DOCUMENT 00 91 13

ADDENDUM NO. 2

DATE:	January 30, 2026
PROJECT:	Well No. 5 Production Well, Pumphouse, SCADA Updates & Well No. 2 Demolition
PROJECT NUMBER:	240564
OWNER:	City of Prairie du Chien
ENGINEER:	Vierbicher
TO:	Planholders

This Addendum is issued to clarify, revise, add to or delete from the Bidding Documents. Please attach to the Bidding Documents and acknowledge receipt in the space provided on the BID FORM.

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated January 2026, with amendments and additions noted below.

This Addendum consists of 40 pages and zero drawings.

CHANGES TO THE PROJECT MANUAL

Note, all changes are in ***BOLD ITALICS*** in the attached revised specification sections.

DOCUMENT 00 41 43 – BID FORM

1. Contact B, Item No. 2: This bid item has been changed to "Well No. 2 MCC Salvage & Reuse". See subsection 1.2 B. PRICE AND PAYMENT PROCEDURES of Section 26 24 19 – MOTOR CONTROL CENTER SALVAGE & REUSE for items of work to be included in the Basis of Payment for this bid item. The subsequent bid items have been renumbered accordingly.
2. Contact B, Item No. 37 (previously No. 36) Water Service Lateral – 1.5" Copper: The quantity has been changed from 12 LF to 163 LF to match the quantity show on Plan Sheet C103.

DOCUMENT 33 09 10 – SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM UPDATE

1. Subsection 2.4 AUTO DIALER has been added.
2. Subsection 2.7 WELL NO. 1 PUMPHOUSE MASTER TELEMETRY UNIT (MTU) B.: An Auto Dialer has been added to the items to be installed in the MTU.

DOCUMENT 33 12 13 – WATER SERVICE CONNECTIONS

1. Subsection 2.2 CORPORATION STORM ASSEMBLY, B. Manufacturers: Mueller Company Model H-15008 added.

2. Subsection 2.3 CURB STOP ASSEMBLY, C. Manufactures: Revised with Muller Company Model H-15008 and Ford B44-44M-Q.

3. Subsection 2.3 CURB STOP ASSEMBLY, E. Curb Boxes and Covers: body type revised and stationary rod extension added.

DOCUMENT 33 12 16 – WATER UTILITY DISTRIBUTION VALVES

1. Subsection 2.1 RESILIENT WEDGE GATE VALVES, B. & C.: Revised to American Flow Control Series 2500 Ductile Iron.

2. Subsection 2.2 VALVE BOXES, A.: Revised to read, "Valve boxes shall consist of a base section, tubular mid and top sections, both with cast threads by which one can be telescoped on the other, extension sections if required, and a circular drop cover."

DOCUMENT 33 12 19 – WATER UTILITY DISTRIBUTION FIRE HYDRANTS

1. Subsection 2.1 FIRE HYDRANTS, C. Manufacturers: Revised to Waterous Pacer & Kennedy Guardian.

DOCUMENT 33 31 13 – PUBLIC SANITARY UTILITY SEWAGE PIPING

1. Subsection 2.1 SANITARY SEWER PIPE AND FITTINGS, A:. Revised to read, "Furnish pipe material as indicated on the plans and bid form."

2. Subsection 2.1 SANITARY SEWER PIPE AND FITTINGS, B.: Revised to add Pressure Plastic Pipe and fittings.

3. Subsection 2.1 SANITARY SEWER PIPE AND FITTINGS, C. & D.: Revised to clarify specifications for non-pressure pipe and fittings.

4. Manufacturers: Revised to Waterous Pacer & Kennedy Guardian.

CHANGES TO THE DRAWINGS

1. None.

REQUIRED FORMS

1. Bid Form
2. Bid Bond
3. Form 8700-294A EIF DBE Worksheet

VIRTUAL BID OPENING INSTRUCTIONS

1. Per the Advertisement for Bid, we will be conducting a virtual bid opening for the above referenced project. We will be utilizing Google Meet, a Google video conferencing method. We will be logged into Quest and ready for the Bid Opening 5-10 minutes before the clock reaches zero.

   If you would like to be invited to the virtual bid opening via Google Meet, please contact Missy Frenz before the bid opening at (608) 234-5518 or mfre@vierbicher.com.

If you have never used Quest before, please read through the **VirtuBid Online Bidding User Guide** found on Quest, under resources. It can take some time to get used to the steps required. You must download forms, print and sign forms, upload forms, complete the Quest online bid worksheet page and then submit before your bid will be accepted. Please do not wait until 30 minutes before the bid opening if this is your 1st time bidding on Quest. The table of contents is also useful in detailing all the steps required. Please note, the excel bid form does NOT have to be completed, this is only provided as a courtesy/resource. Bid items are entered individually on Quest or you can download the CSV file and enter your Unit Prices ONLY. If you edit anything else it will cause the system to error on bid submission.

END OF DOCUMENT

BID FORM - Contract A
Section 00 41 43
Well No. 5 Production Well, Pumphouse, SCADA System Update & Well No, 2 Demolition, Prairie du Chien, W

Bid Item Ref. No.	Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
CONTRACT A - WELL NO. 5 PRODUCTION WELL					
General, Erosion Control & Site Work					
1	Performance & Payment Bonds	LS	1	$ -	$ -
2	Mobilization / Demobilization	LS	1	$ -	$ -
3	Inlet Protection - Type D	EA	4	$ -	$ -
4	Silt Fence or Silt Sock	LF	140	$ -	$ -
5	Strip, Stockpile, & Re-Spread Topsoil (Estimated 125 CY +/-)	SY	865	$ -	$ -
6	Drill Cutting Containment, Stone Weepers, & Erosion Control	LS	1	$ -	$ -
7	Drill Rig Pad or Aggregate Base	LS	1	$ -	$ -
8	Clear Stone Tracking Pad	TON	60	$ -	$ -
9	Lot Re-grading	LS	1	$ -	$ -
10	Restoration - Seed, Fertilizer, & Mulch	SY	865	$ -	$ -
				Subtotal - General, Erosion Control & Site Work	$ -
Production Well					
11	Upper Enlarged Bore Hole & Temporary Outer Casing - 30"	VF	20	$ -	$ -
12	Bore Hole & Temporary Outer Casing - 24"	VF	106	$ -	$ -
13	Permanent Casing - 18" (casing to extend 36" above grade)	VF	73	$ -	$ -
14	Well Screen - 18"	VF	33	$ -	$ -
15	Gravel Pack	LS	1	$ -	$ -
16	Well Development	LS	1	$ -	$ -
17	Conduct Performance Test and Provide Report	HR	24	$ -	$ -
18	Furnish, Install, Remove Test Pump & Well Disinfection	LS	1	$ -	$ -
19	Water Quality Analysis Sampling, Testing & Reports	LS	1	$ -	$ -
20	Sand Seal	LS	1	$ -	$ -
21	Clay Seal	LS	1	$ -	$ -
22	Plumbness Test of Permanent Casing Before Grouting	LS	1	$ -	$ -
23	Annular Grout between 24" Bore Hole & 18" Casing (65 VF)	Bags	92	$ -	$ -
24	Plumbness & Alignment Test of Permanent Casing After Grouting	LS	1	$ -	$ -
25	Collect & Deliver Drilling Samples, Well Construction Report, Casing Pipe Report & Daily Reports	LS	1	$ -	$ -
26	Sealing Casing, Site Clean-up & Demobilization	LS	1	$ -	$ -
				Subtotal - Production Well	$ -
				TOTAL CONTRACT A - WELL NO. 5 PRODUCTION WELL	$ -

