SP-150099
(New)

SPECIAL PROVISIONS FOR WATER MAINS

Linn County
NHSX-100-1(105)--3H-57

Effective Date
May 17, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 GENERAL

1.1 - Section Includes

A. Water Mains.
B. Water Services.
C. Bolts and Fittings.
D. Valves and Valve Boxes.
E. Fire Hydrant Assemblies.
F. Blowoff Assemblies.
G. Air Release Assemblies.

1.2 - Description Of Work

A. Water Mains – This item includes furnishing and installing water pipe in accordance with the contract documents.

B. Water Services – This item includes furnishing and installing water services, and constructing a water service tap on an existing water main which does not have an existing service connection in the required location, in accordance with the contract documents.

C. Bolts and Fittings – This item includes furnishing and installing bolts and fittings in accordance with the contract documents.

D. Valves and Valve Boxes – This item includes furnishing and installing valves and valve boxes, including gate valves, butterfly valves, and tapping valves and sleeves, in accordance with the contract documents.

E. Fire Hydrant Assemblies – This item includes furnishing and installing fire hydrant assemblies in accordance with the contract documents.

F. Blowoff Assemblies – This item includes furnishing and installing blowoff assemblies associated with a water main, in accordance with the contract documents.

G. Air Release Assemblies – This item includes furnishing and installing air release

assemblies associated with a water main, in accordance with the contract documents.

1.3 - Submittals

A. Submit test results as set forth in the contract documents.

B. Submit certificate of compliance indicating the materials incorporated into the Work comply with the contract documents.

C. Submit certificates of compliance from the manufacturer that steel and iron materials utilized on this project comply with Article 1107.06 of the Standard Specifications.

D. Submit joint restraint system.

1.4 - Delivery, Storage and Handling

A. Delivery. Packing slips for steel and iron water main items shall include certificates from the manufacturer that the material is in compliance with Buy America.

B. Store material in accordance with the manufacturers' recommendations and in locations that will minimize the interference with operations, minimize environmental damage, and protect adjacent areas from flooding, runoff and sediment disposition.

1.5 - Scheduling and Conflicts

A. Schedule Work to minimize disruption of public streets and facilities.

B. Discontinue Work that will be affected by any conflicts discovered or any changes needed to accommodate unknown or changed conditions and notify the Engineer.

1.6 - Special Requirements

A. This is a Federal-aid project, and as a result; Federal Highway Administration (FHWA) 23 USC 313 – Buy America 23 CFR 635.410 policies apply to all steel and iron items. Refer to Article 1107.06, B of the Standard Specifications.

B. The use of explosives is not permitted unless provided for in the special provisions of the contract documents.

C. Unless noted otherwise in the contract documents, all materials are to be furnished and installed by the Contractor.

D. Unless noted otherwise in the contract documents, all labor & equipment is to be furnished by the Contractor.

E. Materials to be furnished by the City of Cedar Rapids.

1. Fire hydrant assemblies including: Hydrant isolation valve, and Fire hydrant. (Excludes: locking 90 degree bend, valve box, mainline tee, and 18 inch anchor coupling.)
2. Main valves gate or butterfly valves. (Excludes: valve boxes.)
3. Blow-Off (Flushing Hydrant) assemblies including: 12 inch by 6 inch reducer, two 18 inch anchor couplings, 6 inch isolation valve, and hydrant assembly (without internal working mechanism). Contractor to return these items in good condition following their removal.

F. The Cedar Rapids Water Department will not sell or loan materials from its pipe and fitting inventory, except when water service to the public has been interrupted and repair parts are not readily available from other sources. A service charge will be added to the cost of the materials sold to the Contractor out of inventory.

G. Equipment and Labor furnished by the City of Cedar Rapids

1. The Cedar Rapids Water Department will furnish labor and tapping equipment necessary to make taps from 1 inch to 12 inches in diameter that are a part of this contract.
2. The Cedar Rapids Water Department will furnish all labor and equipment to operate isolation valves in conjunction with the work.

