- B. Fittings:
 - 1. Clean gasket seats thoroughly and wipe gaskets clean prior to installation.
 - 2. Install fittings according to manufacturer instructions.
 - 3. Bolts:
 - a. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight.
 - b. Use torque wrench to tighten bolts to manufacturer instructions.
- C. Provide required upstream and downstream clearances from devices as indicated on Shop Drawings.
- D. Install piping with sufficient slopes for venting or draining liquids and condensate to low points.
- E. Disinfection shall be performed in accordance with AWWA C651.
- F. Testing: The brass process piping shall be tested for bacteriological testing in accordance with ductile iron pipe process piping.
- G. Dielectric Fittings: Provide between dissimilar metals.
- H. Field Cuts: According to pipe and tube manufacturer instructions.

3.4 TOLERANCES

- A. Laying Tolerance: 5/8 inch.

3.5 FIELD QUALITY CONTROL

- A. Inspection:

1. Inspect for damage to pipe lining or coating and for other defects that may be detrimental as determined by Engineer.
2. Repair damaged piping or provide new, undamaged pipe.
3. After installation, inspect for proper supports and interferences.

B. Pressure Testing:

1. Test Pressure: Not less than 170 psi.
2. Conduct hydrostatic test for minimum two hours.
3. Filling:
 - a. Fill section to be tested with water slowly and expel air from piping at high points.
 - b. Install corporation cocks at high points.
 - c. Close air vents and corporation cocks after air is expelled.
 - d. Raise pressure to specified test pressure.
4. Observe joints, fittings, and valves under test.
5. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage and retest.
6. Leakage:
 - a. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.
 - b. Maintain pressure within plus or minus 5 psi of test pressure.
 - c. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
 - d. Compute maximum allowable leakage by following formula:
 - 1) $L = SD \times \sqrt{P}/C$.
 - 2) L = testing allowance in gph.
 - 3) S = length of pipe tested in feet.
 - 4) D = nominal diameter of pipe in inches.
 - 5) P = average test pressure during hydrostatic test in psig.
 - 6) C = 148,000.
 - 7) If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
 - e. If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
 - f. Correct visible leaks regardless of quantity of leakage.

3.6 CLEANING

- A. Keep pipe interior clean as installation progresses.
- B. After installation, clean pipe interior of soil, grit, and other debris.

END OF SECTION 400512

SECTION 400519 - DUCTILE IRON PROCESS PIPE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the ductile iron pipe process piping within the proposed pressure reducing and check valve stations/structures:

1. Ductile-iron pipe.
2. Ductile-iron, malleable-iron, and cast-iron fittings.
3. Accessories.

1.2 REFERENCE STANDARDS

- A. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
3. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
5. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
7. AWWA C153 - Ductile-Iron Compact Fittings.

- B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B31.3 - Process Piping.

- C. ASTM International:

1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.

- D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

- E. Society for Protective Coatings:

1. SSPC SP 6 - Commercial Blast Cleaning.

1.3 COORDINATION

- A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and indicated on Drawings.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer information regarding pipe and fittings.
- B. Shop Drawings: Indicate layout of piping systems, including equipment, critical dimensions, sizes, and materials lists.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements in the Contract Documents and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of piping, valves and other appurtenances, connections, and centerline elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Permanently mark each length of pipe with manufacturer's name or trademark and indicate conformance to standards.
- B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
- C. Perform Work according to Illinois EPA standards.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Protect piping and appurtenances by storing off ground.
3. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. Piping:

1. Comply with AWWA C151.
2. Class: All ductile iron process pipe inside pressure reducing station and check valve station and extending to first buried fitting or joint outside of structure shall be Thickness Class 53.

B. Fittings:

1. Material: AWWA C110, ductile iron.
2. Class : Same as that of connected piping.
3. Flanged Fittings: Comply with AWWA C110.

C. Cement-Mortar Lining:

1. Comply with AWWA C104.
2. Thickness: Standard.

D. Outside Coating:

1. Buried Process Piping:
 - a. Type: Asphaltic.
 - b. Thickness: 1/16th inch minimum.
2. Interior Exposed Service: As specified in Section 099600 - High-Performance Coatings .

2.2 ACCESSORIES

A. Gaskets: SBR.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field dimensions are as indicated on Shop Drawings.
- B. Inspect existing flanges for nonstandard bolt hole configurations or design, and verify that new pipe and flange mate properly.

3.2 PREPARATION

- A. Thoroughly clean pipe and fittings before installation.
- B. Surface Preparation:
 - 1. Clean surfaces to remove loose rust, mill scale, and other foreign substances by SSPC SP 11 Power Tool Cleaning to Bare Metal or commercial sand blasting; SSPC SP 6.
 - 2. Touch up shop-primed surfaces with primer as specified:
 - a. Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
 - 3. Solvent-clean surfaces that are not shop primed.

3.3 INSTALLATION

- A. Buried Service Piping: As specified in Illinois Standard Specifications for Water And Sewer Construction in Illinois, 7th Edition, 2014.
- B. Exposed Service Piping:
 - 1. According to ASME B31.3.
 - 2. Run piping straight along alignment as indicated on Shop Drawings, with minimum number of joints.
- C. Fittings:
 - 1. According to manufacturer instructions.
 - 2. Clean gasket seats thoroughly, and wipe gaskets clean prior to installation.
 - 3. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight; use torque wrench to tighten bolts to manufacturer instructions.
 - 4. Provide required upstream and downstream clearances from devices as indicated on Drawings.
- D. Make taps to ductile iron piping only with service saddle, tapping boss of a fitting or valve body, or equipment casting.
- E. Install piping with sufficient slopes for venting or draining liquids and condensate to low points.

- F. Disinfection and Testing: As specified in Illinois Standard Specifications for Water and Sewer Construction in Illinois, 7th Edition, 2014.
- G. Dielectric Fittings: Provide between dissimilar metals.
- H. Field Cuts: According to pipe manufacturer instructions.
- I. Finish primed surfaces according to Section 099600 High-Performance Coatings.

3.4 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Inspect for damage to pipe lining or coating and for other defects that may be detrimental as determined by Engineer.
 - 2. Repair damaged piping or provide new, undamaged pipe.
 - 3. After installation, inspect for proper supports and interferences.
- B. Pressure Testing: As indicated on drawings.

3.5 CLEANING

- A. Keep pipe interior clean as installation progresses.
- B. After installation, clean pipe interior of soil, grit, and other debris.

END OF SECTION 400519

SECTION 400531 - THERMOPLASTIC PROCESS PIPE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the following PVC process piping within the proposed pressure reducing and check valve stations/structures:

1. PVC pipe.
2. PVC tube.
3. Fittings.

1.2 REFERENCE STANDARDS

- A. ASME International:

1. ASME B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form).
2. ASME B1.20.1 - Pipe Threads, General Purpose (Inch).
3. ASME B1.20.2M - Pipe Threads, 60 deg., General Purpose.
4. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges.
6. ASME B31.3 - Process Piping.

- B. ASTM International:

1. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
2. ASTM A194/A194M -Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
3. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
4. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
5. ASTM D2464 - Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
6. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
7. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
8. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
9. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
10. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

11. ASTM D3892 - Standard Practice for Packaging/Packing of Plastics.
12. ASTM F402 - Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
13. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
14. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

C. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.