The Contract A TOTAL BID PRICE is:

Dollars _____

Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

BID FORM - Contract B
Section 00 41 43
Well No. 5 Production Well, Pumphouse, SCADA System Update & Well No, 2 Demolition, Prairie du Chien, W

CONTRACT B - WELL NO. 5 PUMPHOUSE, SCADA UPDATES & WELL NO. 2 DEMOLITION						
Well No. 5 Pumphouse & Emergency Electrical Generator						
1	Pumphouse	LS	1		$	-
2	***Well No. 2 MCC Salvage & Reuse***	***LS***	***1***		$	-
3	Emergency Electrical Generator & Automatic Transfer Switch	LS	1		$	-
	Subtotal - Well No. 5 Pumphouse & Generator				**$**	**-**
General, Erosion Control & Site Work - Well No. 5 Pumphouse						
4	Performance & Payment Bonds	LS	1		$	-
5	Mobilization	LS	1		$	-
6	Strip, Salvage, & Re-Spread Topsoil (Estimated 160 CY +/-)	LS	1		$	-
7	Common Excavation Move On Site (Estimated 180 CY +/-)	LS	1		$	-
8	Structural Fill - Under Asphalt & Generator Pad	CY	120		$	-
9	Base Aggregate Dense - 1 1/4" (6" Depth)	TON	180		$	-
10	Base Aggregate Dense - 3" (6" Depth)	TON	160		$	-
11	Base Aggregate Dense - 1 1/4" (Shouldering)	TON	15		$	-
12	Temporary Traffic Control	LS	1		$	-
13	Sawcut Concrete Curb Head	LF	20		$	-
14	Sawcut Asphalt	LF	65		$	-
15	Remove Existing Asphalt (2 1/2")	SY	15		$	-
16	Remove Existing Asphalt (4")	SY	20		$	-
17	Remove Existing Tree	EA	2		$	-
18	HMA Pavement - Upper Layer (2"), 4 LT 58-28S	TON	110		$	-
19	HMA Pavement - Lower Layer (2"), 4 LT 58-28S	TON	110		$	-
20	HMA Pavement - Trail (2 1/2") 4 LT 58-28S	TON	2		$	-
21	Asphaltic Tack Coat	SY	435		$	-
22	Restoration W/ Seed, Mulch, & Fertilizer (+/- 1430 SY)	LS	1		$	-
23	Inlet Protection - Type D	EA	4		$	-
24	Clear Stone Tracking Pad	TON	90		$	-
25	Silt Fence / Silt Sock	LF	180		$	-
26	Concrete Pad - Emergency Electrical Generator	LS	1		$	-
27	Concrete Pad - Transformer	LS	1		$	-
28	Concrete Driveway Apron (7")	SF	110		$	-
29	Remove & Replace Concrete Curb & Gutter - 30"	LF	20		$	-
30	Pipe Bollard	EA	2		$	-
	Subtotal - Erosion Control & Sitework - Well No. 5 Pumphouse				**$**	**-**
Sanitary Sewer - Well No. 5 Pumphouse						
31	Sanitary Sewer Lateral - 4-inch, C-900, W/10 AWG Tracer Wire	LF	124		$	-
	Subtotal - Sanitary Sewer - Well No. 5 Pumphouse				**$**	**-**
Water Distribution - Well No. 5 Pumphouse						
32	Water Main - 6" C-900	LF	8		$	-
33	Water Main - 10" C-900	LF	167		$	-
34	Remove Existing Water Service - 6"	LS	1		$	-
35	Gate Valves - 6"	EA	1			
36	Gate Valves - 10"	EA	1		$	-
37	Water Service Lateral - 1.5" Copper	LF	***163***		$	-
38	Water Service - 1.5" Corporation, Curb Stop, Union, and Box	EA	1		$	-
39	Hydrant - New w/ Marker Flag	EA	1		$	-
	Subtotal - Water Distribution - Well No. 5 Pumphouse				**$**	**-**
SCADA System Update						
40	Well No. 3 Pumphouse Remote Terminal Unit	LS	1		$	-
41	Well No. 4 Pumphouse Remote Terminal Unit	LS	1		$	-
42	Well No. 5 Pumphouse Remote Terminal Unit	LS	1		$	-
43	Reservoirs Remote Terminal Unit	LS	1		$	-
44	Well No. 1 Pumphouse Master Telemetry Unit	LS	1		$	-
45	MTU Firewall & Cellular Application for Remote SCADA Access	LS	1		$	-
	Subtotal - SCADA Syestem Update				**$**	**-**
Well No. 2 Demolition						
46	Salvage Designated Equipment & Materials and Deliver to Owner	LS	1		$	-
47	Abandon Well No. 2	LS	1		$	-
48	Hazardous Materials Abatment, Building Demolition, & Materials Disposal	LS	1		$	-
49	Abandon Connecting Water Main, Building Sewer, & Utilities	LS	1		$	-
50	Borrow Excavation (Trucked-in)	CY	170		$	-
51	Restoration W/ 4" Topsoil, Seed, Mulch, & Fertilizer (130 SY)	LS	1		$	-
	TOTAL - Well No. 2 Demolition				**$**	**-**
	TOTAL CONTRACT B - WELL NO. 5 PUMPHOUSE, SCADA SYSTEM UPDATE, & WELL NO. 2 DEMOLITION				$	-

The Contract B TOTAL BID PRICE is:

Dollars _____

Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

Alternate Bid Item - Well No. 5 Pumphouse - Contract B						
1A	Rebuild Well No. 2 Well Pump Bowl Assembly (Instead of New Well Pump Bowl Assembly. Add or deduct to Item #1)	LS	1		$	-
Alternate Bid Item - SCADA System Update - Contract B						
39A	Furnish Wood Utility Pole & Install Antenna - Well No. 5 Pumphouse RTU (Add to Item #39)	LS	1		$	-

SECTION 33 09 10

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM UPDATE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removing and replacing the existing SCADA system components at the Well Nos. 1, 3 & 4 Pumphouses, and the Reservoirs Site. A new Master Telemetry Unit (MTU) shall be provided at the Well No. 1 Pumphouse. Remote Terminal Units (RTUs) shall be provided at the Well Nos. 3, 4 & 5 Pumphouses and the Reservoirs Site. Abandoning data wiring between the Well Nos. 1 & 2 Pumphouses as Well No. 2 is to be abandoned.
2. Installing the antenna on a pole at any facility location if determined necessary per a radio survey (Alternate Bid Items).
3. Providing all SCADA system software, programming, startup, testing, and training.
4. Furnishing and installing all electrical control panels referenced herein, switches, conduit, wire, transducers, radios, radio antennas and mounting brackets, coaxial cable, wiring, and misc. items for a complete operating control system.

