

SECTION 33 11 13

CULINARY WATER SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe, valve, and fittings for culinary water lines.
- B. Service lines, connections and meters.
- C. Fire hydrants.
- D. Thrust restraint devices.
- E. Disinfection.
- F. Pressure testing.

1.2 RELATED SECTIONS

- A. Section 01330 – Submittal Procedures.
- B. Section 02321 – Trenching.

1.3 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Pipe:
  - 1. Measurement: By linear foot for each size indicated. Pipe included in lump sum items will not be measured.
  - 2. Payment: Includes excavation, pipe, tracer wire, fittings, thrust restraint devices, bedding, backfill, compaction, cleaning, disinfection, pressure testing, bacteriological testing, trench compaction testing, abandon existing lines.
- B. Valves:
  - 1. Measurement: By each unit for each size and type indicated. Valves included in lump sum items will not be measured.
  - 2. Payment: includes valve, fittings, box, cover, valve keys, excavation, bedding, backfill, compaction.

- C. Service connection:
  - 1. Measurement: By each unit for each size indicated.
  - 2. Payment: Includes tapping main line, saddle, corporation stop, fittings.
- D. Service Line:
  - 1. Measurement: By linear foot for each size indicated.
  - 2. Payment: Includes pipe, tracer wire, fittings, bedding, excavation, augering or moling, backfill, compact, connection as necessary.
- E. Meter, Setter, Lid, Ring, and Pillow Insulation:
  - 1. Measurement: By each unit.
  - 2. Payment: Includes excavation, removal of existing meter and appurtenances, connection to existing service line, dual check setter, fittings, ring and lid, pillow insulation, and backfill, install owner furnished meter and pit module device.
- F. Meter, Setter, Lid, and Pillow Insulation:
  - 1. Measurement: By each unit.
  - 2. Payment: Includes removal of existing meter, setter, lid and appurtenances, installation of new meter and pit module (owner furnished) and dual check setter, lid, pillow insulation, and connection to existing service lines.
- G. Meter, Lid, and Pillow Insulation:
  - 1. Measurement: By each unit.
  - 2. Payment: Includes removal of existing meter, lid, and appurtenances, installation of new meter and pit module (owner furnished) and lid, pillow insulation, and connection to existing service lines.
- H. Tracer Wire:
  - 1. Measurement: No measurement.
  - 2. No Payment. To be included in price bid for water line and service line.
- I. Meter Barrel

1. Measurement: by each unit.
  2. Payment: Includes excavation, removal of old barrel, and furnishing and installing of new barrel.
- J. Meter Adaptor for Electric Read, Pit Module, Lid, and Pillow Insulation:
1. Measurement: By each unit.
  2. Includes installation of owner furnished electronic equipment and furnish and installation lid.

#### 1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM):
1. ASTM C478 – Precast Reinforced Concrete Manhole Sections.
  2. ASTM D1248 – Polyethylene Plastics Molding & Extrusion Materials.
  3. ASTM D1785 – Poly (VinylChloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
  4. ASTM D2239 – Polyethylene Plastic Pipe (SDR-PR).
  5. ASTM D2241 – Poly (VinylChloride) (PVC) Plastic Pipe (SDR-PR).
  6. ASTM D2737 – Polyethylene (PE) Plastic Tubing.
  7. ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- B. American Water Works Association (AWWA):
1. AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
  2. AWWA C110 – Gray-Iron and Ductile-Iron Fittings, 2 inch Through 48 inch for Water and Other Liquids.
  3. AWWA C111 – Rubber-Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings.

4. AWWA C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Grey-Iron Threaded Flanges.
  5. AWWA C151 – Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
  6. AWWA C502 – Dry Barrel Fire Hydrants.
  7. AWWA C509 – Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.
  8. AWWA C651 – Disinfecting Water Mains.
  9. AWWA C700 – Cold-Water Meters – Displacement Type, Bronze Main Case.
  10. AWWA C704 – Propeller – Type Meters for Water Works Applications.
  11. AWWA C800 – Threads for Underground Service Line fittings.
  12. AWWA C901 – Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, ½ inch through 3 inch Joining Materials.
- C. National Sanitation Foundation (NSF):
1. NSF-14 – Standard for Thermoplastic Materials, Pipe, Fittings, Valves, Traps and Joining Materials.

## 1.5 DEFINITIONS

- A. Abandon existing lines: After new water main lines are ready for use and service connections are complete, cut and plug existing water main lines that will no longer be used. Remove existing fittings such as valves, tees and crosses which are no longer required, and add piping as necessary to make repairs. Completely remove surface items, such as valve boxes. Do not leave abandoned lines under pressure. Abandoning lines is incidental to pipe work.
- B. Bedding: Fill placed under, beside, and directly over pipe to 12 inches above top of pipe, prior to subsequent backfill operations.