PART 2 PRODUCTS

2.1 - Water Mains

A. Ductile Iron Pipe
   1. Minimum thickness class
      a. 4 inch through 24 inch: Class 52 or Pressure Class 350 per ANSI/AWWA C151/A21.51.
   2. Cement-mortar lined, per ANSI/AWWA C104/A21.4 with asphaltic seal coat.
   3. External coating: asphaltic.
   4. Joint Type: Lock Joint.
      a. Push-on: per ANSI/AWWA C111/A21.11.
      b. Mechanical: per ANSI/AWWA C111/A21.11.
      c. Restrained, buried: Pipe manufacturer's standard field removable system.
      d. Restrained in Structures: Restraining gland flanged or grooved - Use restrained Joint Pipe within Casing Pipe. 'Gripper' type gaskets are not approved for pipe within casing.
      e. Flanged: ANSI/AWWA C111/A21.11.
      f. Grooved: ANSI/AWWA C606.
      g. Gaskets: Per ANSI/AWWA C111/A21.11.
   5. Markings on pipe: Name of manufacturer; size and class; and spigot insertion depth gauge.

2.2 - Water Services

A. Refer also to approved service pipe table, in Appendix B of this section.

B. Controlling standards: Local water service, plumbing and fire codes.

C. Materials
   1. Copper Pipe: Conform to ASTM B88. Wall thickness: Type K.
   2. Ductile Iron Pipe: As specified in Section 2.1. Polyethylene wrap is required.

D. Corporation stop: 1 inch minimum. Stop inlet with AWWA threads. Manufacturer as listed in appendix B or approved equal.

E. Curb stop: 1 inch minimum ball valve. Valve size same as service size. Quarter-turn check. Manufacturer as listed in appendix B or approved equal.

F. Curb box.
   1. 1 inch diameter upper half. Stem arch pattern. Height adjustable from 5 feet to 6 feet.
   2. Manufacturer: as listed in Appendix B.
   3. Minneapolis pattern.
   4. 1 1/2 inch upper half.

G. Tapping Saddle.
   1. Ductile iron bodies with fusion bonded epoxy coating.
   2. Double stainless steel straps with Buna-N gasket seal.
   3. Manufacturer: as listed in Appendix B or approved equal.

2.3 - Bolts For Water Main Pipe And Fittings

Corrosion resistant high strength, low alloy steel in accordance with ANSI/AWWA C111/A21.ll (Current Version).

2.4 - Fittings

A. For Ductile Iron Pipe
   1. Fittings shall comply with ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53.
   2. Joint Type: Mechanical or restrained, as required by Engineer.
   3. Cement-mortar lined per ANSI/AWWA C104/A21.4 with asphaltic coating or unlined with fusion bonded epoxy per AWWA C116.
   4. Restrained Joints

a. Restrained Mechanical Joints: Pipe manufacturer's standard field-removable system.
b. Flanged: ANSI/AWW A C110/A21.10. Nuts shall conform to ASTM A 563, Grade A, heavy hex head. Gaskets shall be rubber or approved composition; 0.125-inch thick; full face.
c. Grooved: ANSI/AWWA C606. Face to face dimensions shall be equivalent to flanged, ANSI/AWWA C110/A21.10.

5. Wall thickness: ANSI/AWWA C153/A21.53.
6. Gaskets: Per ANSI/AWWA C111/A21.11.
7. Fittings shall be smooth and pit free. Coatings shall be uniform and undamaged.

2.5 - Special Fittings

A. Flange Adapter
1. Use where noted on plans to allow for ease of dismantling piping in the future.
2. Model: Romac FCA501 Flanged Coupling Adapter.
3. Substitutions: Approved equal.

B. Ductile Iron Sleeve.
1. Use on buried piping to allow for dismantling piping in future or for connecting two buried plain end pipes.
2. Long body sleeves are required.
3. Mechanical joint, ANSI/AWWA C110/A21.10.

C. Restrained Joints.
1. Use to restrain mechanical joint where required by Engineer.
2. Manufacturer: Ebaa Iron, Inc.; Megalug; One Bolt, Oxford, AL; Romac “Grip Ring.”
3. Substitutions: Pipe manufacturer’s standard field removable restraint system.
4. Suitable for buried service.
5. Corrosion resistant components.
6. Designed by pipe manufacturer, conforming to DIPRA "Thrust Restraint Design for Ductile Iron Pipe", latest edition.
7. Joint restraint system to be field installable, field removable and reinstallable.
8. Restraint systems involving pipe clamps and connecting rods are not acceptable unless specifically required in the contract documents.
9. Joint restraint system approval; in writing from Engineer.
10. Contract documents shall identify locations and number of joints to be restrained.