B. Related Sections:

1. Division 26 - Electrical

1.2 PRICE AND PAYMENT PROCEDURES

A. Section 01 20 00 - Price and Payment Procedures Contract Sum/Price

B. SCADA System Update:

1. Basis of Measurement: By lump sum.
2. Basis of Payment: Includes full compensation for removal and disposal of existing SCADA system components, for furnishing and installing a new Master Telemetry Unit at the Well No. 1 Pumphouse, and for furnishing and installing new RTU panels at Well Nos. 3, 4 & 5 Pumphouses, and Reservoirs site. Also includes full compensation for furnishing and installing all electrical panels, switches, conduit, wire, radios, antennas and mounting structures, coaxial cable, and misc. items for a complete operating system. Also includes full compensation for radio surveys, all SCADA system software, programming, startup, testing, and Owner training services, operation and maintenance manuals, and furnishing all materials, tools, equipment, labor and incidentals necessary to complete the work in accordance with the Contract Documents.

C. SCADA Antenna Installation on Utility Pole (ALTERNATE BID ITEMS):

1. Basis of Measurements: By Each.
2. Basis of Payment: Includes full compensation for installing SCADA antenna on a wood utility pole to the height deemed as necessary by the results of the radio survey including furnishing and installing the utility pole, Heliax antenna cable,

stainless steel antenna mounting brackets and hardware, and furnishing all materials, tools, equipment, labor and incidentals necessary to complete the work in accordance with the Contract Documents. The alternate bid item is to cover the additional cost to mount the antenna on a wood utility pole instead of the building/control panel exterior.

1.3 REFERENCE STANDARDS

A. The completed electrical installation shall meet all the requirements of the latest edition of the National Electric Code. This shall not be construed to permit a lower grade of construction where plans and specifications for workmanship or materials are required in excess of code requirements.

B. The work herein specified shall be subject to inspection and approval by authorized representatives of the National Board of Fire Underwriters, State and local governing authorities and the Owner.

C. All control panels shall be built by a UL certified 508 control panel manufacturer.

D. Chapter NR 811, Requirements for the Operation and Design of Community Water Systems of the Wisconsin Administrative Code.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
1. Panel elevations showing layout and dimensional information.
2. Structure Descriptions.
3. Conduit locations.
4. Unit Descriptions.
5. Nameplate Information.
6. Schematic wiring diagrams.

C. Product Data:
1. Data Sheets and Publications on all major components.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of panels and final wiring diagrams and connections.

C. Operation and Maintenance Data: Submit operation and maintenance instructions for components and devices.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with UL 508.

B. Provide components compatible with functions required to form complete working system.

C. Provide UL 508 label on complete assembly.

D. Perform Work in accordance with National Electric Code, State of Wisconsin codes, and local building code and requirements.

1.7 QUALIFICATIONS

A. Manufacturer/System Integrator: Altronex, a Division of LW Allen, Inc., 4633 Tompkins Drive, Madison, WI 53716, 608-210-1471 (Alan Clemens).

B. Substitutions: Not permitted.

1.8 WARRANTY

A. The control system manufacturer shall warrant that the Control System supplied shall be free of defective material and workmanship for one year from date of start-up. The manufacturer shall be obligated to furnish and install at no charge to the owner, replacement materials or units proven defective in the field within this warranty year. The warranty shall not be construed to cover fuses, lights or other materials normally consumed in operation, nor shall it cover damages through vandalism or acts of God.

B. The control system manufacturer shall assume the total, undivided responsibility for the correct operation of the water control system.

C. The manufacturer's price shall include everything required to make the proposed system work, including additional control changes if required. The existing system has various alarms, interlocks, lockouts, etc. All of these functions shall be retained in the new system as required.

1.9 SERVICE AND SPARE PARTS

A. The manufacturer shall certify that he maintains factory trained personnel available on four hours' notice with complete spare parts and maintenance items and stocks as may be required under any and all circumstances.

1.10 IDENTIFICATION AND LABELING OF ELECTRICAL EQUIPMENT

A. All control devices and device enclosures shall be labeled with individual nameplates or legend plates. Individual nameplates or legend plates shall be one of the following types:
   1. Black laminated plastic or micarta with white cut letters.
   2. Corrosion-resistant metal plates with engraved or raised letters and backfill.

1.11 ENVIRONMENTAL REQUIREMENTS

A. The complete control system shall function reliably within an operation temperature of -20° to +70° C (4° to +158° F). Humidity shall be 10% to 95% non-condensing. Each supervisory or remote unit shall be furnished with integral lightning protection devices to protect against lightning induced transients on power lines.

B. The entire control system shall provide a typical system accuracy and repeatability of better than plus or minus 1% over a temperature range of 0° to +50° C (+32° to +122° F).

1.12 FACILITY LOCATIONS

A. The following is a listing of facilities to be included in the control system:
1. Well No. 1 Pumphouse – Master Telemetry Unit
2. Well No. 2 Pumphouse – Abandon data wiring between Well No. 2 & MTU at Well No. 1. Pumphouse.
3. Well No. 3 Pumphouse – New Remote Terminal Unit
4. Well No. 4 Pumphouse – New Remote Terminal Unit
5. Well No. 5 Pumphouse – New Remote Terminal Unit
6. Reservoirs Site – New Remote Terminal Unit

1.13 RADIO TELEMETRY SYSTEM

A. The Bidder shall provide the required radio path site surveys to determine the minimum power requirements for the new RTU locations and shall design the Radio Telemetry System for at least 99.9-percent reliability. Evidence of the radio path site surveys shall be submitted with the radio equipment submittal as supporting information for the choices of power outputs proposed and required antenna height at the RTU sites. The supplier shall submit the proposed mounting heights and required poles for all antennas. The Bidder shall note any repeater station locations needed to communicate with the new RTUs. An alternate bid item for mounting the antenna(s) to a pole(s) (pole to be furnished and installed by the Village) is included on the bid form to cover potential outcomes of the radio study. The alternate bid item will only be used if the radio study deems the poles as necessary.

B. The Bidder shall furnish the antennas and mounting brackets required for the RTUs. The antenna shall be installed by the Bidder. The Bidder shall provide an antenna mounting detail for the RTUs. Particular importance shall be given to the correct installation of the antennas to give adequate radio signal strength, structural and lightning surge protection to the System.