## 1.6 SYSTEM REQUIREMENTS

- A. Minimum Burial Depth:
  1. Main Lines: 4 feet.
  2. Service Lines: 3 feet.

## 1.7 SUBMITTALS

- A. Product Date: Provide data on pipe, pipe fittings, tap saddles, corporation stops, valves, meter, meter barrel, ring and lid, service line, fire hydrants, thrust restraint devices, tracer wire, splice capsules, junction box, copper setters.
- B. Test Results: Submit one copy of each bacteriological test result.

## 1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of Utah Department of Environmental Quality.

## PART 2 PRODUCTS

### 2.1 PIPE

- A. PVC Pipe: 4 inch diameter and larger.
  - 1. Class 200, SDR 21, PVC pipe in accordance with ASTM D2241.
  - 2. Bell and spigot joints with elastomeric gaskets in accordance with ASTM F477.
  - 3. Color: Blue.
  - 4. Be NSF approved and bear NSF label.
  - 5. Pipe Fittings: Cast iron or ductile iron in accordance with AWWA C110 and rubber gasket joints in accordance with AWWA C111.
- B. PVC Pipe: 3 inch diameter when indicate on Drawings.
  - 1. ASTM D1785, Schedule 40.
  - 2. Joints & Fittings: Schedule 80, threaded or solvent weld as required.
- C. Ductile Iron Pipe: Where indicated on Drawings.
  - 1. Pressure class 350 in accordance with AWWA C151.
  - 2. Special thickness class 53 for flanged joint pipe in accordance with AWWA C115.
  - 3. Cement-mortar lining in accordance with AWWA C104.

4. 1 mil asphaltic outside coating.

## 2.2 VALVE

- B. Gate Valve: AWWA C509, iron body, bronze trim, non-rising stem with 2 inch square operator nut, single wedge, resilient seat, mechanical joint ends unless otherwise indicated. Rated for 200 pounds per square inch working pressure. Shall open by turning operator nut counter-clockwise.
- C. Valve Box & Cover: Cast iron, extension sleeve type, cast word "WATER" on cover.
- D. Valve Key: Fabricated from 1 inch diameter galvanized steel pipe with socket end to fit valve operator nut. Furnish 3 to Owner.

## 2.3 SERVICES

- A. Tap Saddle: Nylon Coated Saddle with stainless steel strap. Manufactured by Romac Industries, Inc. or-equal.
  1. Provide full support around circumference of pipe.
  2. Provide 1 inch minimum bearing area along pipe.
  3. Not have lugs which will dig into pipe.
  4. Not have U-bolt type strap.
- B. Corporation Stop: Bronze body, in accordance with AWWA C800. Standard iron pipe threads, compression fittings for polyethylene pipe, and tubing, stainless steel inserts stiffeners. Ford Ballcorp as manufactured by The Ford Meter Box Company, Inc. or-equal.
- C. Service Line: High density polyethylene pipe and tubing, in accordance with NSF-14 and AWWA C901.
  1. Iron Pipe Size: ASTM D2239, ¾ inch services.
  2. Copper Tube Size: ASTM D2737, 2 inch services.

Working Pressure: 200 pounds per square inch.
  3. Color: Blue
- D. Fittings: Bronze.
- E. Coppersetter: 18 inch height with ball valve inlet and double check valve outlet.

Manufactured by The Ford Meter Box Company, Inc. or-equal. Provide connection. Sizes as designated in bid schedule.

1. 5/8 inch x 3/4 inch: Model VBHC72-18W.
- F. Meter: AWWA C700, displacement type magnetic drive Radio read cold water meter with bronze main case and cast iron bottom plate as manufactured by Sensus Technologies, Inc. or-equal. Use Model SR II for 5/8 inch x 3/4 inch meter.
- G. Meter Barrel: High Density Polyethylene with corrugated exterior and smooth interior. White in available sizes and black when white is not available.
- H. Meter Barrel Ring and Lid: Cast iron with "WATER METER" or "WATER" cast on lid.
- I. Meter Insulation: Semi-flexible rubber foam water proof insulation 4" thick that can be installed through existing lid and will expand into the barrel to stay in place. Insulation shall be as manufactured by Wasatch Containers or equivalents.

