Sewer connections shall be paid per each connection of new sewer to existing sewer. All necessary labor, materials, and work required to make the connection shall be included in the price per each as provided in the Bid Form.

Unit bid shall include excavation, pumping, sheeting, pipe completely installed, and backfilled in-place. All measurements will be made along the centerline of the pipe and from center of manhole to center of manhole, or point of juncture with bends, tees or special structures. Riser service pipe installation will be paid as service pipe. Payment for sewer pipe shall be limited to 80% of the actual amount installed until all sewer has been tested, accepted and backfilled to subgrade elevations.

Payment will be made based on the following schedule:

Item No.	Item	Unit
2503.503	__" SPAN RC PIPE-ARCH SEWER CL IIA	L F
2503.503	__" RC PIPE SEWER DES 3006 CL III	L F
2503.503	__" RC PIPE SEWER DES 3006 CL V	L F
2503.601	SANITARY SEWER BYPASS PUMPING	LS
2503.602	CONNECT TO EXISTING SANTIARY SEWER	EACH
2503.602	CONNECT TO EXISTING STORM SEWER	EACH
2503.602	CONNECT INTO EXISTING DRAINAGE STRUCTURE	EACH
2503.602	CONNECT INTO EXISTING MANHOLE (SAN)	EACH
2603.602	CONNECT TO EXISTING SANITARY SEWER SER	EACH
2503.602	8"X4" PVC02 WYE	EACH
2503.603	TELEVISE SANITARY SEWER	L F
2503.603	4" PVC PIPE SEWER	L F
2503.603	__" PVC PIPE SEWER SDR 26	L F
2503.603	__" PVC PIPE SEWER SDR 36	L F
2503.603	4" PVC RISER PIPE	L F
2503.603	__" DUCTILE IRON PIPE SEWER	L F

2504 (CEAM 2611) WATERMAIN

The provisions of CEAM 2611, Standard Specifications for Watermain and Service Line Installation are modified and/or supplemented as follows:

2504.2 (CEAM 2611.2) MATERIALS

The provisions of CEAM 2611.2 are modified and/or supplemented as follows:

A.1 Ductile Iron Pipe and Ductile Iron and Gray Iron Fittings

Ductile iron pipe shall be mechanical joint, Class 50 for 12 in and larger diameter, and Class 52 for 10 in and smaller diameter. All watermain shall have polyethylene encasement in accordance with AWWA C105.

All fittings for watermain shall be mechanical joint, Class 350, Ductile Iron Compact Fittings in accordance with AWWA C153. Fittings shall be furnished with fusion bonded epoxy external coating and/or interior lining in accordance with AWWA C550 and C116, 6 mil to 8 mil nominal thickness.

All nuts and bolts shall be stainless steel or Cor-Blue t-head bolts. All tie rod restraints and corresponding nuts shall be coated with an approved rust-proofing material.

B. Fire Hydrants

Hydrants shall be Waterous Pacer; Model WB-67-250 conforming to AWWA C502 with eight feet (8') of bury. The nozzle shall be a minimum of eighteen inches (18") above grade break-off flange and shall have National Standard Thread Connections. Nozzle caps shall be nut type with chain. Hydrants that require a greater than two-foot (2') extension shall have a heavy duty (HD) rod installed which is incidental unless specified. An “Out of Service” tag, red or yellow in color, shall be installed on the pumper connection at time of hydrant install/backfill. This tag will be removed by the City only. See Appendix B, Typical Plate HU-W-1 for further details.

The following materials shall be furnished to the City and shall be incidental:

Hydrant Marker	Fiberglass, Candy Cane Style; 1 Each Installed Plus 1 Each Extra
Hydrant Wrench	1 Each per 10 Hydrants Installed
Adjustable Gate Valve Key (or 6’ Telescoping Rod with Swivel 2” Socket, extending to 11’	1 Each per 10 Gate Valves Installed (1 Minimum)

C.1 Valve Housings

Valve boxes shall be cast iron, three-piece screw type boxes with 5¼" diameter shaft suitable for 7½' of cover over water main and a drop lid with the word “Water” on the lid. Valve boxes shall be Tyler 6860 Series or approved equal. Butterfly valve manhole castings shall be Neenah R-1733 or approved equal, labeled with the word “Water.” Castings shall be included in the manhole cost.