PART 2 PRODUCTS

2.1 TELEMETRY SYSTEM

A. All control signals, status signals, alarm or variable analog data shall be transmitted and received between the central data gathering site and the remote sites via a Supervisory Control and Data Acquisitions (SCADA) System using digital radio telemetry. The SCADA System shall convert commands, alarms and variable analog data to digital data blocks and transmit this information between a central and the multiple remote locations. The SCADA System shall be capable of communicating with up to a total of 96 remote terminal units (RTU's).

B. Data security shall be provided by a complimentary double scan and cyclic redundancy check (CRC) code.

D. Remote Terminal Units (RTU)

1. Remote Terminal Unit (RTU) shall be capable of sending digital input signals to the central and receiving digital outputs from the central. Analog input signals are to be converted to 16 bit accuracy digital format for transmission to the central. RTU shall include an Allen-Bradley CompactLogix L24ER-QBIB series PLC.
2. The RTU shall contain a tone modulator/demodulator (MODEM), micro-processor based processing unit, A/D converter, and digital input/output isolators and drivers. All RTU units shall be near-identical to allow easy replacement in the field.
3. The RTU shall have a settable address and shall accept the incoming data which includes this address. In responding with data to the central, it shall include this address. In addition, every remote shall accept and process data which includes a single unique common address.
4. All connections to the remote shall be through high density type terminal strips. Each input and output shall have a light emitting diode (LED) to indicate if it is on or off. The inputs shall accept contact closures or voltages and the outputs should open collector transistors to give a voltage output or to drive a relay.
5. An LED indicator shall be provided to indicate if data is being sent or received.
6. When a data fail occurs, all outputs from the RTU shall revert to an "OFF" position. The time before reversion shall be field adjustable from 0.5 minutes to 18 minutes.
7. Each analog input shall accept 4-20 MA or 1-5 VDC signals. The range of each analog signal to be sent by the RTU shall be set by span and offset information stored in the RTU.

2.2 RADIO TRANSCEIVERS

A. Power sources:
1. Remote: 10-60 VDC.

B. Environmental requirements:
1. Operational Temperature Range: -40º to +70º C (-40º 158ºF).
2. Storage Temperature Range: -40º to +85º C (-40º 185ºF)
3. Humidity: 95% at 60º C (140º F) non-condensing.

C. Manufacture & Model: MDS Orbit.

2.3 ANTENNA

A. The Radio Telemetry System Bidder shall provide the radio antenna(s). The antenna shall be attached to the Pumphouse buildings, and Reservoir exterior control panel supports, or if required, to a wood utility pole as determined by the radio path site surveys. The alternate bid item is to cover the additional cost to furnish and install the wood utility pole and mount the antenna it instead of on the building/control panel exterior. Particular importance shall be given to the correct installation of the antenna to give adequate lightning protection to the System. All antennas and poles shall be suitable to withstand ¾" of ice loading.

B. Antenna(s) shall be directional or Omni-directional as needed. They shall be of all aluminum construction and rated to withstand at least 100 mph winds. Adequate lengths of Heliax cable shall be provided for connection between the antenna and radio transceiver at each location.

C. Directional Antenna:
1. Type: Minimum of 5 element Yagi Type, forward gain of at least 9db.
2. Front to Back Ratio: 20 db.
3. Lightning Protection: Direct ground.
4. Feedpoint Method: Weatherproof gamma match for coaxial feedline.

D. Omni-Directional Antenna:
1. Type: Fiberglass Omni directional pattern.
2. Gain: At least 6 dB Omni.
3. Lightning Protection: DC ground through all metal support pipe.

E. The Bidder shall provide ground rods and grounding materials to properly ground the antennas, antenna pole(s), new equipment and enclosures. All grounding and bonding shall meet or exceed the requirements of Article 250 of the National Electrical Code.

2.4 AUTO DIALER

A. Provide an auto-dialer to transmit alarm conditions from each of the water system facilities as received at the Well No. 1 Pumphouse Master Telemetry Unit. Dialer shall be capable of reporting a minimum of thirty-two (32) separate alarm conditions and automatically report the alarm condition via a dedicated telephone connection.

B. Manufacturer & Model: Verbatim Model No. VSS-32C as manufactured by RACO, or approved substitution.

2.5 WELL NOS. 3 & 4 PUMPHOUSE REMOTE TERMINAL UNITS (RTUs)

A. Contractor shall provide 120 VAC power to the RTU panel.

B. Remove the existing control panel backpan and replace it with a new backpan including the following items:

1. Control breaker.
2. 120 VAC lightning protection.
3. Power supplies as required.
4. Radio telemetry RTU as previously specified. Transmit:
   i. Well Pump Status (on/off/failure)
   ii. Well Water Level (analog – for potential future level transducer)
   iii. Data Failure Alarm
5. Provide control circuitry, including all necessary load relays, to allow the chlorine booster pump to run only if the well pump controller's auxiliary contract **and** signal from the flow meter or flow switch are activated/received simultaneously.
6. DC Style UPS System.
7. Radio Transceiver as previously specified.

C. Antenna as previously specified.

2.6 WELL NO. 5 PUMPHOUSE REMOTE TERMINAL UNIT (RTU)

A. Contractor shall provide 120 VAC power to the RTU.

B. Locate the following items in the empty section of the MCC relocated from the Well No. 2 Pumphouse to the proposed Well No. 5 Pumphouse:
1. Control breaker.
2. 120 VAC lightning protection.
3. Power supplies as required.
4. Radio telemetry RTU as previously specified. Transmit:
   iv. Well Pump Status (on/off/failure)
   v. Well Water Level (analog – for new level transducer)
   vi. Flow Rate from flow meter
   vii. Data Failure Alarm
   viii. Intrusion Alarm
   ix. Low Temperature Alarm – Pump Room
   x. Low Temperature Alarm – Chemical Room
   xi. Chemical Room Exhaust Fan Status (on/off)
5. Provide control circuitry, including all necessary load relays, to allow the chlorine booster pump to run only if the well pump controller's auxiliary contract **and** signal from the flow meter or flow switch are activated/received simultaneously.
6. Provide an unlabeled pushbutton for intrusion alarm activation/deactivation upon entry/exit.
7. Provide a door mounted air temperature sensor for the Pump Room.
8. Provide Chemical Room ventilation system and lights control with settable run time and interwire with door limit switch, exterior pilot light switch station, and interior room light switch. Provide ventilation system exhaust fan status to the SCADA system. Coordinate with the electrical plans.
9. Provide well pump pre-lube solenoid control circuit with control relay and timer.
10. DC Style UPS System.
11. Radio Transceiver as previously specified.

