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ADDENDUM NO. 5

DATE: December 9, 2022

FROM: Baxter & Woodman, Inc., Consulting Engineers

TO: Planholders of record for the Work titled:

City of Joliet, Illinois
Kerwin Terrace Water Main Improvements
City of Joliet Contract No. 2684-0123

The Bidding Documents are amended as follows:

1. SPECIFICATIONS

A. Section 00 11 13, ADVERTISEMENT FOR BIDS:

Delete Section 00 11 13, ADVERTISEMENT FOR BIDS in its entirety and insert the attached ADVERTISEMENT FOR BIDS, revision dated December 9, 2022, in lieu thereof **to update the bid opening date**.

B. Section 31 23 79, TRENCHING, BACKFILLING, AND COMPACTING:

Page 31 23 79-4, delete paragraph 2.9 and replace with the following:

"2.9 PIPE TRACER WIRE

A. See Section 33 11 43 for PVC water main tracer wire installation in open cut applications."

Page 31 23 79-12, delete paragraph 3.13 and replace with the following:

"3.13 PIPE TRACER WIRE

A. See Section 33 11 43 for PVC water main tracer wire installation in open cut applications."

C. Section 33 11 43, WATER DISTRIBUTION SYSTEM:

Delete Section 33 11 43, WATER DISTRIBUTION SYSTEM in its entirety and insert the attached WATER DISTRIBUTION SYSTEM, revision dated December 9, 2022, in lieu thereof in order to revise paragraphs 2.1.H and 3.9.

Nothing in this Addendum shall be construed as changing other requirements of the Bidding Documents. Each Bidder shall acknowledge receipt of this Addendum by stating this on the outside of the SEALED bid package. BID PROPOSALS SHALL NOT BE OPENED WITHOUT ACKNOWLEDGEMENT OF RECEIPT OF ALL ADDENDUMS FOR THE GIVEN CONTRACT.

END OF ADDENDUM NO. 5

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ADVERTISEMENT FOR BIDS

CITY OF JOLIET, ILLINOIS
CITY OF JOLIET CONTRACT NO. 2684-0123

1. Time and Place of Opening Bids. Sealed proposals for the construction of the City of Joliet Contract No. - 2684-0123 - Kerwin Terrace Water Main Improvements for the City of Joliet, Will County, Illinois, will be received at the Office of the City Clerk, City of Joliet Municipal Building, 150 West Jefferson Street, Joliet, Illinois 60432 until 10:00 A.M., December 16, 2022, and at that time will be publicly opened and unit price total read aloud. It is highly recommended that bids be tabbed to mark the Bid Bond and unit price total pages. Is it required that an electronic copy of the entire submission be included on a USB flash drive. Those in attendance must adhere to the current City of Joliet City Hall COVID-19 policy. The City of Joliet follows current CDC guidelines regarding COVID-19. Bid results will also be posted on the City's website, and emails sent out to individuals who have subscribed to the related RSS feed. It is preferred that you mail your bids/proposals. They should be addressed as follows:

CITY OF JOLIET – SEALED BID ENCLOSED
OFFICE OF THE CITY CLERK
150 W. JEFFERSON ST.
JOLIET, IL 60432

If you do choose to hand deliver your bid/proposal, they are to be hand delivered to the East or West side of City Hall, 150 W. Jefferson St., Joliet, IL 60432 and marked clearly on the outside of the SEALED package with the BID NUMBER AND NAME OF THE PROJECT, DATE AND TIME OF THE BID OPENING, NAME AND ADDRESS AND PHONE NUMBER OF YOUR COMPANY, and RECEIPT OF ALL ADDENDA (if applicable). All other doors will be locked. Please make sure to mention you are delivering a sealed bid/proposal, so the receiver knows to time stamp the envelope upon receipt. If dropping off a bid in person, bids must be dropped off during business hours only between 8:00 A.M. and 4:30 P.M.

2. Description of Work. The proposed construction consists of installing approximately 460 lineal feet of 6-inch, 6,880 lineal feet of 8-inch, and 3,800 lineal feet of 12-inch water main, including new hydrants, valves, and other miscellaneous items of work. The contract will include all work necessary to install the water main, install water service lines via directional drilling or open cut methods, reconnect existing water service lines, restore the roadway, and perform all restoration to return the area to its original condition.

3. Information for Bidders. Any contract or contracts awarded under this invitation for bids are expected to be funded in part by a loan from the Illinois Environmental Protection Agency (IEPA). Neither the State of Illinois nor any of its departments, agencies, or employees is or will be a party to this invitation for bids or any resulting contract. The procurement will be subject to regulations contained in the procedures for issuing loans from the Public Water Supply Loan Program (35 IAC Part 662), the Davis-Bacon Act (40 USC 276a through 276a-5) as defined by the United States Department of Labor, the Employment of Illinois Workers on Public Works Act

(30 ILCS 570), the Illinois Works Jobs Program Act Apprenticeship Initiative, the Disadvantaged Business Enterprise policy per 40 CFR Part 33, as amended, and the "Use of American Iron and Steel" requirements as contained in Section 436 of H.R. 3547, the Consolidated Appropriations Act, 2014. This procurement is also subject to loan recipient's policy regarding the increased use of disadvantaged business enterprises. The loan recipient's policy requires all bidders to undertake specified affirmative efforts at least sixteen (16) days prior to bid opening. The policy is contained in the specifications.