Valve boxes shall be screw-type with a drop lid cover marked with “Water.” Box to be adjustable a minimum of 6 in up and down from the specified depth of pipe bury.

C.2 Gate Valves

Gate valves shall be Waterous Series 2500 or approved equal, including adaptors (incidental). Metal-seated gate valves will not be allowed. All gate valves require a base adaptor. The Contractor will notify the City 24 hours in advance of any gate valve operations. Valve boxes must be raised to ⅜" below grade within two (2) weeks after the completion of each lift of bituminous.

Gate valve extensions are required where accessibility exceeds 7.5 feet. See Appendix B, Typical Plate HU-W-3 for further details.

D. Water Service Pipe and Fittings

Services shall be new and unused copper, Type K or SDR 7 Polyethylene as approved by the Engineer. No copper to copper installs allowed.

Corporation stops shall be Ford FB600 or engineer-approved equal. They shall be ball valve design with threaded inlet and flare type joint.

Curb stops shall be Ford B22 Series, or engineer-approved equal with ball valve design for use with Minneapolis Pattern Curb Boxes with stationary rod.

Curb boxes located in a driveway or parking lot shall be covered with a Ford A-1 Meter Box Cover or approved equal.

Curb boxes shall be adjustable up and down for seven and one-half (7½') feet of cover.

Service saddles are required on six-inch (6") and smaller mains. Saddles shall have an epoxy coated ductile iron body with double stainless steel straps and neoprene gasket, Mueller H-10526 or approved equal.

F. Mechanical Joint Restraints

All restraints shall be fusion bonded epoxy coated on the inside and outside according to ANSI/AWWA C550 and C116/A21.16. **All bolts and fasteners are to be stainless steel or Cor-Blue t-head bolts.**

Retainer glands shall be ductile iron designed to withstand the same pressures as the watermain pipe and fittings. Retainer glands shall be by American, US Pipe or Mega-Lug type and shall be used at all changes in direction and at all fittings and valves. This shall be considered included in the cost of the watermain pipe

Add the following new paragraph to CEAM 2611.2:

J. Polystyrene Insulation

Insulation board shall be rigid expanded polystyrene, conforming to the material requirements of CEAM 2600.2B. Placement of insulation shall be in accordance with the requirements of CEAM 2600.3.D.

Add the following new paragraph to CEAM 2611.2:

K. Temporary Water Distribution System

A temporary water distribution system shall be required when existing users will be out of water service for a period exceeding eight hours, or as required at the discretion of the Engineer. All piping including hoses used for water service shall be ANSI/AWWA rated. All piping and fittings shall meet current NSF standards and shall be rated for residential or commercial use. The minimum pipe size shall be 2 in for mainlines and ¾ in for individual service connections. Larger pipe sizes may be required based on zoning or Contractor's phasing plans. No additional compensation will be granted for pipe sizes larger than the specified minimum.

2504.3 (CEAM 2611.3) CONSTRUCTION REQUIREMENTS

The provisions of CEAM 2611.3 are modified and/or supplemented with the following:

Dewatering to maintain pipe trenches free of water shall be considered incidental.

Notify the Engineer and the Owner at least 72 hours prior to connecting to existing watermain. All residents who will be affected by shutting off water service shall be given a minimum of 24 hours' notice in writing as to when, and for how long, service will be interrupted. Temporary water shutoffs shall not exceed four hours in duration, and shall only occur between the hours of 9:00 a.m. and 3:00 p.m. Monday through Friday, unless otherwise specified in the Contract. The Contractor shall at all times coordinate work with the Engineer and the Owner.