D. Pump Room occupancy sensor to detect unauthorized entry.

E. Chemical Room door limit switch to detect unauthorized entry & ventilation system control.

F. Chemical Room air temperature sensor.

G. Antenna as previously specified.

2.7 WELL NO. 1 PUMPHOUSE MASTER TELEMETRY UNIT (MTU)

A. Contractor shall provide 120 VAC power to the MTU panel.

B. Remove the existing control panel backpan and replace it with a new backpan including the following items for the New MTU:

1. Control breaker.
2. 120 VAC lightning protection.
3. Power supplies as required.
4. Radio telemetry RTU as previously specified. Transmit:
   i. Well Pump Status (on/off/failure)
   ii. Well Water Level (analog – For a future level transducer)
   iii. Data Failure Alarm
   iv. Low Temperature Alarm
5. Reuse and reconfigure the existing Automation Direct brand OIT touch screen.
6. Provide control circuitry, including all necessary load relays, to allow the chlorine booster pump to run only if the well pump controller's auxiliary contract and signal from the flow meter are activated/received simultaneously.
7. Provide programming to facilitate operation of the Well Nos. 3, 4 & 5 well pumps based on reservoir levels, and alternation of the well pumps.
8. SonicWALL, most current model, firewall connected to the owner provided internet service for secure remote access.
9. Provide a door mounted air temperature sensor.
10. Provide well pump pre-lube solenoid control circuit with control relay and timer.
11. DC Style UPS System.
12. Radio Transceiver as previously specified.
13. ***Auto Dialer as previously specified.***
    i. Transmit alarm conditions as specified under the RTU subsections of this specification section.

C. Antenna as previously specified.

2.8 RESERVOIR RTU

A. Contractor shall provide 120 VAC power to the RTU panel.

B. Remove the control panel backpan and replace it with a new backpan including the following items in the New RTU Panel:

1. Control breaker.
2. 120 VAC lightning protection.
3. Power supplies as required.

4. 200 watt, 120 VAC condensation protective heater with integral thermostat and high temperature cutout thermoswitch.
5. Radio telemetry RTU as previously specified. Transmit:
   i. Tank Level (analog)
   ii. Power Failure Alarm
   iii. Data Failure Alarm
   iv. Intrusion Alarm
6. Replace the existing keyed switches for intrusion alarm.
7. DC Style UPS System.
8. Radio Transceiver as previously specified.

C. Antenna as previously specified.

2.9 ANTENNA UTILITY POLE (ALTERNATE BID ITEM)

A. 50 feet long, Southern Pine or Douglas Fir, ANSI 05.1 Class as required for tip load determined by antenna provider. Confirm pole length/height with radio survey results.

PART 3 EXECUTION

3.1 INSTALLATION, STARTUP AND TRAINING

A. The manufacturer shall provide the services of a qualified Technician to assist in the initial installation of the control equipment.

B. In addition, the manufacturer shall provide the services of a qualified factory Engineer to make final adjustments and instruct the operators in the use and maintenance of the equipment furnished at the various locations. This latter service shall be for a minimum of two days on the jobsite or as is necessary to complete the supervision to the satisfaction of the owner. Manufacturer is to include in his price one added trip without charge within the one year of acceptance.

END OF SECTION

SECTION 33 12 13

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pipe and fittings for domestic water service connections to buildings.
2. Corporation stop assembly.
3. Curb stop assembly.
4. Bedding and cover materials.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 23 16 - Earthwork.
4. Section 31 23 17 – Trenching and Backfilling.
5. Section 33 13 00 - Disinfecting of Water Utility Distribution

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
1. Basis of Measurement: By linear lineal foot. Basis of Payment: Includes full compensation for excavation, bedding, backfill, compaction, testing, and furnishing all materials, fittings, tools, equipment, labor and incidentals necessary to complete the work in accordance with the Contract Documents. New corporation stops, curb boxes, and reconnecting to existing laterals are incidental to water service construction unless accounted for as a bid item on the Bid Form. All water services shall be Copper Type K unless specified on the plans or in the bid form.

B. Corporation Stop Assembly:
1. Basis of Measurement: By the unit. When no quantity is provided, it is incidental to the cost of water service construction.
2. Basis of Payment: Includes corporation stop, fittings and accessories.

C. Curb Stop Assembly:
1. Basis of Measurement: By the unit. When no quantity is provided, it is incidental to the cost of water service construction.
2. Basis of Payment: Includes curb stop, curb box and cover, fittings, and accessories.

1.3 REFERENCES

A. Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

B. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

C. American Society of Mechanical Engineers:
   1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
   2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

D. American Water Works Association:
   1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
   2. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.
   3. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
   4. AWWA C702 - Cold-Water Meters - Compound Type.
   5. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
   6. AWWA C800 - Underground Service Line Valves and Fittings.
   7. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.
   8. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. All American Iron and Steel (AIS) materials need to be certified by the manufacturer.

C. Contractor shall certify upon substantial completion of the project that all iron and steel products installed were produced in the United States.

D. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, service saddles, and accessories.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping mains, curb stops, connections, thrust restraints, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition, except as modified in this section.

B. Wisconsin Administrative Plumbing Code, as administered by the Department of Commerce, shall govern the installation of water services, except as modified in this section.

C. All iron and steel products must be produced in the United States and meet American Iron and Steel requirements as described in the contract documents. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks,

flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.

C. Store products and materials off ground and under protective coverings and custody, away from walls and in manner to keep these clean and in good condition until used.

D. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

PART 2 PRODUCTS

2.1 WATER PIPING AND FITTINGS

A. Water service lines shall be 1 inch unless otherwise shown on the plans.

B. Water service material shall be as indicated on the engineering drawings or bid form.

C. Water services shall comply with Chapter 8.24.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition, with tracer wire installed along PE service laterals as specified in Chapter 2.11.0.

D. Copper Tubing: ASTM B88, Type K, seamless copper tubing, annealed:
   1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper. All water service fittings shall be compression type fittings. Flared fittings shall not be allowed.
   2. Joints: Compression connection or AWS A5.8, BCuP silver braze.

2.2 CORPORATION STOP ASSEMBLY

A. Corporation stops shall comply with Chapter 8.30.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

B. Manufacturers:
   1. Mueller Company: Model H-15008.
   2. Ford Type F-1000-Q

C. Corporation Stops:
   1. Brass or red brass alloy body conforming to ASTM B62.
   2. Inlet end threaded for tapping according to AWWA C800.
   3. Outlet end suitable for service pipe specified.

D. Service Saddles:

1. Minimum 12" wide stainless steel service saddle, designed to hold pressures in excess pipe working pressure.

2.3 CURB STOP ASSEMBLY

A. Curb Valves shall comply with Chapter 8.31.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

B. Service boxes shall comply with Chapter 8.25.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

C. Manufacturers: Shall match municipal standard.
   1. Mueller Company: Model H-15008.
   2. Ford B44-444M-Q

D. Curb Stops:
   1. Brass or red brass alloy body conforming to ASTM B62.
   2. Plug type valve.
   3. Positive pressure sealing.

E. Curb Boxes and Covers:
   1. Cast iron body, Extension Type.
   2. Minneapolis Pattern Base.
   3. Lid with inscription WATER, with Pentagon Plug.
   4. Provide steel stationary rod extension with each curb box.
   5. Curb boxes shall be sized to match the curb stops, as directed by the manufacturer.