1.3 COORDINATION

- A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and indicated on Drawings.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's catalog information regarding pipe and fittings.
- B. Shop Drawings: Indicate layout of piping systems, including equipment, critical dimensions, sizes, and materials lists.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements in the Contract Documents and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

1.5 QUALITY ASSURANCE

- A. Permanently mark each length of pipe with manufacturer's name or trademark and indicate conformance to standards.
- B. Materials in Contact with Potable Water: Certified according to NSF 61.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspection:

1. Accept materials on Site in manufacturer's original packaging and inspect for damage.
 2. Manufacturer's Packaging: Comply with ASTM D3892.
- B. Store materials according to manufacturer instructions.
- C. Protection:
1. Protect materials from puncture, abrasion, moisture, dust, and UV by storing in clean, dry location remote from construction operations areas.
 2. Protect piping and appurtenances by storing off ground.
 3. Provide additional protection according to manufacturer instructions.

1.8 AMBIENT CONDITIONS

- A. Minimum and Maximum Temperatures: Do not install pipe when temperature is below 40 degrees F or above 90 degrees F if pipe is exposed to direct sunlight.
- B. UV Protection: Provide pipe installed above ground or outside with UV protection.

1.9 EXISTING CONDITIONS

- A. Field Measurements:
1. Verify field measurements prior to fabrication.
 2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PVC PIPE, AND FITTINGS

- A. PVC Pipe and Fittings:
1. Pipe:
 - a. Comply with ASTM D1785.
 - b. Schedule: 80.
 2. Joints: ASTM D2855, socket, solvent welded.
 3. Materials:
 - a. Comply with ASTM D1784.
 - b. Minimum Cell Classification: 12545-C.

2.2 FINISHES

- A. Coat machined faces of metallic flanges with temporary rust-inhibitive coating.

2.3 ACCESSORIES

A. PVC Piping:

1. Flange Bolting:
 - a. Hex-Head Bolts: Stainless steel; ASTM A193/A193M; Grade.
 - b. Hex-Head Nuts: Stainless steel; ASTM A194/A194M; Grade.
2. Flange Gaskets:
 - a. Type: Full faced.
 - b. Material: EPDM .
 - c. Comply with ASME B16.21.
3. Solvent Cement:
 - a. Comply with ASTM D2564.
 - b. Primers: Comply with ASTM F656.

2.4 SOURCE QUALITY CONTROL

- ### A. Provide shop inspection and testing of completed pipe sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- ### A. Verify that field dimensions are as indicated on Shop Drawings.
- ### B. Inspect existing flanges for nonstandard bolt hole configurations or design, and verify that new pipe and flange mate properly.

3.2 PREPARATION

- ### A. Thoroughly clean pipe and fittings before installation.
- ### B. Cleaning: Clean surfaces to remove foreign substances.

3.3 INSTALLATION

- ### A. Comply with ASME B31.3.
- ### B. Run piping straight along alignment as indicated on Shop Drawings, with minimum number of joints.
- ### C. Fittings:
1. According to manufacturer instructions.
 2. Gaskets:
 - a. Clean seats thoroughly.
 - b. Wipe gaskets clean prior to installation.

3. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight; use torque wrench to tighten bolts to manufacturer instructions.
- D. Provide required upstream and downstream clearances from devices as indicated.
- E. Install piping with sufficient slopes for venting or drainage of liquids and condensate to low points.
- F. Disinfection shall be performed in accordance with AWWA C651.
- G. Testing: The PVC process piping shall be tested for bacteriological testing in accordance with the ductile iron process piping.
- H. Field Cuts: According to pipe manufacturer instructions.

3.4 FIELD QUALITY CONTROL

A. Inspection:

1. Inspect for piping defects that may be detrimental as determined by the Architect/Engineer.
2. Repair damaged piping, or provide new, undamaged pipe.
3. After installation, inspect for proper supports and interferences.

B. Pressure Testing:

1. Test Pressure: Not less than 175 psig.
2. Conduct hydrostatic test for minimum two hours.
3. Filling:
 - a. Fill section to be tested with water slowly and expel air from piping at high points.
 - b. Install corporation cocks at high points.
 - c. Close air vents and corporation cocks after air is expelled.
 - d. Raise pressure to specified test pressure.
4. Observe joints, fittings, and valves under test.
5. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage and retest.
6. Leakage:
 - a. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.
 - b. Maintain pressure within plus or minus 5 psi of test pressure.
 - c. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
 - d. Compute maximum allowable leakage by following formula:
 - 1) $L = SD \times \sqrt{P}/C$.
 - 2) L = testing allowance in gph.
 - 3) S = length of pipe tested in feet.
 - 4) D = nominal diameter of pipe in inches.
 - 5) P = average test pressure during hydrostatic test in psig.
 - 6) C = 148,000.
 - 7) When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

- e. If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
- f. Correct visible leaks regardless of quantity of leakage.

3.5 CLEANING

- A. Keep pipe interior clean as installation progresses.
- B. Clean pipe interior of soil, grit, shavings, and other debris after pipe installation.

END OF SECTION 400531

SECTION 400551 - COMMON REQUIREMENTS FOR PROCESS VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the following valves in the proposed process piping within the proposed pressure reducing and check valve stations/structures:

- 1. Valves.

1.2 REFERENCE STANDARDS

- A. American Water Works Association:

- 1. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

- B. ASTM International:

- 1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 2. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

- C. Manufacturers Standardization Society:

- 1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.

- D. NSF International:

- 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 SUBMITTALS

- A. Product Data:

- 1. Submit manufacturer information for actuator with model number and size indicated.

- B. Valve-Labeling Schedule: Indicate valve locations and nametag text.

- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- D. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements in the Contract Documents and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

- E. Manufacturer Instructions: Submit installation instructions and special requirements.

1.4 QUALITY ASSURANCE

- A. Maintain clearances as indicated on Drawings.
- B. Ensure that materials of construction of wetted parts are compatible with process liquid.
- C. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.
- D. Perform Work according to Illinois EPA standards.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Protect valve ends from entry of foreign materials by providing temporary covers and plugs.
 - 3. Provide additional protection according to manufacturer instructions.

1.7 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.8 WARRANTY

- A. Furnish 2 -year manufacturer's warranty for valves and actuators.

PART 2 - PRODUCTS

2.1 VALVES

- A. Description: Valves, operator, actuator, handwheel, chainwheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and other accessories as required.
- B. Valve Ends: Compatible with adjacent piping system.
- C. Operation:
 - 1. Open by turning counterclockwise ; close by turning clockwise.
 - 2. Cast directional arrow on valve or actuator with OPEN and CLOSE cast on valve in appropriate location.
- D. Valve Marking and Labeling:
 - 1. Marking: Comply with MSS SP-25.
- E. Valve Construction:
 - 1. Bodies: Rated for maximum temperature and pressure to which valve will be subjected as specified in valve Sections.
 - 2. Bonnets:
 - a. Flanged to body and of same material and pressure rating as body.
 - b. Furnish glands, packing nuts, or yokes as specified in valve Sections.
 - 3. Stems and Stem Guides:
 - a. Materials and Seals: As specified in valve Sections.
 - b. Bronze Valve Stems: According to ASTM B584.
 - 4. Nuts and Bolts: Stainless Steel.