During the installation of the new watermain, service shall be maintained to all properties. It may be necessary to maintain temporary pipes on the surface with connections to outside hose bibs. The temporary connections must be made according to Department of Health standards and approved by the Engineer. New watermain installations shall be coordinated so that no home or business is on temporary water service for more than 14 days unless prior arrangements have been made. The Contractor shall be responsible for any improvements to homes or businesses necessary to facilitate the temporary water connections.

A2 Pipe Laying Operations

Advance excavation shall be the minimum consistent with the Contractor's methods and scheduling, shall be subject to the approval of the Engineer and consistent with other section of these Specifications. The trench excavation must conform to all local, state and federal requirements.

The Contractor shall install, at his expense, the necessary trench support to meet the varying soil conditions and to protect existing structures and property.

A horizontal separation distance of ten feet (10') shall be maintained for water main and sanitary sewer. An eighteen inch (18") vertical separation shall be maintained at all crossings.

C Water Service Installation

Corporation stops shall be tapped into the main only when full of water under operating pressure. No taps shall be made into a dry pipe. Corporation stops shall be turned into the pipe until tight and shall not be turned back to facilitate having the operating nut on top. If water main is PVC pipe, the plastic plug or coupon must be removed. See Appendix B, Typical Plate HU-W-2 for further details.

D Setting Valves, Hydrants, Fittings and Specials

All hydrants shall be given one additional coat of paint after final wear of bituminous has been installed. All abraded surfaces shall be cleaned prior to application of the final field coat.

Contractor to verify paint type with City Public Works Department.

When hydrants are installed in groundwater, the weep holes must be closed. A “No Drain” tag shall be installed on hydrant. Verify with Engineer prior to work.

Conductivity straps, either shop welded or field welded, are required. Gaskets with conductivity molded into the gasket **will not** be allowed.

E. Electrical Conductivity Test

The Engineer shall receive at least 24 hours’ notice for all testing. The Contractor shall perform all testing in the presence of the Engineer in the field.

A low voltage circuit shall be completed with the use of a suitable voltage source and meter to ensure continuity. If a close clamp circuit cannot be completed, the cause shall be isolated and corrected. Thereafter, the section in which the defective test occurred shall be retested as a unit and shall meet the requirements.

F. Hydrostatic Testing of Watermains

The Engineer shall receive at least 24 hours’ notice for all testing. The Contractor shall perform all testing in the presence of the Engineer in the field.

Service pipes may be tested at the time of the foregoing test, if installed, at the Contractor’s option; however, testing of service pipes may be completed as a separate operation from main testing. Service pipe testing, if done separately, shall be done with the corporation stop open.

Add the following new paragraph to CEAM 2611.3:

H. Temporary Water Distribution System

The temporary water distribution system shall be designed to meet a pressure requirement of 30 psi to 60 psi when in operation.

Prior to installing the temporary water distribution system, a detailed plan of the temporary water distribution shall be provided by the Contractor and approved by the Engineer. The Contractor shall allow one week for review and acceptance by the Engineer. The plan shall detail connection points, valves, redundancy measures, back feed ports, materials, mainline and service sizes, sampling points, emergency procedures, and other related information about the temporary water system including installation methods at all street crossings and driveways. The Contractor shall demonstrate that the level of service to the water users will not be significantly impacted and that the temporary system will supply water demands at pressures normal to the existing system. The Contractor shall identify large or exceptional water users and incorporate their needs into the temporary water distribution system.

H.1 Location

All above ground piping shall be installed with appropriate ramping or burial such that the piping will:

- Not be endangered by equipment or vehicular traffic;
- Not pose a hazard for pedestrians (tripping, etc.);
- Provide a barrier-free access; and
- Be constructed to safeguard against vandalism and tampering.

All driveway and street crossings must be buried.

The proposed phasing for the temporary water distribution system shall be planned such that no sleeves will be required to construct the new permanent water distribution system.