2.4 BEDDING AND COVER MATERIALS

A. Bedding: Type 3 Embedment as specified in Section 31 23 17.

B. Cover: Type 3 Embedment as specified in Section 31 23 17.

C. Soil Backfill from Above Pipe to Finish Grade: Native backfill as specified in Section 31 05 13. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

2.5 ACCESSORIES

A. Concrete for Thrust Restraints: high early strength concrete or solid concrete blocks. Wood blocking is not allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

C. Contractor shall be responsible for identifying and reconnecting all existing water laterals to the new water main. Laterals are to be replaced from the new main to just beyond the existing curb stop or as directed by the Engineer.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION - CORPORATION STOP ASSEMBLY

A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Engineer.

B. Provide service clamps for mains other than of cast iron or ductile iron mains.

C. Screw corporation stops directly into tapped and threaded iron main at 10 and 2 o'clock position on main's circumference; locate corporation stops at least 12 inches apart longitudinally and staggered.

D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum 2 inches width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.

E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Engineer.

3.4 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section.

B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth; compact to 95 percent.

C. Backfill around sides and to top of pipe in accordance with Section 31 23 17.

D. Maintain optimum moisture content of fill material to attain required compaction density.

3.5 INSTALLATION - PIPE AND FITTINGS

A. Maintain separation of water main from sewer piping in accordance with NR811 code.

B. Group piping with other site piping work whenever practical.

C. Install piping with minimum cover of 6-1/2 feet below finished grade unless otherwise indicated.

D. Contractor shall be equipped with varying types and sizes of fittings to accommodate the types of connections that may be required due to varying existing conditions.

E. Contractor shall coordinate with City Water Department for operation of existing valves and hydrants.

3.6 INSTALLATION - CURB STOP ASSEMBLY

A. Place curb stop and box on a concrete brick or block. Wrap bottom of curb box with polyethylene wrap. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

B. Curb boxes shall have a minimum length of 7 feet when extended without the use of extension section.

3.7 INSTALLATION – PIPE MARKERS

A. When not connecting to an existing lateral, lateral ends shall be marked with a 6-foot steel fence post with 1-foot of the post below the end of the service. A 6-foot tall 4x4 treated wood post shall also be installed at the end of the service with 3-feet of the post being buried below grade. The exposed portion of the post shall be painted blue.

B. Tracer Wire
   1. Install tracer wire on all HDPE services.
   2. Tracer wire shall be laid flat and shall be securely fastened to the pipe at ten-foot intervals. The wire shall be protected from damage during installation and backfilling. The tracer wire shall be extended out the length of the service line and brought up in the curb box.

3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

3.9 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Pressure test system in accordance with AWWA C600 and the following:
   1. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
   2. Conduct hydrostatic test for at least two-hour duration.
   3. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
   4. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.

5. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
6. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

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

END OF SECTION

SECTION 33 12 16

WATER UTILITY DISTRIBUTION VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cut-In Valves.
   2. Valve boxes.

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete.
   2. Section 33 12 13 - Water Service Connections.
   3. Section 33 12 19 - Water Utility Distribution Fire Hydrants.
   4. Section 33 13 00 - Disinfecting of Water Utility Distribution.

C. Cut-In Valves:
   1. Basis of Measurement: Each.
   2. Basis of Payment: Includes excavation, valve, valve box, pipe, fittings, accessories, tests, backfill and any other necessary items to complete the work. Adjustment of water valve boxes to finish grade shall be incidental to valve installation.

1.2 REFERENCES

A. American Water Works Association:
   1. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
   2. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
   3. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
   4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. National Sanitation Foundation:
   1. NSF 61 - Drinking Water System Components - Health Effects

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Contractor shall certify upon substantial completion of the project that all iron and steel products installed were produced in the United States.

C. Shop Drawing:
   1. Installation Plan: Submit description of proposed installation.

D. Design Data: Submit manufacturer's latest published literature include illustrations, installation instructions, maintenance instructions and parts lists.

E. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from material suppliers attesting that valves and accessories provided meet or exceed AWWA Standards and specification requirements. **All American Iron and Steel (AIS) materials need to be certified by the manufacturer.**

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of valves.

C. Provide Operation and Maintenance Data for valves.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with State of Wisconsin Standard Specifications for Sewer and Water Construction standard.

B. Comply with requirements of local water utility.

1.6 QUALIFICATIONS

A. Manufacturer: company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum 3 years experience.

1.7 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.

B. Prepare valves and accessories for shipment according to AWWA Standards and seal valve and ends to prevent entry of foreign matter into product body.

C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with State of Wisconsin standards and utilities within construction area.

PART 2 PRODUCTS

2.1 RESILIENT WEDGE GATE VALVES

A. Gate valves shall conform to Chapter 8.27.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

B. Valves shall be American Flow Control's Series 2500 Ductile Iron, Resilient Wedge, or approved equal.

C. Manufacturers:
   1. American Flow Control Series 2500 Ductile Iron.
   2. Substitutions: Section 01 60 00 - Product Requirements Not Permitted.

2.2 VALVE BOXES

A. Valve boxes shall consist of a base section, tubular mid and top sections, both with cast threads by which one can be telescoped on the other, extension sections if required, and a circular drop cover.

B. Valve boxes shall conform to Chapter 8.29.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition, specified for 7.5-foot bury (or as required for varying depths), and include valve box adaptor, Adaptor, Inc. or equal.

C. Castings shall be thoroughly coated with a 1 mil minimum thickness bituminous coating.

D. Cast iron lid, marked "Water".

2.3 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00. Valves shall be placed on a solid concrete block (8"x8"x16").

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Determine exact location and size of valves from Drawings; obtain clarification and directions from Engineer prior to execution of work.

C. Verify invert elevations of existing work prior to excavation and installation of valves.

3.2 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify, and protect utilities to remain from damage.

C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
   1. Notify Engineer and Owner not less than 2 days in advance of proposed utility interruption.
   2. Do not proceed without written permission from the Engineer.

D. Perform trench excavation, backfilling and compaction in accordance with Section 31 23 17.

3.3 INSTALLATION

A. Install valves in conjunction with pipe laying; set valves plumb.

B. Provide buried valves with valve boxes installed at ½" to ¾" below finished pavement elevations.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements : Field inspecting, testing, adjusting, and balancing.

B. Pressure test system in accordance with AWWA C600 and the following:
   1. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
   2. Conduct hydrostatic test for at least two-hour duration.
   3. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
   4. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
   5. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.

6. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

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

END OF SECTION

SECTION 33 12 19

WATER UTILITY DISTRIBUTION FIRE HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire hydrants.

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete.
   2. Section 33 12 13 - Water Service Connections.
   3. Section 33 12 16 - Water Utility Distribution Valves.
   4. Section 33 13 00 - Disinfecting of Water Utility Distribution.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Fire Hydrants:
   1. Basis of Measurement: Each.
   2. Basis of Payment: Includes excavation, fire hydrant, accessories, test and backfill.