D. Couplings
1. Use to join two spigot ends of two pieces of pipe
2. Ductile Iron couplings are to be used for joining pipe sizes up to and including 12 inch.
3. carbon steel couplings are to be used for joining pipes greater than 12 inch. Minimum laying length shall be 14 inches. Minimum yield strength of 30,000 psi.
4. Bodies of all couplings are to be epoxy coated inside and outside per AWWA C213
5. All bolts, nuts, and hardware are to be grade 304 stainless steel or better.

2.6 - Concrete thrust blocks

A. Application:
1. For use with pipe sizes up to 16 inch diameter unless approved by Engineer.
2. For pipe sizes greater than 16 inch diameter, use restraining glands or manufacturers standard restraint system per Paragraph 2.4.

B. Refer to plans for dimensions and installation of thrust blocks.

C. Concrete minimum compressive strength is 3000 psi.

2.7 - Pipe Line Accessories

A. Polyethylene Wrap: Use polyethylene wrap on all buried ductile iron pipe and fittings,

and on copper service lines starting at the main and terminating 3 feet away from main. Minimum thickness 8 mils. Conform to ANSI/AWWA C105/A21.5.

B. Tracer System
   1. Use on all ductile iron and PVC pipe.
   2. Tracer Wire: No.12 AWG solid single strand copper.
   3. Ground Rod: 3/8 inch diameter, 60 inch long steel rod uniformly coated with metallically bonded electrolytic copper. Ground-rod clamp: High-strength, corrosion-resistant copper alloy.
   4. Splice Kit: Buried service wire splice.
   5. Receptacle Post: 1 pound per foot channel post 4 feet long. UP-1 by Grimco, Inc., or equal.
   6. Terminations: Scotchcast terminating kit or equal.
   7. Splice Bolt: No. 8F brass split bolt manufactured by Reliable Power Products, Inc. or approved equal.

C. Insulation: Linear low-density polyethylene (LLDPE) suitable for direct burial applications. Color blue. Thickness 0.045 inches.

2.8 - Gaskets, Special

All gaskets on this project shall be Nitrile Gaskets.

2.9 - Valves

A. General
   1. Same size as pipeline in which it is installed, unless noted otherwise in the plans.
   2. Manufacturer's name or initial and working pressure cast on valve body.
   3. Open when turned left or right as required by jurisdiction. Opening direction arrow shall be cast on operating nut.
   4. Factory tested to twice the rated working pressure.
   5. Buried service: Mechanical joints, unless noted otherwise.
   6. Service within structure: Flanged, per ANSI/AWW A C110/A21.10. Flanges drilled to conform to ASME/ANSI B16.1 class 125, unless noted otherwise. All valve operators to be supplied by valve supplier.
   7. Bolts for joints: Refer to paragraph 2.3.A.
   8. Open when turned right.

B. Butterfly Valves, Buried Service
   1. Use: 16 inch diameter and larger
   2. Type: Rubber seat.
   3. Pressure rating: 150 psi working pressure.
   4. Bubble-tight at rated pressures with flow in either direction.
   5. Comply with: ANSI/AWWA C504 class 150B.
   6. Body: Cast iron per ASTM A 126 class B; two trunnions for shaft bearings.
   7. Ends: Mechanical joint, except as otherwise shown in the Plans.
   8. Disc: Cast iron ASTM A126 class B, with plasma-applied nickel-chromium edge; connected to shaft by mechanically fixed stainless steel pins.
   9. Shaft: Type 304 stainless steel; turned, ground and polished.
   10. Seat: Synthetic rubber compound; simultaneously molded in, vulcanized and bonded to body.
   11. Bearings: Corrosion resistant and self-lubricating, sleeve type. Bearing load not greater than 1/5 the compressive strength of the bearing or shaft material.
   12. Packing: Replaceable Self-Adjusting Packing
   13. Operator
      a. Type: Buried service.
      b. 2 inch square nut.
      c. Three bolt minimum mounting to valve.
      d. Hold valve in any intermediate position between fully open and fully closed without creeping or fluttering. Equipped with mechanical stop-limiting devices to prevent over- travel of the disc in the open and closed positions.

e. Fully enclosed, gasketed and grease packed.
f. Designed to operate the valve under full rated working pressure with a maximum of 80 foot-pounds applied force. Withstand an input of 450 foot-pounds at extreme operator position without damage.