H.2 Source Water Connection

Source water connections to fire hydrants are discouraged unless the Contractor can demonstrate that the hydrant has been disinfected and thoroughly flushed. The Owner and Engineer assume no responsibility for the quality of water obtained from a hydrant. After disinfection, the hydrant shall be pressurized at all times in which it serves as a source of potable water. Isolation valves are required at the source water connection, branches (two on 3-way, three on 4-way) and at every service.

H.3 Reduced Pressure Zone (RPZ)

The Minnesota State Plumbing Code required protection of potable water. A Reduced Pressure Zone (RPZ) backflow preventer must be installed at each point of connection. That RPZ must be tested annually and rebuilt on a five-year operating cycle, in accordance with the State Plumbing Code. The Contractor shall provide certification of such for each RPZ utilized with the project. Installation of RPZs shall be included with the cost of the temporary water distribution system.

H.4 Pressure Testing and Leakage

All above ground piping shall be regularly inspected to ensure leak tight connections at the beginning and during the period that the temporary water distribution system is in use. At the discretion of the Engineer, buried temporary water distribution piping shall satisfy hydrostatic pressure testing.

The Contractor shall make its own determination about water pressure maintained by the temporary water distribution system and shall determine if a pressure reduction valve(s) (PRV) is necessary. If so, the PRV shall be include with the cost of the temporary water distribution system.

H.5 Chlorine Residual and Bacteriological Testing

After the temporary water distribution system is installed (both mainlines and services) in its final location, but before service piping is connected to the water users, the temporary water distribution system shall satisfy the chlorine residual and bacteriological testing standards and protocols for the commissioning of new watermain. Disinfection materials and procedures, and the collection and testing of water samples, shall be in accordance with the provisions of AWWA C-651.

H.6 Service Connections

The service connection piping shall be installed and disinfected at the same time as the main line in order that disinfection is accomplished on the service piping. The final connection to the water user shall not be made until the chlorine residual and bacteriological testing requirements have been satisfied. A check valve shall be installed on the service connection between the mainline and the connection to the water user. Prior to connection to water users, individual service lines shall be thoroughly flushed. The final connectors shall be spray-disinfected and swabbed with a minimum 1 percent and maximum 5 percent sodium hypochlorite (bleach) solution to disinfect the fittings. The Contractor shall arrange for the plumbing system to be flushed to remove any elevated chlorine residuals. A typical service connection to

a private building shall be at an outside hose bib, requiring the water valve at the meter to be shut-off. It is the responsibility of the Contractor to determine how to provide temporary water service to the satisfaction of the property Owner and the Engineer. The Contractor is responsible to provide an appropriate connection to the water user. The property Owner is under no obligation to allow the temporary water system to be connected to their internal system at any location other than on the public side of the curb stop. If a property Owner will not permit an above ground connection as typical, it shall be the Contractor's responsibility to make alternate arrangements to service the property. In lieu of making aboveground temporary servicing, the Contractor has the option to connect the temporary distribution system to the public side of the existing curb stop.

H.7 Operation

The temporary water distribution system shall be continually pressurized after the bacteriological testing is completed and be capable of supplying normal water demands throughout its installation. In the event of a main or service break, the Contractor shall take immediate steps to minimize water loss and to avoid system contamination. Each end of the broken pipe shall be elevated in a manner to avoid backflow into the pipe. All fittings used in the repair and the pipe ends shall be spray-disinfected and swabbed with a minimum 1 percent and maximum 5 percent sodium hypochlorite (bleach) solution to disinfect the connection. At the discretion of the Engineer, a round of chlorine and bacterial samples may be taken to ensure the integrity of the system.