2.2 FINISHES

- A. Valve Lining and Coating: Comply with AWWA C550.
- B. Exposed Valves: As specified in Section 099600 - High-Performance Coatings.
- C. Do not coat flange faces of valves unless otherwise specified.

2.3 SOURCE QUALITY CONTROL

- A. Testing: Test valves according to manufacturer's standard testing protocol, including hydrostatic, seal, and performance testing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping system is ready for valve installation.

3.2 INSTALLATION

- A. Install valves, actuators, extensions, valve boxes, and accessories according to manufacturer instructions.
- B. Firmly support valves to avoid undue stresses on piping.
- C. Coat studs, bolts and nuts with anti-seizing lubricant.
- D. Clean field welds of slag and splatter to provide a smooth surface.
- E. Install valves with stems upright or horizontal, not inverted.
- F. Install brass male adapters on each side of valves in copper-piped system and solder adapters to pipe.
- G. Install valves with clearance for installation of insulation and to allow access.
- H. Provide access where valves and fittings are not accessible.
- I. Valve Applications:
 - 1. Install shutoff drain valves at locations as indicated on Drawings and as specified in this Section.
 - 2. Install shutoff and isolation valves.
 - 3. Isolate equipment, part of systems, or vertical risers as indicated on Drawings.
 - 4. Install valves for throttling, bypass, or manual flow control services as indicated on Drawings.
 - 5. Install ball, butterfly, and gate valves in water systems for shutoff service.

3.3 FIELD QUALITY CONTROL

- A. Valve Field Testing:
 - 1. Test for proper alignment.
 - 2. If specified by valve Section, field test equipment to demonstrate operation without undue noise, vibration, or overheating.
 - 3. Engineer will witness field testing.

END OF SECTION 400551

SECTION 400563 - BALL VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the ball valves for within the proposed pressure reducing and check valve stations/structures:

1. Brass ball valves.
2. Plastic ball valves.

1.2 REFERENCE STANDARDS

- A. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
3. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded.
4. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.
5. ASME B1.20.1 - Pipe Threads, General Purpose, Inch.
6. ASME B1.20.2 - Pipe Threads, 60 deg. General Purpose (Metric).

- B. ASTM International:

1. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
2. ASTM D3222 - Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
3. ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

- C. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

PART 2 - PRODUCTS

2.1 RUBBER-SEATED BALL VALVES

- A. Manufacturers:

1. Apollo Liquid Ball Valves, Model 77CLF.
2. Substitutions: Shall receive approval in accordance with the plans and specifications.

B. Smaller Than 4 Inches:

1. Comply with MSS SP 110.
2. Minimum Working Pressure: 250 psi.
3. Body:
 - a. Type: Two piece.
 - b. Material: Bronze.
4. Ball: Brass, chrome plated.
5. Port: Full.
6. Seats: PTFE.
7. Stem: Blowout proof.
8. End Connections: Threaded.
9. Operator: Hand lever.
10. Finishes: As specified in Section 400551 - Common Requirements for Process Valves.
11. Country of Origin: Brass ball valves shall be manufactured in the USA.

2.2 PLASTIC BALL VALVES

A. Manufacturers:

1. Spears Manufacturing Company.
 - a. Schedule 80 True Union 200 Industrial Ball Valves.
2. Substitutions: Shall receive approved in accordance with the plans and specifications.

B. Description:

1. Minimum Working Pressure: 235 psi.
2. End Connections:
 - a. Socket.

C. Operator: Tee handle.

D. Materials:

1. Body and Ball: PVC, ASTM D1784.
2. Seats: EPDM.

2.3 SOURCE QUALITY CONTROL

A. As specified in Section 400551 - Common Requirements for Process Valves.

B. Testing: Test ball valves according to AWWA C507.

PART 3 - EXECUTION

3.1 INSTALLATION

A. According to AWWA C507.

END OF SECTION 400563

SECTION 400564 - BUTTERFLY VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes for the proposed butterfly valves within the proposed pressure reducing and check valve stations/structures:

1. Rubber-seated butterfly valves.

1.2 REFERENCE STANDARDS

- A. American Water Works Association:

1. AWWA C504 - Rubber-Seated Butterfly Valves.

- B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
3. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.

- C. ASTM International:

1. ASTM A536 - Standard Specification for Ductile Iron Castings.
2. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
3. ASTM D3222 - Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
4. ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

1.3 SUBMITTALS

- A. As specified in Section 400551 - Common Requirements for Process Valves: Submittal requirements for compliance with this Section.
- B. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

PART 2 - PRODUCTS

2.1 RUBBER-SEATED BUTTERFLY VALVES

A. Manufacturers:

1. Clow Valve Company; a subsidiary of McWane, Inc.
2. Kennedy Valve Company; a division of McWane, Inc.
3. Mueller Co.
4. Substitutions: Shall receive approval for use on the project in accordance with the plans and specifications.

B. Description:

1. Comply with AWWA C504.
2. Minimum Working Pressure: 200 psi.
3. Style: Flanged.
4. Shaft: Self-lubricating.
5. Seats:
 - a. Mounting: On body/disc for valves 24 inches and smaller.
6. Packing: Replaceable without dismantling valve.
7. End Connections: Comply with ASME B16.1.

C. Operator:

1. Ten-position lever handle.
2. Gear Actuators for Manual Valves: Comply with AWWA C504.

D. Materials:

1. Body: Ductile iron, ASTM A536.
2. Stem: ASTM B584 Bronze.
3. Disc: Ductile iron, ASTM A536.
4. Seats:
 - a. Type: Resilient and replaceable.
 - b. Material: EPDM rubber.
5. Seating Surfaces: Type 316 stainless steel.
6. Connecting Hardware: Type 316 stainless steel.

E. Finishes: As specified in Section 400551 - Common Requirements for Process Valves.

2.2 SOURCE QUALITY CONTROL

A. Testing: Test butterfly valves according to AWWA C504.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. As specified in Section 400551 - Common Requirements for Process Valves: Submittal requirements for compliance with this Section.

3.2 INSTALLATION

- A. According to AWWA C504.

END OF SECTION 400564

SECTION 400565.23 - SWING CHECK VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Swing check valves 3 inches and larger for within the proposed pressure reducing and check valve stations/structures.

1.2 REFERENCE STANDARDS

- A. American Water Works Association:

- 1. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.

- B. ASME International:

- 1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
 - 2. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.

- C. ASTM International:

- 1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 3. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 4. ASTM B148 - Standard Specification for Aluminum-Bronze Sand Castings.

- D. NSF International:

- 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.

- E. SSPC - The Society for Protective Coatings:

- 1. SSPC SP 6 - Commercial Blast Cleaning.

1.3 COORDINATION

- A. Coordinate Work of this Section with piping and equipment connections as specified in other Sections and as indicated on Drawings.

1.4 SUBMITTALS

- A. As specified in Section 400551 - Common Requirements for Process Valves: Submittal requirements for compliance with this Section.
- B. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to SRF Requirements and United States Environmental Protection Agency AIS guidelines included in the contract documents for product requirements.

1.5 QUALITY ASSURANCE

- A. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
- B. Perform Work according to Illinois EPA standards.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Protect valves and appurtenances by storing off ground.
 - 3. Provide additional protection according to manufacturer instructions.

1.7 WARRANTY

- A. Furnish two -year manufacturer's warranty for swing check valves.