14. Finish: In accordance with ANSI/AWW A C504; Fusion bonded epoxy per AWWA C550, interior and exterior.
15. Exposed bolts and hex nuts: Per paragraph 2.3 of this section.
16. Approved Manufacturers: DeZurik; Mueller; M&H; Pratt; GA Industries**.**

C. Gate Valves, Buried Service

1. Type: Non-rising stem, resilient seat. 2 inch square nut operator. Comply with: ANSI/AWW A C509.
2. Pressure rating: 200 psi working pressure up to and including 12 inch and 150 psi over 12 inch.
3. Body, Bonnet and Gate: Cast iron per ASTM A 126 class B or Ductile Iron per ASTM A536.
4. Ends: Mechanical joint, except as otherwise noted.
5. Seat, disc rings, stem and spindle: solid bronze bearing against bronze surface.
6. Shaft seals: Double O-rings permanently lubricated between seals. Lubricant certified for use in potable water.
7. Mechanism design: travel of discs ceases before discs begin to seat in closing; travel of discs commences after disc is fully unseated in opening.
8. Exterior finish: Fusion bonded epoxy per AWWA C550.
9. Interior finish: In accordance with AWWA C550.
10. Approved Manufacturers: Mueller (Decatur, IL); Clow (Oskaloosa, IA); Kennedy (Elmira, NY); M&H (Anniston, AL).

D. Tapping Valve Assemblies

1. Valve: Tapping valve conforming to ANSI/AWW A C509.
2. Gasket: To completely surround pipe; minimum thickness 0.125 inch; material: nitrile rubber.
3. Bolts: Per 2.3
4. Tapping Sleeve (Tap size larger than one-half pipe size).
   a. Stainless steel, full body, split construction.
   b. Must fully surround pipe.
   c. Mechanical joint ends; branch flanged to match tapping valve.
   d. Outlet flange: 304L Stainless steel: ANSI B16.1, 125-pound pattern.
   e. Approved sleeves: American Flow Control, Mueller Company, or approved equal.
   f. Restrictions – See Section1.6
   g. Cedar Rapids Water Department will provide tapping valves for this contract.
5. Tapping Sleeve (Tap size one-half pipe size or less).
   a. Sleeves shall have fusion bonded epoxy coating per AWWA C213, interior and exterior
   b. Sleeves shall be furnished with type 304 stainless steel bolts and accessories
   c. Romac SST III or approved equal.
6. On 16 inch or larger water mains use a cast or ductile iron full body Tapping Sleeve as in 4. above.

E. Valve Box

1. Applicability: For all buried gate or butterfly valves.
2. Type:
   a. In paved areas (streets, alleys, drives, sidewalks, parking lots), water main less than 12 inches diameter: slide type.
   b. Slide type with locking lid for valve boxes in pavement for mains 16 inch and larger.
   c. In all other areas; screw extension.

d. Material: Cast iron. Cast iron cover labeled "WATER".
e. Wall thickness: 3/16 inch, minimum.
f. Inside diameter: 5 inches, minimum.
g. Length: Adequate to bring top to ground surface.
h. Factory finish: Asphalt coating.
i. Manufacturer: Tyler (Domestic), or approved equal.

2.10 - Fire Hydrant

A. Conform to ANSI/AWWA C502, as modified herein.
B. Manufacturers and features: See Fire Hydrant Tables, Appendix C of this specification. No substitutions unless approved in writing by the Engineer.
C. Break-away stem coupling.
D. Painting: Shop coating; per ANSI/AWWA C502. Field coating above grade; exterior coating type and color selection by Engineer.
   1. Interior: asphaltic coating.
   2. Exterior below grade: asphaltic coating.
   3. Exterior above grade: 9 mil epoxy plus two coats enamel (Club Green color).
E. Provide auxiliary gate valve with valve box conforming to Paragraph 2.9.C. or E.
F. Exposed bolts and hex nuts: Steel.