H.8 Off-Hours Corrective Action

If corrective action is needed to the temporary water distribution system outside of normal working hours, the Engineer or Owner will attempt to contact the Contractor to take corrective actions. At the preconstruction meeting for the project, the Contractor shall provide the name and 24-hour contact information for the person(s) responsible for repairs. If, in the sole opinion of the Owner, the Contractor is unable to make the corrections in a timely manner, the Owner may direct their own forces to take corrective steps. The Contractor will be responsible for any costs incurred by the Owner.

H.9 Relocation of the Temporary Water Distribution System

The relocation of the temporary water distribution system either in whole or in parts by any means without conducting and passing the chlorine residual and bacteriological requirements shall not be permitted. Relocation is defined as depressurizing and moving the pipe work to service other water users.

Add the following new paragraph to CEAM 2611.3:

I. Irrigation System Repair

The Engineer shall attempt to field verify any existing irrigation systems in the project area prior to construction. The Engineer shall notify the Contractor of such known systems. The Contractor shall avoid or minimize disturbance to existing irrigation systems during construction. Homeowners must be notified by the Contractor of any disturbances or disruptions of existing systems. Existing private irrigation systems (of all types and designs) impacted by construction are to be repaired and/or replaced. New components used in the repair/replacement shall be consistent with existing system components. The existing system and its components shall be salvaged and reinstalled where possible.

2504.4 (CEAM 2611.4) METHOD OF MEASUREMENT

The provisions of CEAM 2611.4 are modified and/or supplemented with the following:

H. Ductile and Gray Iron Fittings

Ductile Iron compact fittings (AWWA C-153) shall be measured by the pound. (See Appendix for Fitting Weights table.)

Add the following new paragraph to CEAM 2611.4:

K. Insulation

Insulation shall be measured on a square yard basis installed to the specified thickness, and shall include all materials, equipment, and labor required for placement.

2504.5 (CEAM 2611.5) BASIS OF PAYMENT

Payment at the lump sum unit price for Temporary Water Service shall include all costs of furnishing, installing, and removing the temporary water distribution system as required by the plans and specifications.

Irrigation System Repair: Payment at the bid unit price per each sprinkler system repair shall include all labor and materials required to satisfactorily repair each existing irrigation system impacted by construction, including but not limited to salvaging, repairing, or replacing the system and/or its components. If the Contractor damages an existing system unnecessarily or is otherwise negligent, the Owner reserves the right to require payment of the resulting excessive repair costs by the Contractor.

Payment will be made based on the following schedule:

Item No.	Item	Unit
2504.601	TEMPORARY WATER SERVICE	LS
2504.602	CONNECT TO EXISTING WATER MAIN	EACH
2504.602	CONNECT TO EXISTING WATER SERVICE	EACH
2504.602	HYDRANT	EACH
2504.602	ADJUST HYDRANT	EACH
2504.602	ADJUST GATE VALVE & BOX	EACH
2504.602	__” CORPORATION STOP	EACH
2504.602	__” GATE VALVE & BOX	EACH
2504.602	__” CURB STOP & BOX	EACH
2504.602	ADJUST CURB BOX	EACH
2504.602	IRRIGATION SYSTEM REPAIR	EACH
2504.603	__” TYPE K COPPER PIPE	L F
2504.603	__” WATERMAIN DUCTILE IRON CL 52	L F
2504.604	4” POLYSTYRENE INSULATION	S Y
2504.608	DUCTILE IRON FITTINGS	LB

2505 UTILITY COORDINATION

2505.1 DESCRIPTION

The Contractor shall coordinate its activities with the activities of all “private” utility (natural gas, power, phone, etc.) owners present within the project limits. Coordination will include any delays associated with scheduling conflicts, fees charged by utility owners for construction services, and all time necessary to communicate and work with utility owners within the project limits.

The plans show only known underground utilities (including public utilities) and the locations are approximate. No assurance is given that additional underground facilities do not exist. The Contractor shall make its own investigation to determine to what extent existing utilities shall affect the Contractor’s work.

In the event a private or public utility is to be relocated by Others, the Contractor shall coordinate their work directly with the private or public utility.