PART 2 - PRODUCTS

2.1 SWING CHECK VALVES

- A. Manufacturers:
 - 1. Val-Matic Valve & Manufacturing Corp.
 - a. Model: 500A Swing-Flex Check Valve.
 - 2. Substitutions: Shall receive approval for use on the project in accordance with the plans and specifications.
- B. Description:
 - 1. Type: Full flow body type, with a domed access cover and only one flexible disc.
 - 2. Size: 3 inches and larger.
 - 3. Comply with AWWA C508.

4. Flow Area: Full open , equal to connecting nominal pipe diameter.
5. Mounting: Horizontal or vertical.
6. End Connections: Flanged, ASME B16.1.
7. The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. The flex portion of the disc contains nylon reinforcement and shall be warranted for twenty-five years.

C. Materials:

1. Body and Cover: Ductile iron, ASTM A536.
2. Disc: EPDM.
3. Connecting Hardware: Type 304 stainless steel.

D. Finishes: As specified in Section 400551 - Common Requirements for Process Valves.

2.2 SOURCE QUALITY CONTROL

A. Testing:

1. Hydrostatically test check valves at twice rated pressure according to AWWA C508.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field dimensions are as indicated on Shop Drawings.
- B. Inspect existing flanges for nonstandard bolt-hole configurations or design, and verify that new valve and flange mate properly.

3.2 PREPARATION

- A. Thoroughly clean valves before installation.
- B. Surface Preparation:
 1. Touch up shop-primed surfaces with primer as specified in Section 099600 - High Performance Coatings.
 2. Solvent-clean surfaces that are not shop primed.
 3. Clean surfaces to remove loose rust, mill scale, and other foreign substances by power wire brushing.
 4. Prime surfaces as specified in Section.

3.3 INSTALLATION

- A. According to AWWA C508 and manufacturer instructions.
- B. Dielectric Fittings: Provide between dissimilar metals.

3.4 FIELD QUALITY CONTROL

A. Inspection:

1. Inspect for damage to valve lining or coating and for other defects that may be detrimental as determined by Engineer.
2. Repair damaged valve or provide new, undamaged valve.
3. After installation, inspect for proper supports and interferences.

B. Pressure test valves with piping.

3.5 CLEANING

A. Keep valve interior clean as installation progresses.

B. After installation, clean valve interior of soil, grit, loose mortar, and other debris.

END OF SECTION 400565.23

SECTION 400567.36 - PRESSURE-REGULATING VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the following within the proposed pressure reducing valve and check valve stations/structures:

1. Pressure-reducing valves.

1.2 REFERENCE STANDARDS

- A. ASME International:

1. ASME B1.20.1 - Pipe Threads, General Purpose (Inch).
2. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300.

- B. ASTM International:

1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
2. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.

- C. American Water Works Association:

1. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

- D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 COORDINATION

- A. Coordinate with installation of process piping.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer catalog information.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- C. Manufacturer Instructions: Submit special procedures and setting dimensions.
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- E. Qualifications Statement:
 - 1. Submit qualifications for manufacturer.

1.5 QUALITY ASSURANCE

- A. Materials in Contact with Potable Water: Certified to NSF Standards 61 and 372.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.
 - 3. Provide additional protection according to manufacturer instructions.

1.8 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.9 WARRANTY

- A. Furnish two -year manufacturer's warranty for atmospheric vacuum breaker backflow preventers.

PART 2 - PRODUCTS

2.1 PRESSURE-REDUCING VALVES

A. Manufacturers:

1. CLA-VAL.

B. Substitutions: Not permitted.

C. Description:

1. Normally closed valves to maintain constant downstream pressure regardless of changing flow rate or varying inlet pressure.
2. Type: Pilot operated.
3. Furnish V-ports for pressure control at low flows.
4. Indicator Rod: Attached to piston for visual position indication.

D. Pilot Valves:

1. Type: Globe.
2. Body: Bronze.

E. End Connections:

1. Flanged, ASME B16.42, Class 150.

F. Materials:

1. Body: Ductile iron, ASTM A536.
2. Disc and Diaphragm:
 - a. Buna-N rubber.
 - b. Disc Retainer and Diaphragm Washer: Cast iron.
3. Trim: Stainless steel.
4. Stem, Nut, and Spring:
 - a. Stem: Dura-Kleen(R) Stem.
 - b. Nut and Spring: Stainless steel.
5. Control Piping: Bronze with stainless-steel wetted trim.

G. Interior Coating: Coat cast-iron and ductile-iron surfaces with epoxy coating according to AWWA C550.

H. Accessories:

1. Pilot isolation cocks.

I. Model: The pressure reducing valves shall the model indicated on the plans for each respective pressure reducing station/structure.

2.2 SOURCE QUALITY CONTROL

- A. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field dimensions are as indicated on Shop Drawings.
- B. Inspect existing flanges for nonstandard bolthole configurations or design and verify that new pipe and flanges mate properly.

3.2 PREPARATION

- A. Thoroughly clean end connections before installation.
- B. Close pipe and equipment openings with caps or plugs during installation.
- C. Cleaning: Clean surfaces to remove foreign substances.

3.3 INSTALLATION

- A. According to manufacturer instructions and local code requirements.
- B. Install with nameplate and test cock accessible.

3.4 FIELD QUALITY CONTROL

- A. After installation, inspect for interferences and proper supports.
- B. Testing:
 - 1. Hydrostatic: Test each assembled valve, except control piping, hydrostatically at 1-1/2 times rated working pressure for minimum five minutes.
 - 2. Leakage:
 - a. Test each valve for leakage at rated working pressure against closed valve.
 - b. Test Duration: Minimum 15 minutes.
 - c. Permitted Leakage: Zero.
 - 3. Perform functional test on each valve to verify specified performance.
- C. Repair damaged coatings with material equal to original coating.

3.5 CLEANING

- A. Keep interior of valves clean as installation progresses.

3.6 DEMONSTRATION

- A. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

3.7 ATTACHMENTS

- A. Pressure-Reducing Valve Schedule:

1. Irvine Street PRV:
 - a. Pressure:
 - 1) Upstream: 93 psi.
 - 2) Downstream Set Point: 65 psi.
2. Hill Street PRV
 - a. Pressure:
 - 1) Upstream: 77psi.
 - 2) Downstream Set Point: 48 psi.
3. Ext. of Clay Street PRV
 - a. Pressure:
 - 1) Upstream: 94 psi.
 - 2) Downstream Set Point: 53 psi.
4. Franklin Street PRV
 - a. Pressure:
 - 1) Upstream: 122 psi.
 - 2) Downstream Set Point: 81 psi.
5. Meeker Street PRV
 - a. Pressure:
 - 1) Upstream: 89 psi.
 - 2) Downstream Set Point: 47 psi.
6. Shadow Bluff Drive PRV (2")
 - a. Pressure:
 - 1) Upstream: 95 psi.
 - 2) Downstream Set Point: 67 psi.
7. Shadow Bluff Drive PRV (6")
 - a. Pressure:
 - 1) Upstream: 95 psi.
 - 2) Downstream Set Point: 60 psi.
8. Gear Street PRV
 - a. Pressure:
 - 1) Upstream: 101 psi.
 - 2) Downstream Set Point: 53 psi.