Bidders are also required to comply with the President's Executive Order No. 11246, as amended. The requirements for Bidders and Contractors under this order are explained in 41 CFR 60-4. The City of Joliet Local Bidders Ordinance does not apply to this contract.

All pertinent documents may be examined at the Office of the City Clerk, City of Joliet Municipal Building, 150 West Jefferson Street, Joliet, Illinois 60432 between the hours of 8:00 A.M. and 4:30 P.M., Monday through Friday. Hard copies will not be available for purchase. Electronic copies of the Bidding Documents can be downloaded free of charge at https://www.joliet.gov/government/departments/purchasing/bids-proposals.

Contractor(s) shall pay prevailing wages at rates not less than those under Davis-Bacon Wage Act Provisions as determined by U.S. Department of Labor to all laborers, workmen and mechanics performing work under this contract.

All Bidding Document holder should sign up for RSS feeds at https://www.joliet.gov/government/departments/purchasing/bids-proposals/construction-public-utilities and provide first and last name and email address to automatically receive addendums. Addendums will also be posted on the City of Joliet's website at https://www.joliet.gov/government/departments/purchasing/bids-proposals. The potential Contractor remains responsible for obtaining all addenda to the original specifications and should check the specific bid page before submitting a bid to ensure they have received all addenda.

Prequalification pursuant to Ordinance No. 7345 is necessary. Bidders are required to be pre-qualified through the Illinois Department of Transportation, the Capital Development Board or the City of Joliet. It is the responsibility of the bidder to ensure that their pre-qualification information is provided to the City of Joliet Purchasing Division prior to the bid opening. If bidders are not prequalified through IDOT or Capital Development Board, then they must be prequalified with the City of Joliet. Financial prequalification forms can be obtained from the City of Joliet website at https://www.joliet.gov/government/departments/purchasing/prequalification-process. This prequalification MUST be renewed yearly. To check on your current prequalification status, you can contact purchasing@joliet.gov. The current price for City of Joliet prequalification is $175, which offsets the costs for independent auditor review of the documents. Those documents are to be submitted to the Purchasing Division, City of Joliet, 150 West Jefferson Street, Joliet, IL 60432 at least 6 days prior to the bid opening

If at the time the Agreement for this Project is executed, or if during the term of the Agreement, there is excessive unemployment in Illinois as defined in the Employment of Illinois Workers on Public Works Act, 30 ILCS 570/0.01 et seq., as two consecutive months of unemployment exceeding 5%, the Bidder agrees to employ Illinois laborers in accordance with

the “Employment of Illinois Workers on Public Works Act”. An “Illinois laborer” is defined as any person who has resided in Illinois for at least thirty (30) days and intends to become or remain an Illinois resident.

All proposals are subject to the requirements of the City of Joliet Procurement Code (Section 2-430 – 2-453) of the Bidder Instructions.

All Bids must be accompanied by a Bidder's bond, certified check, bank cashier's check or bank draft payable to the City of Joliet for ten percent 10% of the total amount of the Bid as provided in the Bidder Instructions.

A **mandatory** Pre-Bid Conference of all prospective Bidders and/or their representatives will be held on November 10, 2022 at 10:00 A.M at City of Joliet East Side WWTP, 815 Adler Street, Joliet, Illinois 60436. Bidders are **required** to attend and participate in the conference.

Direct all questions about the meaning or intent of the Bidding Documents to the Engineer Peter Kozak (pkozak@baxterwoodman.com).

4. Rejection of Bids. The Council reserves the right to reject any or all Bids and to waive technicalities. Unless the Bids are rejected for good cause, award of contract shall be made to the lowest responsible and responsive Bidder.

Advertisement Date(s): Herald News, October 27, 2022

James V. Capparelli, City Manager

Dawn A. Kochan, Purchasing/Contracts Administrator

END OF ADVERTISEMENT FOR BIDS

SECTION 33 11 43

WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide water distribution system as shown on the Drawings, as specified herein, and as needed for a complete and proper installation, and in accordance with the latest edition of the “Standard Specifications for Water and Sewer Construction in Illinois”, except as revised herein.

B. Provide labor, materials, tools, chemicals and equipment necessary to perform the pressure and leakage tests and disinfection.

C. Distribute door hangers provided by the Owner at various construction milestones of the project, as described in the General Notes. The distribution of door hangers is considered incidental to the installation of the new water main and no additional compensation will be allowed.

D. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

E. References – (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals
   1. Manufacturer, make, and model information for all fire hydrants, valves, corporation stops, and curb stops.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Furnish two (2) copies of bacteriological test reports.

1.3 QUALITY ASSURANCE

A. Ensure all brass and bronze alloys supplied with the products contain less than 15 percent zinc, unless otherwise specified.

1. Brass that will come in contact with potable water shall contain no more than 0.25% lead.
    a. Brass fittings shall be marked with industry standard marking to indicate the amount of lead (no lead, low lead, etc.) in the brass.
    b. Brass for service saddles may contain more than 0.25% lead to improve ductility of the saddles.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

B. In compliance with AWWA C605, PVC pipe that may be exposed to direct sunlight for more than one year before installation shall be covered with a light-color canvas or other light-colored, breathable opaque material with provision for air circulation to minimize heat accumulation.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. General:
    1. Provide ductile iron or PVC pipe materials where indicated on the Drawings.