## 2.4 ACCESSORIES

- A. Thrust Restraint Devices: Use one of the following:
1. Concrete Thrust bocks: Class B or B(AE) concrete in accordance with section 03300.
  2. Restrained Joints:
    - a. Pipe: Bell and spigot joint restraint harness or clamp. Rated at pressure class of pipe or greater.
    - b. Pipe Fittings: Mechanical joint with restrained follower gland. Rated at pressure class of pipe or greater. Megalug, or-equal.
- B. Tracer Wire: 14/1 UF direct burial wire.
1. Splices: 3M Company, Cat. No. MH14 BCX heat shrink butt splice or-equal.
- C. Junction Box: Pedestal type, Reliable Electric/Utility Products, Catalog No. UPCBD2 or-equal.
- D. Bedding:
1. Excavated materials consisting of earth, loam, sandy clay, sand, and gravel which are free from clods of earth, rocks larger than 1.5 inch, frozen material, organic material and debris.

2. If excavated material is unsuitable for bedding, import bedding consisting of pitrun grave, crushed rock, or sand, with 1.5 inch maximum size gradation.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Verify location, depth, material, and size of existing water lines.
- B. Excavate pipe trench in accordance with Section 31 23 16.13. Hand trim excavation for accurate placement of pipe.
- C. Remove large rocks or other hard matter which could damage pipe or impede installation.
- D. Remove water from trench.

#### 3.2 INSTALLATION - PIPE

- A. Install pipe and fittings. Seal joints watertight. Route pipe in straight line.
- B. Place bedding material at sides of pipe and over pipe in layers not exceeding 6 inches compacted depth. Place bedding to minimum compacted thickness of 12 inches above top of pipe.
- C. If excavated material is unsuitable for bedding or trench bottom is unsuitable to support pipe, import granular bedding.
- D. Compact bedding to 96 percent of maximum laboratory density. Maintain moisture content of bedding material within plus or minus 2 percent of optimum to attain required compaction density.
- E. Install tracer wire continuous below spring line of pipe. Install tracer wire with new main lines, fire hydrant lines and service lines. Wrap tracer wire around fire hydrants above ground, around copper setters at meters or connect to junction boxes at 1000 feet maximum intervals. Where there is existing tracer wire, connect new tracer wire to existing tracer wire. If splices are required, make watertight connection.
- F. Place restraining devices according to manufacturer's recommendations or concrete thrust blocks at any change of pipe direction and fittings. Use mechanical joint restraint devices on fittings for live tie-ins when there is not adequate time for concrete thrust blocks to cure.
- G. Backfill trench in accordance with Section 31 23 16.13.

### 3.3 INSTALLATION - VALVES

- A. Set valves on solid bearing. Center and plumb valve box over valve. Set box cover flush with finished grade.

### 3.4 WATER PIPING PRESSURE TEST

- A. Test water piping at pressure rating of pipe.
- B. Fill pipe with water and place under slight pressure for at least 48 hours.
- C. Bring pipe pressure to test pressure and maintain for 4 hours minimum.
- D. Provide accurate means for measuring quantity of water needed to maintain test pressure on pipe for test period.
- E. If volume of water added to pipe is 10 gallons per inch of pipe diameter per mile of pipe per 24 hours or less, pipe passes test.
- F. If pipe does not pass test, find source of leakage, repair or replace, and retest. Repeat until pipe passes test.

### 3.5 WATER PIPING DISINFECTION

- A. After completing pressure test, flush pipe to remove dirt or other foreign objects.
- B. Add liquid chlorine or liquid calcium hypochlorite to pipe to obtain 50 ppm concentrate of chlorine. Maintain 25 ppm chlorine residual at end of 24 hours. Disinfection procedures shall comply with Utah State Rules for Public Drinking Water Systems, R309-550-8(10), and AWWA C651.
- C. Flush chlorinated water from pipe. Chlorinated water discharged from pipe line shall be disposed of in acceptable manner and in conformance with rules of Utah Water Quality Board (See R317 of Administrative Code).

### 3.6 SERVICES

- A. Install new service lines and fittings as needed to connect existing services to new water lines. Install new service lines where indicated on Drawings.
- B. If existing service line is in poor condition or galvanized, install new service line to existing meter setter, yoke or equivalent. Install fittings as needed to make connections. Replace all galvanized steel service lines, on public side of meter.
- C. If service line is replaced, install tracer wire with new service line.

- D. At locations indicated on Drawings, install new service meter and relocate existing service meter. Locate, cut and remove existing service line as required for new service meter. Install meter on Town's side of property line. Install meter barrel plumb. Install fittings as required to make connections.

3.7 PROTECTION

- A. Protect pipe from damage or displacement.
- B. Prevent mud, silt, gravel, and other foreign materials from entering pipe and from contact with joint surfaces.
- C. Install plug in pipe end when pipe laying is not in progress.

END OF SECTION