2.11 - Blowoff and Air Release Assemblies

A. Construct according to detailed drawings. Locations as shown in plans.
B. Nominal size: 2 inch
C. Components: Pipe, valve, curb box, thrust block, elbow, pipe cap and miscellaneous fittings, all as specified or shown. All components shall have iron threads.
D. Drain-back holes are not acceptable.

PART 3 EXECUTION

3.1 - General Pipe Installation

A. Property corners are to be placed prior to constructing water main, as required for the Project. If property corners are moved, damaged or disturbed during construction they are to be re-set after construction by a registered Land Surveyor.
B. Install only approved materials.
C. Protect pipe joints and valves from damage while handling and storing. Polywrapped pipe is to be handled with lifting straps or other means that protect the wrap from cuts, tears or damage.
D. Use no deformed, defective, gouged, or otherwise damaged pipe or fittings.
E. Excavate and prepare trench.
F. Prepare the trench bottom with sufficient exactness so that only minor movement of the pipe will be necessary after installation.
G. Clean pipe interior prior to placement in the trench.
H. Install pipe with fittings and valves to the lines and grades shown in the plans, with a maximum allowable variation of 3 inches.
I. Provide uniform bearing along the full length of the pipe barrel. Provide bell holes.
J. Clean joint surfaces thoroughly and apply lubricant approved for use with potable water.
K. Make joints according to pipe manufacturer's recommendations and these specifications.
L. Tighten bolts in a joint evenly around the pipe.
M. Install concrete thrust blocks or joint restraints at all bends. Refer to plans.
N. Install remaining pipe bedding in accordance with construction details using material conforming to these Specifications.
O. Do not install pipe in water. Keep trench free of water. Refer to ANSI/AWWA C651 for wet trench installation procedures, if Engineer approves such installation.
P. Close ends of installed pipe with water-tight plugs when pipe installation is not underway.
Q. Do not allow any water from the new pipeline to enter existing distribution system piping.

R. Do not locate water service lines under proposed driveway locations and sidewalks.

S. The Contractor shall install water stops in the trench at locations set forth in the Contract Documents. They shall be constructed of clayey excavated material compacted to 95% of optimum density (ASTM D698).

T. Water main shall not be installed by directional drilling or horizontal boring without a casing pipe, unless specified otherwise in the contract documents.

3.2 - Additional Requirements For Ductile Iron Pipe Installation

A. Install in accordance with AWWA C600.

B. Install with cover per pipe size as follows:

10" and smaller	5' 6" cover
12" to 20"	5' 0" cover
24" to 30"	4' 6" cover
36" to 54"	4' 0" cover

C. Cut pipe perpendicular to pipe barrel. Do not damage cement lining. Bevel cut ends for push-on joints according to AWWA C600.

D. Encase pipe, valves and fittings with polyethylene wrap, as required by the respective Jurisdiction.

3.3 - Pipe Insulation

Install where shown or specified. Minimum Thickness: 4 inches.

3.4 - Polyethylene Encasement Installation

A. Application: All buried ductile iron pipe, fittings, and appurtenances.

B. Install in accordance with AWWA C105.

C. The polyethylene encasement is to prevent contact between the pipe and the bedding material, but need not be airtight or watertight. Repair all cuts and tears.

3.5 - Tracer System Installation

A. Install tracer wire on all publicly-owned water mains, privately-owned water mains, and fire service lines into buildings, irrespective of water main material.

B. Begin and terminate system at all connections to existing mains.

C. Install wire continuously along top center of pipe. Do not install wire along bottom of pipe. Attach wire to pipe at midpoint of each pipe length; use 2 inch wide 10 mil thickness polyethylene pressure- sensitive tape.

D. Install splices only as authorized by Engineer. Allow Engineer to inspect all below grade splices of tracer wire prior to backfill.