B. Ductile Iron Pipe:
    1. Provide ductile iron pipe complying with ANSI A21.51, thickness Class 52, with joints complying with ANSI A21.11.
        a. Use cement lining complying with ANSI/AWWA C104/A21.4, standard thickness.
        b. Exterior Coating:
            (1) The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179.
            (2) The mass of the zinc applied shall be 200 grams per square meter of pipe surface area.
            (3) A finishing layer of asphaltic coating shall be applied over the zinc coating.
                i. The mean dry film thickness of the finishing coat shall not be less than 3 mils, with a local minimum not less than 2 mils.
            (4) The coating system shall conform in every respect to ISO 8179-1 “Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Second edition 2004-06-01”.

c. In areas where petroleum contamination is present use Buna-Nitrile gaskets.

2. Provide restrained joint pipe system, where indicated on the Drawings, that utilizes one of the following methods:
   a. Lock rings welded into place around pipe barrel.
   b. Bolted rings installed around pipe barrels that fit inside pipe bells.
   c. Gaskets which include stainless steel locking segments vulcanized into the gasket.
   d. Mechanical joint retainer gland systems that provide locking segments shaped to pipe barrel that do not create stress points on pipe barrel.
      (1) Do not use set screw type retainer glands.
   e. Acceptable products:
      (1) Meg-A-Lug System.
         i. Series 1100 Megalug for MJ to pipe.
         ii. Series 1700 Megalug Harness for push on joint.
         iii. As recommended by manufacturer for connection to existing pipes.

C. PVC plastic pipe:
1. Pipe material: Use Class 12454A or B polyvinyl chloride complying with ASTM D1784.
2. Pipe 12-inch and smaller: Comply with AWWA C900 for Class 235 pressure pipe with a standard dimension ratio of 18.
   a. Provide pipe manufactured with ductile iron outside diameters.
   b. Provide pipe manufactured from a PVC stock with a starting hydrostatic design basis (HDB) of 4,000 psi, and a finished HDB of 7,100 psi.
3. Pipe 14-inch through 18-inch: Comply with AWWA C900 having ductile iron pipe outside diameter, a pressure rating of 235 psi, and a standard dimension ratio of 18.
4. Use push-on bell and spigot type joints with elastomeric ring conforming to ASTM F-477.

D. PVC Restrained Joint pipe:
1. Mechanical joint retainer gland systems that provide locking segments shaped to pipe barrel that do not create stress points on pipe barrel.
2. Acceptable products for pipes:
   a. Meg-A-Lug System.
      (1) Series 2000PV Megalug for MJ to Pipe (C900).
      (2) Series 1500 Megalug Harness for push on joint (C900).
      (3) As recommended by manufacturer for connection to existing pipes.

E. Fittings:
1. Ductile iron fittings: Provide mechanical joints complying with ANSI A21.10 or A21.53.
   a. Cement lining: Comply with ANSI A-21.4, standard thickness.

b. Bolts and nuts:
(1) Use A-304 stainless steel bolts with nuts and washers of series 300 stainless steel per ASTM A194.
(2) Duratron Sac Nuts or equal.
i. One sac nut per fitting.

F. Polyethylene sheet: Comply with ANSI/AWWA C105/A21.5:
1. Thickness: Three layers of co-extruded linear low-density polyethylene (LLDPE) fused into a single thickness of not less than 8 mils.
2. The inside surface of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a blend of anti-microbial biocide to mitigate microbiologically influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion.
3. Markings: The following information will be clearly marked on the sheet at minimum increments of 2 feet along its length:
a. Manufacturers name or trademark.
b. Year of manufacture.
c. Minimum film thickness and material type (LLDPE).
d. Applicable range of nominal pipe diameter size(s).
e. Warning – Corrosion Protection – Repair Any Damage.
4. Acceptable manufacturers:
a. V-BIO® Enhanced Polyethylene Encasement.
b. Or approved equal.

G. Conductivity appurtenances:
1. Provide wedges of serrated silicon bronze or #10-copper cable and tapping devices specifically designed for this purpose.
2. Use devices provided by the pipe manufacturer.
3. Standard mechanical joints, Field-Lok, Megalug joints or similar joints/restrained joint systems do <u>not</u> provide conductivity.

H. Pipe tracer wire.
1. Provide 12-gauge wire to be used for electronic locating of PVC pipe.
2. Provide locating system components designed for compatibility to ensure end-to-end conductivity for detecting underground utilities.
a. Copperhead Complete Utility Locating System.
b. Or approved equal.
3. Wire: Single Strand, single conductor, copper-clad steel, No. 12 AWG high strength, high carbon with min. 450 lb. break load, min. 30 mil. HDPE insulation thickness (1230B-HS) for direct bury installation; color coded blue per APWA Standards.
4. Connectors: Single, three-way locking connectors (LSC1230C); Mainline to service connectors (3WB-01) and dielectric silicon sealant.
5. Connect tracer wire to inside of valve vault walls with ½-inch stainless steel cable clamps. Stainless steel cable clamps to be secured to valve vault walls with Tapcon ¼” X 1½” embedment stainless steel concrete screw anchors or approved equal.
6. Provide 1.5 pound magnesium grounding anodes and 12-AWG wire.

7. Tracer wire termination point: Provide stainless steel band to install at connection point between PVC water main and existing iron water main in accordance with manufacturer recommendations.
8. Tracer wire hydrant access point on fire hydrants: Provide for a direct connection to the tracer wire by utility locate transmitter manufactured for the application location; color coded red.
    a. Copperhead Cobra Hydrant Package T1-FLPKG.
    b. Or approved equal.