1.3 REFERENCES

A. American Water Works Association:
   1. AWWA C502 - Dry-Barrel Fire Hydrants.
   2. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
   3. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. National Sanitation Foundation:
   1. NSF 61 - Drinking Water System Components - Health Effects.

C. National Fire Protection Association:
   1. NFPA 281 - Recommended Practice for Fire Flow Testing and Marking of Hydrants.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Contractor shall certify upon substantial completion of the project that all iron and steel products installed were produced in the United States.

C. Shop Drawing:
   1. Installation Plan: Submit description of proposed installation.

D. Design Data: Submit manufacturer's latest published literature. Include illustrations, installation instructions, maintenance instructions and parts lists.

E. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from material suppliers attesting that hydrants and accessories provided meet or exceed AWWA Standards and specification requirements. **All American Iron and Steel (AIS) materials need to be certified by the manufacturer.**

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of fire hydrants.

C. Provide Operation and Maintenance Data for fire hydrants.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with State of Wisconsin Standard Specifications for Sewer and Water Construction.

B. Perform work in accordance with AWWA C502.

C. Comply with requirements of local water utility.

D. Maintain one copy copies of each document on site.

E. All iron and steel products must be produced in the United States and meet American Iron and Steel requirements as described in the contract documents. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

1.7 QUALIFICATIONS

A. Manufacturer: company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation Meeting.

1.9 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.

B. Prepare hydrants and accessories for shipment according to AWWA Standards and seal hydrant and ends to prevent entry of foreign matter into product body.

C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

1.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with local municipality's standards and utilities within construction area.

PART 2 PRODUCTS

2.1 FIRE HYDRANTS

A. Fire Hydrants shall conform to Chapter 8.26.0 of the Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.

B. Hydrants shall have a 5 ¼" valve opening with two 2 ½" nozzle openings and one 4 ½" pumper nozzle with caps and chains. Hydrants shall be for 7.5' bury or as required, and have a ground line breakable flange.

C. Manufacturers:
   1. Waterous Pacer.
   2. Kennedy Guardian.
   3. Substitutions: Section 01 60 00 - Product Requirements Not Permitted.

2.2 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.

B. Aggregate: Aggregate for hydrant drainage specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Determine exact location and size of hydrants from Drawings; obtain clarification and directions from Architect/Engineer prior to execution of work.

C. Verify invert elevations of existing work prior to excavation and installation of fire hydrants.

3.2 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify, and protect utilities to remain from damage.

C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
   1. Notify Engineer not less than two days in advance of proposed utility interruption.
   2. Do not proceed without written permission from the Engineer.

D. Perform trench excavation, backfilling and compaction in accordance with Section 31 23 17.

3.3 INSTALLATION

A. Install fire hydrants; provide support blocking and drainage gravel; do not block drain hole.

B. Hydrants shall be restrained to tee with concrete buttresses and lugged retainer glands.

C. Set hydrants plumb with pumper nozzle facing roadway; set hydrants with centerline of pumper nozzle 18 inches above finished grade and safety flange not more than 6 inches nor less than 2 inches above grade.

D. For fittings, hydrants, valves and shortened pipe sections where cable bond type or copper conductivity type continuity devices are not provided by the manufacturer the Contractor shall field weld a lug onto the fitting, hydrant, valve or shortened pipe section and shall field install a strip or cable capable of carrying 500 amperes continuously between the sections. Cable bonds or copper conductivity strips may be installed around such fittings, valves or shortened pipe sections; but hydrants shall be equipped with continuity devices.

E. Hydrant color shall be Red, original manufacturer enamel coating.

F. Hydrant shall be set on a 12"x16"x8" solid concrete block. One-half (1/2) cubic yard of crushed stone shall be placed around the hydrant and a 6-mil poly shall be placed over the crushed stone as shown on the details. Hydrants shall be solidly buttressed against the trench wall.

G. After hydrostatic testing, flush hydrants and check for proper drainage.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Pressure test system in accordance with AWWA C600 and the following:
   1. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
   2. Conduct hydrostatic test for at least two-hour duration.
   3. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
   4. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
   5. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
   6. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

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

END OF SECTION

SECTION 33 31 13

PUBLIC SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary sewer pipe and fittings.
2. Connection to existing manholes.
3. Manholes.
4. Wye branches and tees.
5. Sanitary Laterals.
6. Bedding and cover materials.
7. Abandon Existing Sanitary Sewer

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Concrete type for manhole base pad construction.
2. Section 31 05 13 - Soils for Earthwork: Soils for backfill in trenches.
3. Section 31 23 16 -Earthwork: Product and execution requirements for excavation and backfill required by this section.
4. Section 31 23 17 – Trenching and Backfilling: Execution requirements for trenching required by this section.
5. Section 33 01 32 - Sewer and Manhole Testing.: Pressure, infiltration, and deflection tests.
6. Section 33 05 14 - Public Manholes and Structures: Concrete manholes, frames and grates for sanitary sewer.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
1. Basis of Measurement: By the linear foot for each size of pipe.
2. Basis of Payment: Includes hand trimming excavation, bedding, pipe and fittings, to indicated depth feet and connection to existing sewer.

Sanitary wyes, fittings, and 4"x4" wood posts should be considered incidental to the construction of PVC lateral pipe of the size specified.

Connection to the existing sewers and manholes shall be incidental to sanitary sewer construction.

B. Manholes:
1. Basis of Measurement: By the each.
2. Basis of Payment: Includes hand trimming excavating, foundation pad, unit installation with accessories, connection to sewer piping.

C. Abandon Existing Sanitary Mains & Manholes:

1. Basis of Measurement: By Lump Sum or each as indicated on the bid form.
2. Basis of Payment: Shall be full compensation for furnishing all materials, for excavation and backfilling when necessary, for removal and off-site disposal, and for all labor, tools, equipment and incidentals necessary to complete the work.

If no price is stated in the Bid Form, abandoning existing mains & manholes shall be considered incidental to new main and manhole construction

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
   2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   3. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
   4. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
   5. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
   6. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
   7. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   8. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
   9. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   10. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
   11. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
   12. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
   13. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   14. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
   15. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   16. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
   17. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
   18. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

19. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
20. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
21. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. American Water Works Association:
1. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
4. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C150 - ANSI Standard for the Thickness Design of Ductile Iron Pipe.
6. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
7. AWWA C153 - American National Standard for Ductile-Iron Compact Fittings for Water Service.

D. National Fire Protection Association:
1. NFPA 24 - Installation of Private Fire Service Mains and Their Appurtenances.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product data and shop drawings: Submit catalog cuts and other pertinent data indicating proposed materials, accessories, details, and construction information.

C. Submit reports indicating field tests made and results obtained.

D. Manufacturer's Installation Instructions:
1. Indicate special procedures required to install Products specified.
2. Submit detailed description of procedures for connecting new sewer to existing sewer line and directional drilling pipe jacking installation.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with State of Wisconsin Standard Specifications for Sewer and Water Construction standard.