END OF SECTION 400567.36

SECTION 407313 - PRESSURE AND DIFFERENTIAL PRESSURE GAUGES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Pressure gages within the proposed pressure reducing and check valve stations/structures.

1.2 REFERENCE STANDARDS

- A. ASME International:

- 1. ASME B40.100 - Pressure Gauges and Gauge Attachments.

- B. NSF International:

- 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 COORDINATION

- A. Coordinate Work of this Section with piping Work.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer information for system materials and component equipment, including connection requirements.
- B. All applicable product data submittals shall be accompanied by an American Iron and Steel (AIS) Certification Letter. Refer to the requirements within the project Contract Documents for the AIS requirements associated with the project.
- C. Shop Drawings:
 - 1. Indicate system materials and component equipment.
 - 2. Submit installation requirements and other details.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of equipment and accessories.

1.6 QUALITY ASSURANCE

- A. Ensure that materials of construction of wetted parts are compatible with process liquid.
- B. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.
- C. Perform Work according to Illinois EPA standards.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.9 WARRANTY

- A. Furnish two -year manufacturer's warranty for pressure gages.

PART 2 - PRODUCTS

2.1 PRESSURE GAGES

- A. Manufacturers:
 - 1. Weksler
 - a. Model: Regal BY14.
 - 2. Substitutions: Shall receive approval in accordance with the plans and specifications.
- B. Type: Liquid Filled Pressure Gauge.
- C. Dials:
 - 1. Nominal Diameter: 4-1/2 inches.
 - 2. Face: White, laminated plastic dials with black graduations.
 - 3. Scale: Extend over arc not less than 270 degrees.
 - 4. Ranges and Graduation Units: As indicated 0 to 160 psi.

D. Cases:

1. Liquid filled.
2. Material: Stainless steel or polypropylene.
3. Type: Blowout protected.
4. Windows:
 - a. Material: Clear, shatterproof glass.
 - b. Thickness: 1/8 inch.
 - c. Provide gasket.

E. Connection:

1. Location: Bottom.
2. Socket:
 - a. 1/4-inch NPT male thread.
 - b. Material: Brass forging.
 - c. Extend a minimum 1-1/4 inches below gage cases.
 - d. Provide wrench flats.

F. Measuring Element:

1. Accuracy:
 - a. Comply with ASME B40.100.
 - b. Plus and minus 3 percent of full-scale range.

G. Adjustment:

1. Provide for zero-reading adjustment.
2. Adjusting Screws: Accessible from rear of case without need for disassembly.

H. Accessories:

1. Pressure Snubber:
 - a. Material: Type 316 stainless steel or brass.
 - b. Provide isolation ball valve.

2.2 SOURCE QUALITY CONTROL

- A. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that items provided by other Sections of Work are ready to receive Work of this Section.

3.2 INSTALLATION

- A. According to manufacturer instructions.
- B. Coordinate location and orientation of gages and seal assemblies with final piping and equipment installations.
- C. Ensure that gages are located to be easily read during operation and easily accessible for maintenance.

3.3 FIELD QUALITY CONTROL

- A. Equipment Acceptance:
 - 1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
 - 2. Make final adjustments to equipment under direction of manufacturer's representative.

3.4 DEMONSTRATION

- A. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

END OF SECTION 407313

CONTRACT B

WATER TOWER DEMOLITION

DIVISION 02 - EXISTING CONDITIONS

Structure Demolition..... 024116

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the specifications and requirements associated with the demolition of the existing City of Galena, Illinois, Franklin Street Water Tower.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate:
 - 1. Demolition and removal sequence and location of salvageable items.
 - 2. Location and construction of barricades fences and temporary Work.

1.3 QUALIFICATIONS

- A. The work described in this section shall be performed by a company that specializes in the demolition of water towers or similar structures. The company performing the demolition shall have a minimum of 10 years of experience in demolishing water towers and standpipes. The demolition company shall have successfully demolished a minimum of 30 water towers/standpipes within the last 10 years. Documentation of the Contractors experience may be required to be supplied to the Engineer and Owner prior to contract award.

1.4 EXISTING CONDITIONS

- A. The City will remove all their existing controls equipment that they wish to salvage prior to the Contractor arriving on-site.
- B. Owner assumes no responsibility for actual condition of the structure to be demolished.
- C. Notify Engineer upon discovery of hazardous materials other than those identified below.
- D. Do not sell demolished materials on-site.

PART 2 - PRODUCTS

- 2.1 Not Used.

PART 3 - EXECUTION

3.1 UTILITIES

- A. The City has isolated the existing water tower from the distribution system and drained the tank. The Contractor will be required to drain the remaining water in the riser pipe. The power for the level control system and SCADA has been deactivated. There are no known telephone lines to the water tower. There are no sewer lines, gas lines, or drainage lines connected to the standpipe.
- B. The water tower demolition contractor is not responsible for foundation removal, the need for excavation is not anticipated. However, the demolition contractor should contact the Illinois Julie Locate System Call 811 to determine the location of any underground utilities in the vicinity of the water tower.

3.2 WATER TOWER INFORMATION

- A. The Franklin Street Water Tower that is to be demolished was built in 1963 by the Pittsburgh Des-Moines Steel Co. The Water Tower has a storage capacity of 500,000 gallons. The height of the water tower is 91 feet to the high water line above existing grade. The diameter of the water tower is 50 feet. A copy of the Water Tower erection plan from Pittsburgh Des-Moines Steel Co. is included in the contract documents.
- B. KLM Engineering Inc. performed an inspection of the Franklin Street Water tower in May of 2020. The demolition contractor shall reference this inspection report for information on the existing coating system and additional information on the condition of the existing water tower. The inspection report generated by KLM Engineering Inc. may be requested by contacting the City of Galena.
- C. According to the KLM Engineering Inc. inspection report the exterior coating of the tower is classified as lead-based paints. Chromium levels in the test samples indicate levels from 0.0051 to 2.4 percent chromium. The water tower demolition contractor shall utilize procedures deemed necessary and appropriate in handling the lead painted steel including Chromium in accordance with applicable local, state and Federal regulations. After the standpipe has been removed the demolition contractor shall vacuum the site to remove any paint chips and cutting slag. The vacuum exhaust shall be filtered. The Contractor shall dispose of vacuumed material in a safe and legal manner. If applicable, the Contractor shall remobilize to vacuum the site once the snow during the demolition work being completed. The costs of dealing with the lead paint with Chromium, including the scrap steel, and site cleanup shall be included in the lump sum bid amount of the water tower demolition.

3.3 WATER DEMOLITION

- A. The project shall include the demolition of the steel structure (tank, ladder, etc.). The Contractor is not responsible for removing the existing concrete foundation, including the above ground concrete. The City will isolate the tank from the existing water system and will install a blind flange on the riser pipe, once the riser pipe has been removed by the Contractor.
- B. All portions of the existing steel standpipe including the tank, ladders, and all portions of the existing water tower materials are to become property of the Contractor. The Contractor shall remove all materials from the site and dispose of them in accordance with the applicable laws and regulations. The Contractor will be responsible of any costs associated with the disposal of materials. Recycling of materials is encouraged to the greatest extents.
- C. The City has received approval from the property owned directly north of the water tower for the Contractor to utilize for staging or tipping of the water tower. The Contractor shall not cause damage to any of the existing trees around the existing water tower, unless approved by the Engineer and Owner.