E. Install ground rods at locations shown on plans or as required by Engineer.

F. Bring double run of wire to surface at each mainline and hydrant valve location; strip ends of wire and connect together with split bolt. Holes in valve boxes for tracer wire shall be drilled, not sawn.

G. Terminate exposed tracer wire at hydrants. Secure to traffic flange with stainless steel straps and hardware. Install the tracer wire and stainless steel straps on property side of hydrant (away from street).

H. The Engineer will conduct final inspection of the tracer system at the completion of the Project and prior to acceptance. Verify the electrical continuity of the system. Repair any discontinuities.

I. Refer to plans for tracer wire installation.

3.6 - Transitions in Piping Systems

Where the specified material of piping system entering or exiting a structure changes, the change shall occur at the outside of the structure wall, beyond any wall pipe or wall

fitting required, unless otherwise shown or specified.

3.7 - Structure Penetrations

A. Wall Pipes

1. Install where pipes penetrate and terminate at a wall or floor surface of a concrete structure, or where the pipe protrudes through the concrete wall or floor and the protrusion is otherwise unsupported.
2. Provide a waterstop flange near the center of the embedment length. Waterstop is to be cast integral with the wall pipe, or fully welded to it around the pipe circumference.

B. Wall Sleeves

1. Install where a pipe passes through a structure wall.
2. Sleeves in concrete walls are to be supplied with a waterstop collar, fully welded, and shall be cast in place in the concrete.

3.8 - Service Taps and Connections

A. Provide service tap and connection for each lot or property or as otherwise shown on the plans.

B. Construct service in conformance with contract documents.

C. Consult with Cedar Rapids Water Department.

D. Prepare the Site and make preparatory excavation at the location for the tap. Preparatory Work must be in conformance with this specification and OSHA standards. Blanket main during PVC taps.

E. Close the tap site in accordance with this specification.

F. Coordination

1. Water main to be in service and all tests passed prior to ordering taps.
2. Lot pins to be placed prior to making tap.
3. Call Engineering (319-286-5957) at least 24 hours ahead of need for taps for all taps.
4. Confirming and/or cancellation: Call the day of installation (taps 2 inches and smaller).
5. To have taps made in morning, call Meter Shop (319-286-5930) between 7:30 a.m. and 8:00 a.m.
6. To have taps made in afternoon, call Meter Shop (319-286-5930) between 11:30 a.m. and noon.
7. Schedule taps larger than 2 inches with Engineering (319-286-5957) and Distribution (319-286-5967) at least 24 hours prior to when tap is needed. To cancel scheduled 2 inch and larger taps, call Distribution (319-286-5967) by no later than 7:00 a.m. on the day of the scheduled tap.

G. Additional Guidelines

1. Taps 2 inches and smaller are made by the Meter Shop.
2. Taps larger than 2 inches and up to 12 inches are made by the Distribution Shop.
3. Taps larger than 12 inches shall be made by the Contractor after notification to the Water Department.
4. For taps larger than 12 inches, notify Distribution (319-286-5967) at least 24 hours in advance of commencement of work. Taps are not allowed without authorized City Staff on site.
5. Contractor shall furnish and install all pipe fittings, and appurtenances, except the mainline tapping valves and valve boxes.

3.9 - Testing

A. Test in accordance with AWWA C600.

B. Coordinate Testing with City of Cedar Rapids Water Department.

C. Test piping with water.

D. Flush out main before testing to remove air

E. Furnish labor, material and equipment associated with construction dewatering.

3.10 - Flushing

A. Method of flushing is subject to prior approval of Engineer. Flush in accordance with approved method under the supervision of the Engineer.

B. Disinfection: In accordance with AWWA C651.

3.11 - General Requirements For Installation Of Valves And Appurtenances

A. Install only approved materials.
B. Install in accordance with the contract documents and the Engineer's instructions, as appropriate.
C. Test and disinfect all valves, hydrants and appurtenances as components of the completed water main in accordance with AWWA C651.
D. Apply polyethylene wrap to all valves, valve boxes, hydrants and fittings.
E. Set tops of valve boxes to finish grade in paved areas and 2 inches below finish grade in non- paved areas unless otherwise directed by Engineer.
F. Check the working order of all valves by opening and closing through entire range.
G. Support fittings, valves and hydrants on suitable concrete blocks.