I. Pipe marking tape.
1. Provide marking tape manufactured for use in underground locations to be installed in open cut trenches.
2. Provide tape labeled with message that indicates what type of pipe is below, such as “Caution – Buried Water Line Below”.
3. Materials (Detectable):
    a. Provide solid color, organic virgin polyethylene film with a 0.00035” solid aluminum foil core, with clear film reverse printed and laminated to aluminum foil.
    b. Thickness: 5.0 mil. ASTM D2103
    c. Tensile strength: 15,000 psi ASTM D882
    d. Elongation: 80% ASTM D882-75B
    e. Adhesives: AV1257/CA1001
    f. Colors: APWA code for sewer and water
    g. Printability: 45 Dynes ASTM D2578
    h. Width: 6.0 inches
4. Acceptable product:
    a. Pro-Line Safety Products by Pro-Line Safety Product Company.
    b. Or approved equal.

2.2 VALVES

A. Provide valves with clockwise closing direction.

B. Gate valves:
1. Valves 3-inch through 14-inch:
    a. Design in accordance with AWWA C509 (cast iron body), or AWWA C515 (ductile iron body), bronze fitted, resilient wedge and seat type with non-rising stem and O-ring packing.
    b. Provide gear operator for valves 14-inch and larger.
2. Provide mechanical joint ends for buried valves and ANSI Class 125 flange ends or mechanical joint ends for valve installed in vaults as indicated on the Drawings.
    a. Provide restrained type joints for all mechanical joint end valves.
    b. Provide and install nuts and bolts matching the nuts and bolts used for fittings.

3. Acceptable valve manufacturers:
   a. American Flow Control.
   b. Clow.
   c. EJ.

2.3 VALVE BOXES

A. Provide adjustable valve boxes on buried valves:
   1. Valve box compatible with size and type of valve protected.
   2. Extend box to finished grade.
   3. Mark valve box cover "WATER" for potable water piping valves. Other valve box covers unmarked.
   4. Stainless steel valve extension stems and 2-inch square operating nuts 2 inches below the cover.
   5. Two valve operating tee wrenches with 2-inch square socket, 24-inch long, 1½-inch pipe handle, and 48-inch long 1½-inch pipe stem.

B. Provide valve box stabilizer for all valve boxes.
   1. Acceptable manufacturers:
      a. Alberico.
      b. American.
      c. Adaptor, Inc.
      d. EJ Series 8550.
      e. Tyler 6850.
      f. Or equal.

2.4 VALVE VAULTS

A. Precast:
   1. Provide precast reinforced concrete manhole sections, bottoms, and flat top slabs complying with ASTM C478 unless otherwise indicated on Drawings.
   2. Provide concentric cone section for gate valves.
   3. Provide eccentric cone section for butterfly valves.
   4. Provide precast reinforced concrete monolithic or separate base.
   5. Design flat slab tops for AASHTO HS20-44 wheel loading.

B. Concrete:
   1. Provide 4,000 psi concrete using Type I Portland Cement complying with ASTM C150.

C. Mortar:
   1. Mix one part Portland Cement to three parts fine aggregate.

D. Joints for precast sections:
   1. Provide joints of either flexible watertight rubber gaskets or preformed bituminous plastic gaskets consisting of a homogeneous blend of refined

hydro-carbon resins and plasticizing compound reinforced with inert mineral filler.

a. Acceptable manufacturers:
   (1) Henry Company, RN103 – RAM-NEK Preformed Flexible Plastic Gasket (Coils).
   (2) ConSeal Concrete Sealants, Inc., Type CS-102.
   (3) Or equal.

E. Steps:
1. Provide steps with a minimum width of 12 inches and a minimum projection of 5 inches.
2. Use steps consisting of copolymer polypropylene plastic with a continuous ½-inch steel reinforcement as manufactured by M.A. Industries, Inc.; cast iron steps, Neenah R-1980-I; or equal.

F. Frames and covers:
1. Provide cast iron frames and covers with heavy duty, indented top, with solid self-sealing lids and machined bearing surfaces, stamped with the word “WATER” and “CITY OF JOLIET”.
   a. East Jordan 1050Z1.
   b. Neenah R-1710.
   c. Or equal.

G. Flexible pipe connectors:
1. Provide flexible rubber gasket collar for connecting pipe to the manhole.
   a. Comply with ASTM C923.
   b. For pipe 24-inch and smaller, use PSX gasket system by Press-Seal Gasket Corporation, or equal.
   c. For pipe 27-inch and larger, use resilient gasket by A-LOK Products, Inc., or equal.

2.5 FIRE HYDRANTS

A. General:
1. Comply with AWWA C502.
2. Paint fire hydrants in colors selected by the Owner.
   a. Public water: red.
   b. Raw water: green.
   c. Private systems: yellow.
3. Match the fire hydrants generally installed in the Owner's water system.
4. Acceptable manufacturers:
   a. Clow Medallion.
   b. EJ 5BR 250.
   c. Mueller Centurion A423.

B. Materials:
1. Provide compression type with a 5¼-inch minimum size main valve assembly, O-ring seals, two 2½-inch hose nozzles, and a 4½-inch pumper

nozzle with National Standard threads, a National Standard operating nut, and an above ground break flange.