3.4 SITE ACCESS

- A. The existing standpipe is located northwest of Galena Middle School and is located along Franklin Street approximately 750 feet southeast of the intersection of Highway 20 and Franklin Street.

3.5 RESTORATION

- A. The Contractor shall level, scarify and seed any disturbed areas due to the tank demolition process. Seeding, mulching and fertilizing shall be completed in accordance with Section 21 of the Standard Specifications for Water and Sewer Construction in Illinois, 7th Edition.
- B. The Contractor shall replace any pavement that is damaged during the tower demolition process. The pavement shall be replaced in accordance with applicable sections of the Standard Specifications for Water and Sewer Construction in Illinois, 7th Edition and Illinois DOT requirements.

3.6 PAYMENT

- A. All work associated with the water tower demolition including but not limited to: traffic control, surface restoration (including pavement replacement, if applicable), site cleanup, etc. shall be considered incidental to the water tower demolition. Water tower demolition shall be paid for by the lump sum.

END OF SECTION 024116

DIVISION 32 - EXTERIOR IMPROVEMENTS

| | |
|----------------------------------|--------|
| Chain Link Fences and Gates..... | 323113 |
|----------------------------------|--------|

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: The requirements for the replacement and installation of the fencing surrounding the City's well building adjacent to the City's Franklin Street Water Tower project.
1. Fence framework, fabric, and accessories.
 2. Excavation for post bases.
 3. Concrete foundation for posts.

1.2 REFERENCES

A. ASTM International:

1. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
5. ASTM A817 - Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcellled Tension Wire.
6. A1011/A1011M-07 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
7. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
8. ASTM F552 - Standard Terminology relating to Chain Link Fencing.
9. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
10. ASTM F626 - Standard Specification for Fence Fittings.
11. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
12. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

B. Chain Link Fence Manufacturers Institute:

1. CLFMI - Product Manual.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- B. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.
- C. Manufacturer's Installation Instructions: Submit installation requirements.

1.4 QUALITY ASSURANCE

- A. Supply material according to CLFMI - Product Manual.
- B. Perform installation according to ASTM F567.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Identify each package with manufacturer's name.
- C. Store fence fabric and accessories in secure and dry place.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. Materials and Components: Conform to CLFMI Product Manual.
- B. Fence Fabric: Chainlink fabric to be zinc coated in accordance with ASTM A 392. Fence fabric to meet the requirements of ASTM A 817. Fence fabric to be No. 9 gauge wire woven in 2 inch continuous mesh, without knots or ties except in the form of the knuckling or twisting of the ends of the wire to form the desired selvage of the fabric. Fence fabric shall be 6 feet in height.
- C. Fence Posts, Rails and Braces
 - 1. Stand weight (Schedule 40) pipe complying with ASTM F1083.
 - 2. Galvanized pipe inside and out.
 - 3. Line post size to be 2.5" diameter.
 - 4. Terminal post (corner, angle and pull posts) to be 3" diameter.
 - 5. Top/intermediate rail braces to be 1-1/4" diameter.
 - 6. Provide caps for all posts. Comply with ASTM F 626.
- D. Fittings
 - 1. Comply with ASTM F 626.
 - 2. Provide attachments to connect braces to posts by fittings that will hold both post and brace rigidly.

3. Provide 3/8 inch diameter round steel diagonal tension rods with an appropriate commercial means for tightening. Provide a locknut or other device to hold the tightening device in place.
4. Provide a suitable sleeve or coupling device, recommended by the manufacturer, to connect sections of top rail and provide for expansion and contraction.
5. Use stretcher (tension) bars of the size specified in ASTM F626 with suitable bands for attaching fabric to corner or end.

E. Tie Wire and Tension Wire

1. Tie Wire: Provide tie wires for chain link fence that are the size and type the manufacturer recommends, but no smaller than No. 9 diameter for post ties or No. 12 diameter for rail and brace ties. Comply with ASTM F 626.
2. Tension Wire: Comply with ASTM A 824, with Type I or Type II (Class 3) coating per ASTM A 817.

F. Barbed Wire Supporting Arms

1. Comply with ASTM F 626 for type of arm configuration specified in the contract documents, as listed below:
 - a. Type I: Single slanted arm for three barbed wire strands.
2. Anchor arms to line, end, corner, and pull posts.

G. Barbed Wire

1. Comply with ASTM A 121, design number 12-4-5-14R, Type A or Type Z (Class 3) coating.
2. Provide three evenly spaced strands of barbed wire securely attached to the barbed wire supporting arms.

H. Concrete

1. Provide concrete foundations in accordance with manufacturer recommendations. Concrete to be in accordance with ASTM C94, Normal Portland Cement and 2,500 psi (minimum) strength at 28 days.

PART 3 - EXECUTION

3.1 Chain Link Fence Installation

- A. General: Comply with ASTM F 567. Construct fence at the location and height specified in the contract documents.
- B. Posts:
 1. Post Location:
 - a. Place posts in the line of the fence with equal spacing not to exceed 10 feet on center.
 - b. Set terminal (end, and corner) posts at the beginning and end of each continuous length of fence and at abrupt changes in vertical and horizontal alignments. Place pull posts so that no more than 300 linear feet of fence is constructed with only line posts.
 2. Post Setting:

- a. Dig or drill post holes to the following dimensions: minimum depth 3 feet below existing/proposed grade, minimum concrete encasement diameter for terminal posts (corner, angle, end and pull posts) is 1' and 10" diameter for line and brace posts.
 - b. Set posts in concrete. Ensure all posts are set plumb in a vertical position.
 - c. Form top of concrete footing so it extends 1 inch above grade and is sloped to direct water away from the post. To prevent frost heave, ensure footing is a uniform size to full depth without flare at the top of the grade.
 - d. Install posts no less than 24 hours prior to installation of fabric.
 - e. Set terminal, corner, angle, pull, and gate posts with the required brace-post assembly as specified in the contract documents.
3. Rails:
 - a. Top Rail: Pass the top rail through the base of the line post caps to form a continuous brace from end to end of each stretch of fence. Join rail sections with sleeve or coupling device to allow for expansion and contraction. Securely fasten the top rail to the terminal posts with pressed steel connectors.
 - b. Intermediate Rail: Securely fasten the intermediate rail between all line posts and terminal posts with pressed steel fasteners. Intermediate rail is required only on fences 8 feet tall or taller.
4. Braces:
 - a. Securely fasten braces to the posts by means of malleable iron or pressed steel connections; then truss from the line post back to the end or corner post.
 - b. Tighten the diagonal tension rod (truss rod) to produce proper tension.
5. Fabric:
 - a. Install fabric on the outside of the posts from the area being fenced or on the roadway side of the posts.
 - b. Secure one end of the fabric by a stretcher bar inserted in the final link of the fabric. Pull fabric taut with bottom selvedge, 2 inches above grade, before making attachment elsewhere.
 - c. Tighten and secure each end or each run of chain link fabric by a stretcher bar inserted in the final link of the fabric. Secure stretcher bar to the end post by tension bands equally spaced no more than 15 inches apart.
 - d. Attach fence fabric securely to the braces, top rail, tension wire, and all intermediate posts with wire ties or bands at intervals of no more than 12 inches.
6. Bottom Tension Wire:
 - a. Install bottom tension wire on fence 5 feet high and taller.
 - b. Stretch bottom tension wire taut from terminal post to terminal post and securely fasten to each intermediate post within the bottom 6 inches of fabric.
7. Barbed Wire:
 - a. Install 3 parallel wires on each barbed wire supporting arm on the outside of the area being secured, unless otherwise specified in the contract documents.
 - b. Pull wires taut, without kinks or twists, for tension.