3.12 - Flushing Device (Blowoff)

A. Install where shown on the plans, in accordance with contract documents.
B. Install gravel backfill.
C. Install thrust block, bearing on perpendicular excavation face of undisturbed earth.

3.13 - Fire Hydrant

A. If auxiliary valve is positioned adjacent to water main, attach it to anchoring tee.

B. If auxiliary valve is positioned away from water main, restrain all joints between valve and water main.

C. Fire hydrant depth setting:

1. Use adjacent finish grade to determine setting depth. If finish grade is not to be obtained during the current project, consult with the Engineer for proper setting dimension.
2. Not lower than manufacturer's minimum setting dimension, and not lower than 18 inches, measured from nozzle to grade.
3. Refer also to Fire Hydrant Tables, Appendix C of this specification.

D. Coordinate installation with tracer wire installation.

E. Construction Details.

1. Special Detail: Hydrant Set Detail, Parallel to Water Main.
2. Special Detail: Typical Hydrant Set Elevation View

F. Tee, isolation valve, and associated piping (but NOT barrel) shall be wrapped with polyethylene sheeting.

G. Hydrant extensions will not be allowed. If possible, adjust height by deflection of joints; if necessary, adjust height by use of fittings.

3.14 - Required Separations of Water Mains, Sanitary Sewers, and Storm Sewers

A. Separation of water mains from sanitary sewers and storm sewers shall be in accordance with the Iowa Wastewater Facilities Design Standards, Chapter 12, Section 5.8, "Protection of Water Supplies."

B. The following factors should be considered in providing adequate separation:

1. Materials and types of joints for water and sewer pipes.
2. Soil conditions.
3. Service and branch connections into the water main and sewer line.
4. Compensating variations in the horizontal and vertical separations.
5. Space for repair and alterations of water and sewer pipes.
6. Off-setting of pipes around manholes.

C. Parallel installation: Water mains shall be laid at least 10 feet horizontally from any existing

or proposed sewer or septic tank absorption field trench. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

D. Crossings: Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

E. Exception: The reviewing authority must specifically approve any variance from the requirements of paragraphs C and D of this section when it is impossible to obtain the specified separation distances. Where sewers are being installed and these paragraphs cannot be met, the sewer materials shall be waterworks-grade 150-psi pressure-rated pipe or equivalent and shall be pressure-tested to insure water tightness.

F. Force mains: There shall be at least a 10-foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18-inch vertical separation at crossings as required in paragraph D above.

G. Sewer manholes: No water pipe shall pass through or come in contact with any part of a sewer manhole.

3.15 - Service Taps

A. Made at ten o'clock or two o'clock position unless corporation would have less than five feet of cover. When five feet of cover is not available, tap may be rotated downward no farther than midpoint of pipe. Taps shall be no closer than 18 inches apart and staggered around the circumference of pipe.

B. Taps on A-C pipe: purge valve of tapping machines opened so chips will be flushed from pipe.

C. Tapping saddle is required for taps 1 1/2 inches and larger, on mains 4 inches or smaller, and on PVC pipe.

D. Wrap service saddle and service line with polyethylene to a point 4 feet from main toward curb.

3.16 Water Main Abandonment

A. Water mains must be abandoned in place by using mechanical devices manufactured specifically for such purposes to completely seal the ends of the pipe.

B. Mechanical joint plugs or mechanical joint caps with watertight gaskets must be installed at the termination points of the abandoned water main.

C. Specially fabricated, watertight gaskets are required where water main exists in contaminated soil areas.

D. Oversized mechanical joint caps or plugs may be required depending upon the outside diameter of the existing water pipe.

E. The Engineer may require the existing water main to be removed from the ground in lieu of abandonment "in place". Unless such removal is called for on the contract documents, a change order to the contract price will be negotiated.

F. Remove valve boxes on valves on abandoned mains to a minimum of 1 foot below top of grade in unpaved areas, or to bottom of sub-grade in paved areas.

G. Fill remainder of valve box and excavation with sand to a minimum of 1 foot below grade in unpaved areas, or to bottom of sub-grade in paved areas.