2. Provide a 6-inch auxiliary resilient seat type gate valve with restrained type joints or bituminous coated metal tie rods between the valves and the tee fittings.
   a. Provide and install nuts, bolts, and tie rods matching the nuts and bolts used for fittings.
3. Provide valve boxes with cover marked with the word “WATER”.
   a. Stainless steel valve extension stems and 2-inch square operating nuts 2 inches below cover.
4. Provide valve box stabilizers on all fire hydrant auxiliary valves.
   a. Acceptable manufacturers:
      (1) Alberico.
      (2) American.
      (3) Adaptor, Inc.
      (4) Or equal.
5. Provide 12 lb zinc anodes, conforming to ASTM B418-73 Type II with 12-AWG wire.
6. Provide red color above ground access for tracer wire systems
   a. Acceptable manufacturers:
      (1) Copperhead Industries Cobra Hydrant Flange Package Part #T1-FLPKG
      (2) Or approved equal.

2.6 WATER SERVICES

A. General:
   1. Provide service saddles, corporation stops, curb stops, service boxes, and water service tubing.
   2. Comply with the most recent edition of AWWA C800 (or NSF/ANSI 372) for service lines and service line appurtenances.

B. Materials:
   1. Service lines: Type K soft temper seamless copper water tubing complying with ASTM B88.
   2. Service saddles:
      a. Provide service saddles on all water mains.
      b. Stainless steel saddle with O-ring and grade 30 rubber grid map; Cascade styles CSC2, CS22, or equal.
   3. Corporation stops: A.Y. McDonald No. 74701BQ.
   4. Curb stops: A.Y. McDonald No. 76104Q.
   5. Services boxes: Tyler 6500 with BBAF valve box stabilizer.

2.7 TAPPING SLEEVES AND VALVES

A. Tapping sleeves:
   1. Use two-piece bolted sleeve ductile iron or stainless steel type with mechanical joints. Stainless steel sleeves only allowed with prior approval

from City of Joliet Utilities Department.
2. Provide joint accessories.
3. Measure existing water main outside diameter to determine proper tapping sleeve size.
4. Acceptable manufacturers:
   a. Ductile iron: Clow F-5205, or equal.

B. Tapping valves:
1. Use fully ported gate valves complying with AWWA C500.
2. Use mechanical joints type, McWane Ductile F-5093, or equal.

2.8 RESTRAINED FLANGE ADAPTOR

A. Provide a ductile iron flange adaptor dual ring system with bolt circles compatible with 125#/Class 150 bolt pattern.
1. Provide adaptor with individual actuated gripping wedges that utilize torque limiting screws to insure proper initial set.
2. Set screw “only” restraining adaptors are not acceptable.
3. Provide system that allows joint deflection of up to 5°.
4. Provide a fluoropolymer coating to the wedge and wedge assembly and powder coating to the restraint body.

B. Acceptable manufacturers:
1. Series 2100 Megaflange by EBAA Iron:
   a. Or approved equal.

2.9 PIPE INSULATION

A. Rigid Pipe Insulation:
1. Provide extruded polystyrene sheathing conforming with ASTM C578, Type IV.
2. Thickness: 2 inches.
3. R-Value: 10.
4. Water absorption: No greater than 0.10% by volume per ASTM C272.
5. Acceptable product:
   b. Formular Rigid Foam Insulation, Owens-Corning.
   c. Or equal.

PART 3 - EXECUTION

3.1 PIPE INSPECTION, HANDLING, STORAGE, AND INSTALLATION

A. General:
1. Install in accordance with pipe manufacturer's recommendations.

B. Ductile iron or PVC water mains and appurtenances:
1. Comply with AWWA C600 and C605.

2. Protect ductile iron pipe and fittings installed in corrosive soils containing cinders or having a high organic content by loose wrapping or tubing with polyethylene sheet.
   a. Place polyethylene sheet or tube around the entire circumference of the pipe, tie or tape sheet securely to prevent displacement during backfilling.
   b. Comply with ANSI/AWWA A21.5-99/C105 regarding installation of polyethylene protection.
3. On ductile iron pipe, install conductivity through joints by use of conductivity wedges or copper cable and taps.
   a. Use two (2) wedges per joint for pipes 12 inches or smaller, and four (4) wedges per joint for pipe sizes larger than 12 inches.
   b. Use number of copper cable connectors per joint as recommended by the pipe manufacturer.

3.2 DEPTH OF PIPE COVER

A. Install water mains and water service lines with a minimum depth of cover of five (5) feet below finished grade ground level unless otherwise indicated on the Drawings.

B. Where new water mains cross existing water mains, install new water main below existing main unless otherwise indicated on the Drawings.

3.3 CONNECTIONS TO EXISTING WATER MAINS

A. Make connections to existing water mains.

B. Use non-pressure connections except where pressure connections are shown on the Drawings, or required by the conditions encountered at the time of construction.

C. Make one connection at a time except as approved by the Engineer.

D. Do not operate the valves on the existing water mains. The employees of the Owner's Water Department will open and close the valves as required for the connections.

E. Coordinate shutdown of existing water mains with Owner’s Water Department and Engineer with a minimum of 48 hours’ notice prior to shutdown.

3.4 PIPE RESTRAINING SYSTEMS

A. General:
   1. Provide protection from movement of water main piping, plugs, caps, tees, valves, hydrants, and bends of 11¼ degrees or greater.

B. Restrained joint pipe, fittings and valves:
   1. Provide restrained joint pipe to a distance indicated on the Drawings, or if not shown on the Drawings, to a distance not less than two pipe lengths on each side of a fitting or valve to be restrained.
   2. Protect all restrainers used for PVC fittings with a double layer of polyethylene wrapping or tubing.