3.2 Removal of Existing Fence

- A. Remove all fences, including posts and footings, within work areas unless otherwise specified in the Contract Documents or plans. Remove fence to first line post beyond construction limits.

3.3 Connecting to Existing Fence

- A. Where the proposed fence abuts the existing fence that is not to be removed. The Contractor shall install or utilize an existing post and shall utilize a stretcher bar with clamps at a maximum spacing of 15 inches to connect the proposed and existing fences at the post in question. This shall include the installation of a brace and truss rod and turnbuckle on existing and proposed (if not already present).

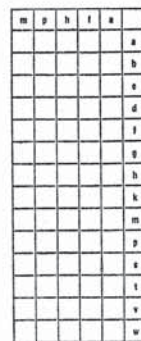
END OF SECTION 323113

PLAN SHEET

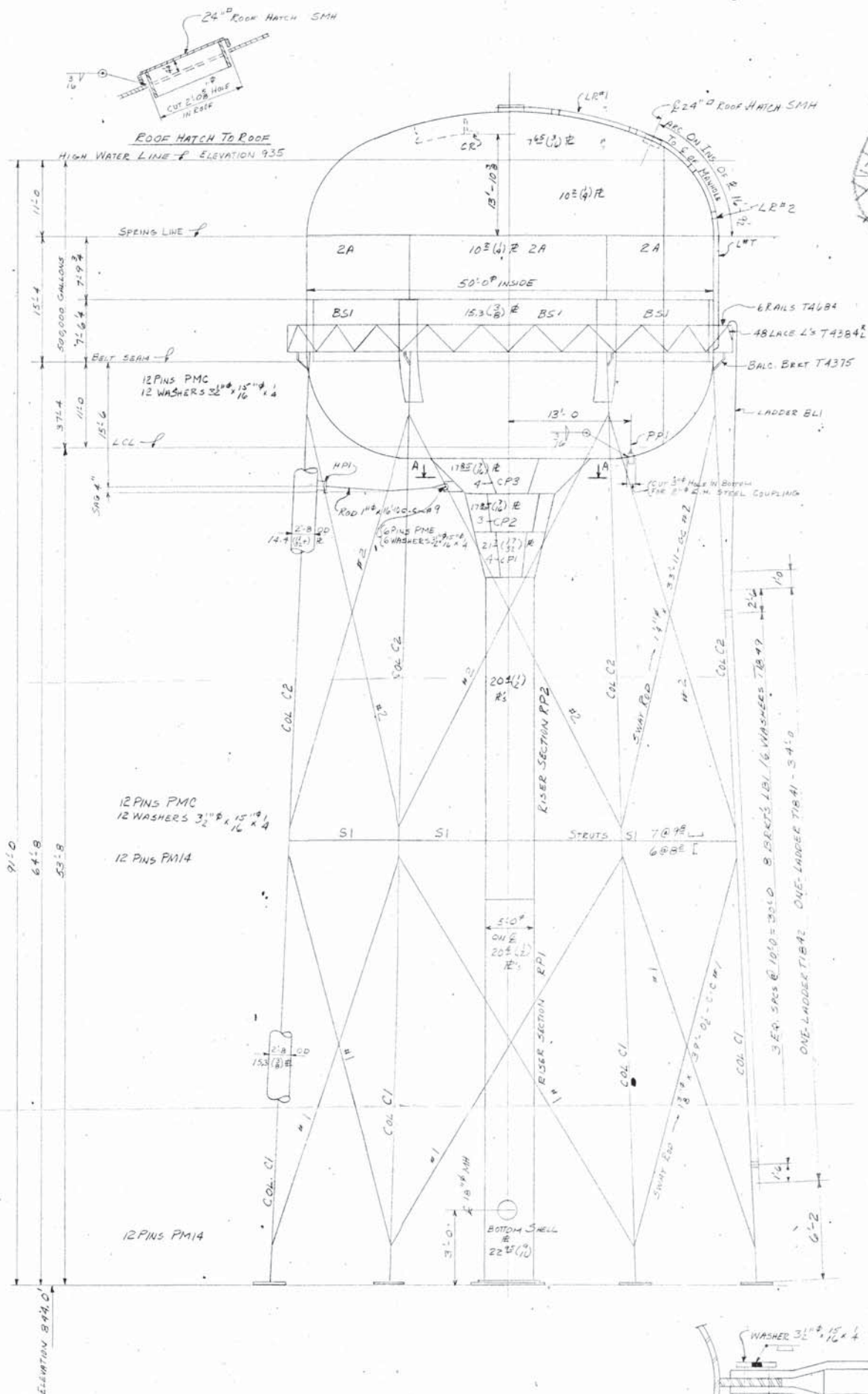
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| Existing Conditions - Demolition Standpipe Plan | C1.01 |
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REFERENCE DOCUMENTATION (NOT CERTIFIED BY IIW, P.C.)

1963 Franklin Street Water Tower Plan prepared by Pittsburg-Des Moines Steel Co.

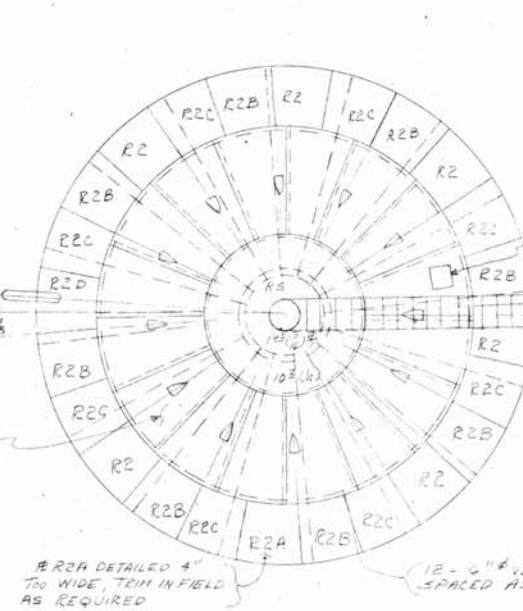
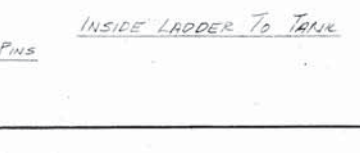
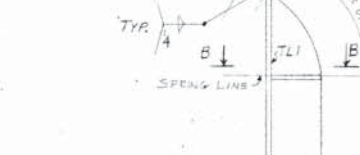
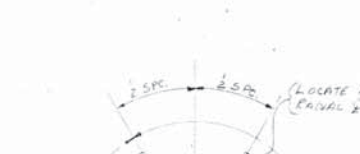
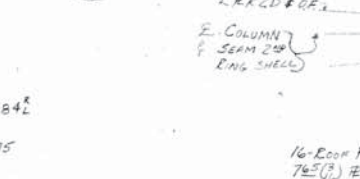
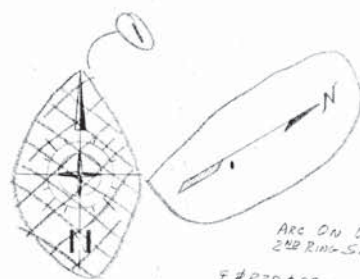