3.17 - Water Service Line Abandonment

A. The Contractor shall disconnect water service at the main. The location of mains, where known, will be provided by the local jurisdiction. The Contractor may be required to schedule excavations in certain streets in accordance with the requirements of the local jurisdiction. Methods of Work on mains and services will be subject to prior approval and inspection by the Engineer. The work shall be subject to approval by the Engineer prior to backfilling.

B. Those water services controlled by a corporation stop on the main shall be disconnected at the main by closing the corporation stop and disconnecting the service line. A cap or corporation nut shall be installed on the corporation stop. Upon completion of a water service disconnect, and inspection of the same, the Contractor shall backfill the excavation. The backfill shall be compacted to 95% of the Standard Proctor Density as set forth in ASTM D698.

C. Curb stops and risers must be completely removed from all abandoned service lines. The remaining service line must be terminated in the following fashion:

D. Copper: Install a copper cap using a silver soldering method.

    1. Lead: Flatten a minimum of 8 inches of lead pipe end, fold a minimum of 2 inches of flattened end back 180 degrees, then re-flatten forming a folded seal on the tail of the lead service line material.
    2. All service lines larger than 2 inch, or manufactured from materials other than copper or lead, must be terminated at a point closest to the water main. Tapping valves shall be removed from its associated tapping sleeves. A blind flange shall be installed on the tapping sleeve, where possible, after the tapping valve is removed.

E. If a blind flange cannot be installed, then one of the following methods of abandonment must be used:

    1. The tapping sleeve must be cut out of the water main and a new spigot piece of water pipe must be inserted in its place.
    2. A cast iron split repair sleeve shall be installed on the water main to seal the tapped opening in the pipe.
    3. A full body cast iron tapping sleeve with blind flange shall be installed on the water main to seal the tapped opening in the pipe.
    4. Unless one of these approaches is called for on the contract documents, a change order to the contract price will be negotiated.

F. Service lines that are terminated at a tee must be sealed by installing a mechanical plug, cap, or flange, at the outlet of the tee. If this method of abandonment is not possible then the tee must be cut out of the water main and a new spigot piece of pipe must be inserted in its place. Unless this approach is called for on the contract documents, a change order to the contract price will be negotiated.

APPENDIX B
APPROVED SERVICE LINE MANUFACTURERS AND MODEL NUMBERS

B.1 - Corporation Stop

A. Cedar Rapids approved manufacturers and model numbers:

1. Mueller H-15000
2. AY McDonald 4701
3. Ford F600

B.2 - Curb Stop

A. Cedar Rapids approved manufacturer and model number:

1. Mueller H-15154 or H-25154
2. AY McDonald 6104
3. Ford B22-M

B.3 - Curb Box

A. Cedar Rapids approved manufacturers and model numbers:
All Lids to be equipped with 1 1/2 inch, cast iron pentagon plug

1. Ford Meter Box

B.4 - Tapping Saddles

A. Cedar Rapids approved manufacturers and model numbers:

1. Romac 202N, or approved equal

APPENDIX C
APPROVED FIRE HYDRANT MANUFACTURERS AND MODEL NUMBERS

B.1 – Acceptable Manufacturers

A. Cedar Rapids approved manufacturers and model numbers (Furnished by CRWD for Public projects):
   1. American Flow Control Model B-84-B
   2. Clow Medallion
   3. Kennedy Guardian
   4. Kennedy K-81D
   5. Mueller Super Centurion 200
   6. Waterous Pacer, 1996 or newer model

B.2 - Hydrant Characteristics

	Cedar Rapids
Main Valve Size	5 1/4 inch
Inlet Connection Type	6 inch MJ
Direction of Opening	Right
Pumper Nozzle Size	4 1/2 inch
Pumper Nozzle Thread	5.562" OD w/ 6 tpi
Hose Nozzle Number/Size	Two each - 2 1/2 inch
Hose Nozzle Thread	3.065" OD w/ 6 tpi
Operating Nut	1 inch square
Nominal Bury Depth	6'-0"
Remarks	Attach caps w/ chains. Word "OPEN" and arrow to be cast on top. Bronze drain ring, valve seat ring, upper and lower valve plates. Paint green.