C. Concrete thrust blocks:
   1. When conditions prevent the use of restrained joints, use concrete thrust blocks of an approved type. The use of concrete thrust blocks in lieu of restrained joint pipe, fittings and valves requires written approval of the Engineer.
   2. Provide precast or cast-in-place concrete thrust blocking with a compressive strength of 3,000 psi in 28 days.
   3. Locate thrust blocking between solid ground and the fitting to be anchored.
   4. Unless otherwise shown or directed by the Engineer, place the base and thrust bearing sides of thrust blocking directly against undisturbed earth.
   5. Sides of thrust blocking not subject to thrust may be placed against forms.
   6. Place thrust blocking so the fitting joints will be accessible for repair.

3.5 SEWER CROSSING

A. General:
   1. Separate water mains and water service lines from sanitary sewer, storm sewers, combined sewers, house sewer service connections, and drains in accordance with the “Standard Specifications for Water and Sewer Construction in Illinois”.

B. Water mains:
   1. Wherever water mains cross storm sewers, sanitary sewers, or sewer service connections:
      a. Install the water main so that its invert is at least 18 inches above the top of the sewer.
      b. Maintain this vertical separation for that portion of the water main located within 10’ horizontally of any sewer or drain crossed.
      c. Center a length of water main pipe over the sewer to be crossed with joints equidistant from the sewer or drain.
   2. When it is impossible to obtain the minimum 18 inches vertical separation, or when it is necessary for the water main to pass under a sewer or drain:
      a. Construct the sewer or drain of pressure pipe, conforming to the specification for water main materials.
      b. Extend the sewer construction on each side of the crossing until the normal distance from the water main to the sewer or drain is at least ten feet.
      c. As an alternate, install either the water main or sewer inside a water main quality casing pipe for a distance of 10 feet measured perpendicular to the sewer on each side of the crossing.

3. Where a water main must cross under a sewer:
   a. Maintain a vertical separation of 18 inches between the invert of the sewer and the crown of the water main.
   b. Support the sewer or drain line to prevent settling and breaking the water main.

C. Water service lines:
1. Comply with the requirements of water main separation.

D. Sewer manholes:
1. Do not install water line through sewer manhole.

3.6 VALVE VAULTS

A. General:
1. Install pipe through valve vault as shown on the Detail.
2. Make vault watertight with use of flexible manhole connectors as per the Detail.

B. Steps:
1. Provide each valve vault over 3 feet deep with individual wall-mounted steps as shown on the valve vault detail.
2. Comply with the requirements of governmental agencies having jurisdiction.

C. Jointing:
1. Use flexible watertight gaskets for each joint.
2. Trim smooth and free from surplus gaskets.

D. Frames and covers: Unless otherwise shown on the Drawings or as directed by the Engineer, set frames and covers:
1. In paved areas: So that the top of the solid cover will be flush with the finished pavement.
2. In unpaved areas: To drain away from the valve vault.
3. With flexible watertight gaskets.
4. With grade rings not to exceed 8 inches.

3.7 FIRE HYDRANT INSTALLATION

A. Install fire hydrants plumb with the lowest hose connection at least 18 inches, but not more than 26 inches, above the finished grade ground level.

B. Set fire hydrant and auxiliary valve on precast concrete blocks to provide firm support for the bases.

C. Brace the fire hydrant base with solid concrete blocking between the base and undisturbed trench wall to counteract the reaction thrust of water pressure at the base.
   1. Provide mechanical joint anchoring fittings, or approved restrained joints.

D. Brace the fire hydrant barrels during backfilling.
   1. Do not block the drain hole in fire hydrant.

E. Place a minimum of 1/2 cubic yards of washed coarse stone at and around the base for proper drainage.
   1. Cover stone with plastic before backfilling.

F. Place and compact backfill materials in 6-inch layers around the fire hydrant and auxiliary gate valve.

G. Cover new fire hydrant with plastic bag until new system is in service.

3.8 WATER SERVICE CONNECTION

A. General:
   1. Make service connections at locations shown on the Drawings or determined by the Engineer at the time of construction.
   2. Notify the City's Public Utilities Department immediately if existing lead water services are discovered.
   3. Install water service pipe, corporation stop and curb stop as shown on the standard water service installation detail.
   4. Set curb stop on a precast concrete block.
   5. Do not splice the water service pipe.
   6. Sequence of installation: See TESTING AND INSPECTING section of these Specifications for outline of when, in the sequence of construction, the corporation stops, curb stops, and service boxes are to be installed, leakage tested, and disinfected.
      a. Water service installation work must begin within 5 days of satisfactory sample results and IEPA approval.
      b. Water service installation work must be completed within 15 working days after receiving the operating permit from IEPA, including partial approvals.

B. Service boxes:
   1. Install over the curb stop in a truly vertical position.
   2. Set the top of the box flush with the finished grade ground level.

C. Direct tapping of polyethylene-encased D.I.P.:
   1. Wrap two or three layers of polyethylene adhesive tape completely around the pipe to cover the tapping machine and chain mounting area.
   2. Make the tap and install the corporation stop directly through the tap and polyethylene.

3. After making the direct service connection, inspect the entire circumferential area for damage and make any necessary repairs.
4. Wrap the corporation stop and a minimum distance of 3 feet of the copper service pipe with polyethylene.