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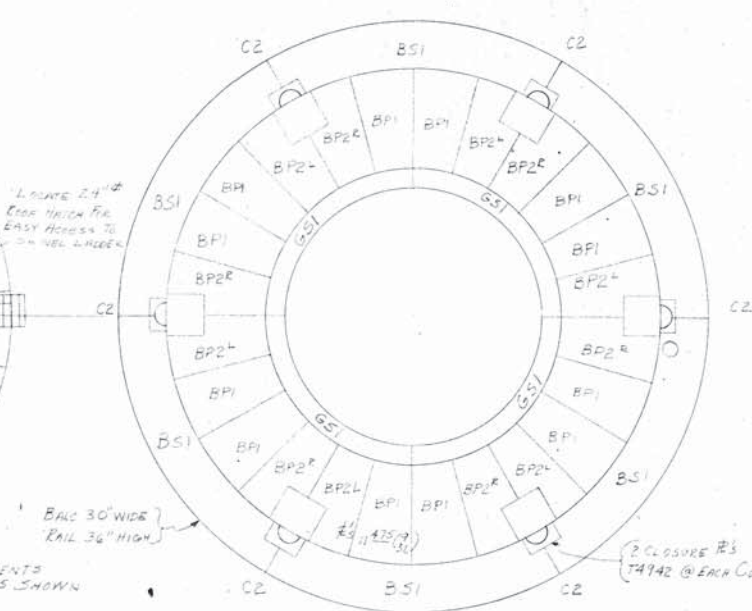


NOTE: USE SHIMS T242, T243, T244 & T245 TO PLUMB COLUMNS AND RISER

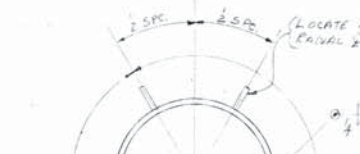
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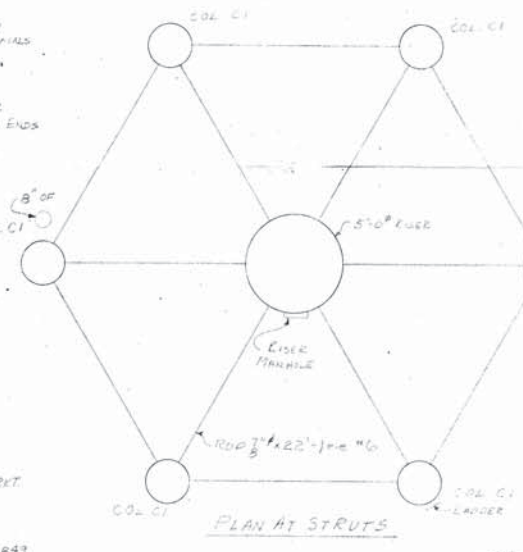
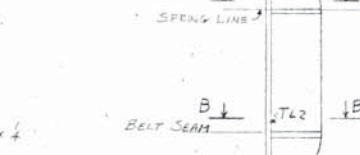
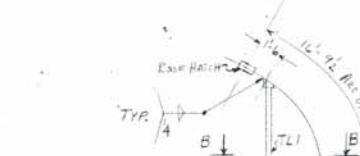
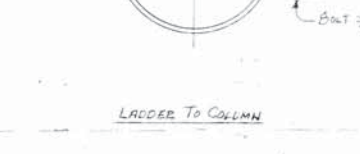
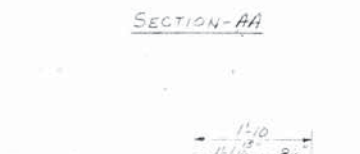
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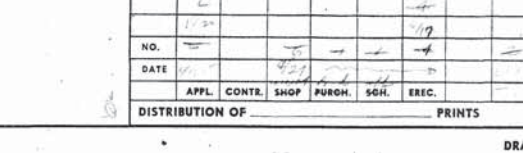
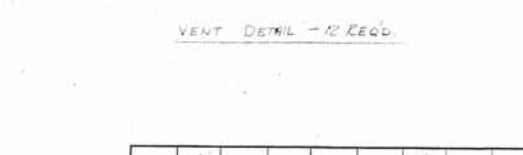
BOTTOM PLAN



SECTION-AA



PLAN AT STRUTS



FIELD NOTES:
ALL CONNECTIONS WELDED EXCEPT AS NOTED
BOLT END FRAMING CONNECTIONS
BOLT LUG ANGLES TO HAND RAIL & SIDING
BOLT LUG SPICES
BOLT LUGS TO BRKTS
BOLT SPIDER RIDS TO COLUMNS
BOLT PIPE CLAMP CONNECTIONS

SEE SHEET P1 FOR PAINTING INSTRUCTIONS
SEE SHEET E2 FOR WELDING DETAILS
SEE SHEET B3 FOR ERECTION OF INLET WITH AREA OF 4' OUTLET

SEE SHEET E4 FOR STERILIZATION INSTRUCTIONS
SEE SHEET 10 FOR ERECTION OF 8" O.F. TO GROUND
CATASTROPHIC PROTECTION SYSTEM SUBLET
ALL MATERIAL & LABOR FOR FIELD PAINTING SUBLET

APPROVED
in accordance with
Section 50-14 of
the General Conditions
of the Contract
C. K. WILLET
By _____
Disc. Minis

REVISED
MAY 17 1963
DESTROY
PREVIOUS PRINTS



NAME SKETCH

| | | | | |
|---|--|--|--|--|
| RIVETS | | SHOP ASSEMBLE AND MATCHMARK | | Yes <input type="checkbox"/> NO <input type="checkbox"/> |
| FOR MATCHMARK DIAGRAM SEE SHEET | | | | |
| HOLES FOR FIELD CONNECTIONS | | | | |
| PAINT CONTACT SURFACES | | YES <input type="checkbox"/> NO <input type="checkbox"/> | | |
| GRIT BLAST | | YES <input type="checkbox"/> NO <input type="checkbox"/> | | |
| SHOP PAINT | | | | |
| PITTSBURGH-DES MOINES STEEL CO. ENGINEERS-FABRICATORS-CONTRACTORS PITTSBURGH, PA. • WARREN, PA. • BRISTOL, PA. • BALTIMORE, MD. BIRMINGHAM, ALA. • DES MOINES, IOWA • PROVO, UTAH STOCKTON, CALIF. • SANTA CLARA, CALIF. • FRESNO, CALIF. 500 M.GAL. TANK T.F.T. GALENA, ILLINOIS ERECTION BY _____ DATE _____ DRAWN O.A.P. CHECKED J.A.H. DRAWING NO. E-3 CONTRACT NO. 231633 | | | | |

| NO. | DATE | APPL. | CONTR. | SHOP | PURCH. | SOH. | EREC. |
|-----|------|-------|--------|------|--------|------|-------|
| 1 | 1/24 | | | | | | |
| 2 | 2/19 | | | | | | |
| 3 | 4/21 | | | | | | |
| 4 | 5/14 | | | | | | |

DRAWINGS PREPARED AT

BILL PAGE