3.9 PVC WATER MAIN TRACER WIRE

A. Install tracer wire system per manufacturer's instructions.

B. Place tracer wire taped to pipe at maximum intervals of 5 feet at 3 o'clock or 9 o' clock positions on the north or east side of the pipe.

C. Extend wire to top of valve boxes and other structures. Install tracer wire as a single continuous wire, except where using approved connectors.

D. Install tracer wire access points behind each fire hydrant. Leave 24-inches of slack to facilitate connections.

E. Extend tracer wire to top of valve vault cone sections and mount tracer wire to vault walls with stainless steel cable clamps. Leave 36-inches of slack to facilitate connections. Extend wire up to top of marker posts, if marker posts are included with project.

F. Tracer wire installed along PVC water main to terminate with a mechanical connection of the tracer wire to the connecting iron water main with a stainless steel grounding band in accordance with manufacturer recommendations. Install tracer wire to allow proper access for connection of tracing equipment, without loss or deterioration of low frequency (512 Hz) signal, and without distortion of signal caused by more than one wire installed in close proximity.

G. Interconnect tracer wires at intersections. At tees, join the three wires using single, three-way locking connectors. At crosses, join the four wires using two three-way locking connectors with a short jumper wire between them.

H. Install grounding anodes at each end of pipeline and at a maximum spacing of 1,000 feet.

I. Successfully test tracer wire system installation after final restoration by locating the full length of facility using a low frequency (512 Hz) line tracing equipment in the presence of Owner and Engineer.

3.10 PIPE MARKING TAPE

A. General:
1. Install marking tape in trench directly above pipe to be marked.
2. Protect tape during backfill procedures.
3. Continue tape through vaults or structures.

B. Depth:
   1. Install tape 18 inches below finished grade unless different depths are noted on the drawings or in other sections of these Specifications.

3.11 PRESSURE CONNECTION

A. Support the exposed existing water main on concrete pedestals at sufficient intervals to properly carry its own weight, plus the weight of the tapping machinery and fitting.
   1. Provide a concrete thrust block behind tapping sleeve.

B. The City of Joliet Water Department shall do the actual tapping of the main. The Contractor will be responsible for calling 815-724-4220 to schedule an appointment with City Water Department. Appointments are available on Tuesdays and Thursdays.

C. Minimum tap hole diameter:
   1. For pipe 12-inch or smaller: 1/2-inch less than the nominal pipe diameter.
   2. For pipe 14-inch through 20-inch: 1½-inch less than the pipe diameter.

D. Open valve to flush any foreign material after completion of the pressure tapping.

3.12 PIPE INSULATION

A. Rigid Pipe Insulation:
   1. Place rigid insulation board above the pipe bedding material to the width of the trench.
   2. Place rigid insulation board to the required thickness at locations as directed by the Engineer.

3.13 POLYETHYLENE WRAPPING OF DUCTILE IRON PIPE AND APPURTENANCES

A. Comply with requirements of ANSI/AWWA A21.5-99/C105.
   1. Place polyethylene sheet around the entire circumference of the pipe, tie or tape sheet securely to prevent displacement during backfilling.
   2. Wrap all water mains, fittings, valves, fire hydrant leaders, fire hydrants, and service lines.
      a. Wrap copper service lines to a point 3 feet from center of water main.
      b. Do not block fire hydrant weep hole.

3.14 TESTING AND INSPECTING

A. Sequence of installation:
   1. Install new water main but do not install corporation stops, service lines, curb stops, or service boxes; conduct pressure test, leakage test; and disinfection of new water main; flush main; after acceptance for use put main into service (while existing main continues to function): Install

corporation stops, curb stops, and new service boxes; and connect new service box to existing service lines.

2. Water service installation work must begin within 5 days of satisfactory sample results and IEPA approval.
3. Water service installation work must be completed within 15 working days after receiving the operating permit from IEPA, including partial approvals.

B. Hydrostatic tests:
1. Where any section of a water line is provided with concrete thrust blocking for fittings, do not make hydrostatic tests until at least 5 days after installation of the concrete thrust blocking, unless otherwise directed by the Engineer.
2. Devise a method for disposal of waste water from hydrostatic tests, and for disinfection, as approved in advance by the Engineer.

C. Pressure tests:
1. Subject the new water mains and service lines, including valves and hydrants, to a hydrostatic pressure of 150 psi, meeting AWWA C600 requirements.
2. Test pressure shall not vary by more than ±5 psi for the duration of the test.
3. Carefully examine exposed pipe, joints, fittings, and valves.
4. Replace or remake joints showing visible leakage.
5. Remove cracked pipe, defective pipe, and cracked or defective joints, fittings, and valves. Replace with sound material and repeat the test until results are satisfactory.
6. Make repair and replacement without additional cost to the Owner.
7. Use only solid stainless full-body repair clamps as approved by the Engineer.

D. Leakage test:
1. Conduct a metered leakage test after the pressure test has been satisfactorily completed.
2. Duration of each leakage test: two (2) hours.
3. Subject the new water mains, including valves and hydrants, to a hydrostatic pressure of 150 psi.
4. Test pressure shall not vary by more than ±5 psi for the duration of the test.
5. Install water meter approved by the Engineer.
   a. Provide double check valve assembly between water meter and existing water main.
6. Maximum allowable leakage: As recorded by a meter approved by the Engineer, with leakage to not exceed the number of gallons per hour (gph) as determined by the following formula:

   $$gph = LD(P^{½})/133{,}200$$

   in which: L = Length of pipe test, in feet
   D = Diameter of water main, in inches
   P = Average pressure, in pounds per square inch (gage)
7. Should any test of pipe disclose leakage greater than the maximum allowable amount, locate and repair the defective joint or joints and then

repeat the 24-hour metered leakage test until the leakage is within the specified allowance, and at no additional cost to the Owner.

E. Time for making test:
1. Except for joint material setting, or where concrete reaction backing necessitates a 5-day delay, pipelines jointed with rubber gaskets, mechanical, or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill.
2. Perform the pressure and leakage tests satisfactorily prior to requesting the Engineer to witness the official tests.
3. Notify the Engineer at least 48 hours prior to the time of the requested official tests.
4. Depending on traffic conditions, public hazard, or other reasons, the Engineer may direct when to conduct the tests, and may order the tests to be made in relatively short sections of water mains.

3.15 PRELIMINARY FLUSHING

A. Prior to disinfection, flush water main as thoroughly as possible.
1. Flush water main until water runs clear.
2. Provide a minimum flushing velocity of 2.5 feet per second in the water main.
3. Where no fire hydrant exists on the end of a water main, the plug (or cap) on the end of the water main must be tapped with opening in the end for flushing purposes. After acceptance install threaded plug into tap.
   a. 8”, 10” and 12” mains: 2½-inch tap.
   b. 16” mains: 3-inch tap.
   c. Larger than 16” use temporary fire hydrants.
4. Contractor has the option to use temporary fire hydrants in lieu of taps. Temporary fire hydrants must be removed after testing is complete.

B. Coordinate time of flushing with Owner and Engineer, at least 72 hours in advance of flushing.
1. Do not initiate flush without Owner’s permission.

3.16 DISINFECTION

A. General:
1. After the water main work has been satisfactorily completed and tested, disinfect the work in accordance with AWWA C651, and "Standard Specifications for Water and Sewer Construction in Illinois" as modified by these Specifications.

B. Application of chlorine:
1. Apply chlorine by gas feed or solution feed chlorinator as approved by the Owner.
   a. Provide effective diffusion of the gas or solution into the water.

b. Provide means for preventing the backflow of water into the feeder.

2. Chlorine solution:

a. Apply solution of sodium hypochlorite into one end of the section of main to be disinfected while filling the main with water.

C. Requirement of chlorine:

1. Initial chlorine solution in pipe: At least 50 mg/L, but not more than 100 mg/L.
2. Retain the disinfecting solutions in the work for at least 24 hours.
3. Chlorine residual after the retention period: At least 25 mg/L.

D. Flushing and testing:

1. Following chlorination, flush treated water thoroughly from the water mains until the chlorine concentration in the water flowing from the main is no higher than generally prevailing in the Owner's system, or less than 1 mg/L.
2. After flushing, the Owner will collect two samples on successive days at least 24 hours apart in sterile bottles treated with sodium thiosulfate. Notify the Engineer and Owner when leakage testing is complete and schedule the time for sample collection with the Owner. Provide materials and support to the Owner in collection of samples.
3. The Owner will perform bacteriological analysis.
4. Should the initial disinfection result in an unsatisfactory bacterial test, repeat the chlorination and sampling procedures until satisfactory results are obtained.

E. Swabbing:

1. Flush and swab the piping, valves, and fittings that must be placed in service immediately and cannot be disinfected by the above specified methods, with 5 percent solution of calcium hypochlorite prior to assembly.

a. Secure the Engineer's approval before applying this method of disinfection.

3.17 DECHLORINATION

A. Comply with AWWA C651-05 requirements to neutralize the residual chlorine in new water mains.

B. After new water mains have passed disinfection requirements, utilize portable diffusing dechlorinators that utilize sulfur dioxide or other chemicals listed in Appendix C of AWWA C651 to lower chlorine residuals prior to discharge to the drainage system.

1. Lower concentration to 1 mg/L or less.

3.18 ABANDONMENT OF EXISTING WATER MAINS AND APPURTENANCES

A. Abandon water mains indicated on the Drawings as “to be abandoned” only after all requirements for testing and disinfection have been satisfied and all existing services have been connected to new water mains.

B. Provide concrete plugs in all water main pipes to be abandoned at the limits of the trench excavations, or at other locations if so indicated by the Drawings.

C. Provide ductile iron plugs, caps, or other necessary fittings, and thrust blocking, on ends of portions of existing water mains that are to remain in service. Tees should be removed and replaced with the appropriate diameter of water main, or tees shall have ductile iron plugs installed, as directed by the Engineer. Length of dead end mains shall be no greater than two times the outside diameter of the main.

D. Close existing water valves only with the permission of the Engineer.

E. Leave valve in place, but remove valve box to top of existing valve, and fill excavation with compacted granular material.

F. Leave valve in place, remove frame and lid and top section of valve vault, and backfill excavation with compacted granular material.

G. Remove fire hydrants in total, including auxiliary box, and backfill excavation with compacted granular material.

H. Deliver valves, valve boxes, fire hydrants, and frames and lids to the Owner at 921 Washington Street, Joliet, Illinois.

I. Where abandonment of existing water mains or appurtenances require work outside of the work zone, restore area of work as indicated on the Drawings or Section 32 92 00 of the Specifications.

J. Removal of existing water mains that are being replaced by new water mains in the same location is considered incidental to the installation of the new water main and no additional compensation will be allowed.

END OF SECTION