B. Sanitary laterals shall be installed in conformance with the Department of Commerce Plumbing Code and any local plumbing codes and regulations.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section.

B. Installer: Company specializing in performing work of this section.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver and store valves in shipping containers with labeling in place.

C. Block individual and stockpiled pipe lengths to prevent moving.

1.10 FIELD MEASUREMENTS

A. Verify field measurements and elevations are as indicated.

1.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate the Work with Municipality of authority having jurisdiction.

C. Notify affected utility companies minimum of 72 hours prior to construction.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPE AND FITTINGS

A. Furnish pipe material as indicated on the plans and bid form.

B. Pressure Plastic Pipe: AWWA C900 Poly Vinyl Chloride (PVC), Class 150 (DR 18) material, inside nominal diameter of 4" - 60", bell and spigot style rubber ring sealed gasket joint per ASTM D3139 and ASTM F477, green color for sanitary application.

1. ***Fittings: PVC, AWWA C900 or C907 (injection-molded), pressure class matching that of the pipe, push-on, gasketed joints per ASTM D3139 and ASTM F477, green color for sanitary application.***

C. ***Non-pressure Plastic Pipe, 4" – 15"***: ASTM D3034, SDR 35, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of inches 4" to 15", bell and spigot style rubber ring sealed gasket joint.
   1. Fittings: PVC.
   2. Joints: ASTM F477, elastomeric gaskets.

D. ***Non-pressure Plastic Pipe 18" – 36"***: ASTM F679, PS 46, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of inches 18" to 36", bell and spigot style rubber ring sealed gasket joint.
   1. Fittings: PVC.
   2. Joints: ASTM F477, elastomeric gaskets.

2.2 NON-FLEXIBLE COUPLINGS

A. Non-Flexible Coupling: PVC SDR 35 Gasketed Repair Coupling or PVC Gasketed Repair Stop Coupling .

2.3 FLEXIBLE PIPE BOOT FOR MANHOLE PIPE ENTRANCES

A. Manufacturers:
   1. Lock Joint Flexible Manhole Sleeve, Inc. Model.
   2. Substitutions: Section 01 60 00 - Product Requirements.

B. Flexible Pipe Boot: ASTM C923, ethylene propylene rubber (EPDM), Series 300 stainless steel clamp and stainless steel hardware.

2.4 MANHOLES

A. Manholes: As specified in Section 33 05 14; precast concrete, 48 inch diameter, eccentric conical top, water tight cast iron frames and covers.

2.5 BEDDING AND COVER MATERIALS

A. Bedding and Cover: Type 3 Sand or Sand Screenings bedding as specified in Section 31 23 17 and as shown in the detail.

B. Soil Backfill from Above Pipe to Finish Grade: Native backfill or select granular backfill as specified in Section 31 23 17. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

2.6 ACCESSORIES

A. Cellular concrete shall meet the following specifications: 1 part cement, 1 part fly ash, and 8 parts sand or an approved equal and water. Cement shall meet the requirements

of Subsection 501.3.2 of the Standard Specifications for Type 1 Portland Cement. Sand shall meet the requirements of Subsection 501.3.6.3 of the Standard Specifications. Water shall meet the requirements of Subsection of 501.3.5 of the Standard Specifications.

2.7 Fernco Connections

A. All ferncos must have stainless steel shear rings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

3.2 PREPARATION

A. Correct over excavation with coarse aggregate.

B. Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.

C. Protect and support existing sewer lines, utilities and appurtenances.

D. Maintain profiles of utilities. Coordinate with other utilities to eliminate interference. Notify Engineer where crossing conflicts occur.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17.

B. Excavate to lines and grades shown on Drawings or required to accommodate installation of encasement.

C. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.

D. Provide sheeting and shoring in accordance with Section 31 23 17.

E. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth; compact to 95 percent.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Lay pipe to slope gradients noted on layout drawings. Begin at downstream end and progress upstream.

C. Assemble and handle pipe in accordance with manufacturer's instructions except as modified on the Drawings or by Architect/Engineer.

D. Keep pipe and fittings clean until work is completed and accepted by Architect/Engineer. Cap open ends during periods of work stoppage.

E. Lay bell and spigot pipe with bells upstream.

F. Connect pipe to existing sewer system as noted. Connecting to existing sewer shall be incidental to new main unless otherwise indicated on the bid form.

G. When replacing existing sewer, the existing sanitary sewer shall be excavated and removed as construction occurs. The new sewer shall be connected to the existing sewer at the end of each workday. Raw sewage shall not be allowed to run into the trench. Pumping sewage between manholes will be required.

H. Install trace wire continuous over top of pipe when shown on the plans or bid form.

3.5 INSTALLATION - CONNECTION TO EXISTING MANHOLE

A. Core drill existing manhole to clean opening. Using pneumatic hammers, chipping guns, sledge hammers, is not permitted.

B. Connection to existing manholes shall be made with a watertight KOR-N-SEAL boot.

C. Prevent construction debris from entering existing sewer line when making connection.

3.6 INSTALLATION - MANHOLES

A. Install manholes in accordance with Section 33 05 14.

3.7 INSTALLATION - WYE BRANCHES AND TEES

A. Install wye branches or pipe tees at locations indicated on Drawings concurrent with pipe laying operations. Use standard fittings of same material and joint type as sewer main.

B. Maintain minimum 5 feet separation distance between wye connection and manhole.

C. Use saddle wye or tee with stainless steel clamps for taps into existing piping. Mount saddles with solvent cement or gasket and secure with metal bands. Layout holes with template and cut holes with mechanical cutter. Clamp on wye branches shall not be permitted.

3.8 INSTALLATION - SANITARY LATERALS

A. Construct laterals from wye branch to terminal point at right-of-way or as shown on the plans or as directed by the Engineer.

B. Where depth of main pipeline warrants, construct riser type laterals from wye branch.

C. Maintain 8 feet minimum depth of cover over pipe unless connecting to existing laterals with less cover.

D. Maintain minimum 5 feet separation distance between laterals.

E. Lateral cards provided by Engineer must be completed by Contractor for each lateral.

F. It is the responsibility of the contractor to identify and reconnect all existing live laterals.

G. Sewer and water services may be placed in a common trench if installed concurrently. If not installed concurrently, a minimum 10-foot horizontal separation must be maintained between the sewer and water services.

H. The minimum size sewer service shall be 4-inches in diameter. Sewer service size and class shall be as specified in the Contract Documents.

I. The alignment of a sewer service shall be straight extending from the spur or socket of the main sewer in a direction at right angles to the main sewer to a point even with the water service curb stop as specified on the plans.

J. Sanitary sewer services shall have a slope of one-fourth inch per foot where possible. In no case shall the slope be less than one-eighth inch per foot. Between the lot line and the sewer main, or riser pipe, the sewer shall be laid at uniform slope not exceeding one-half inch per foot. Between the lot line and the building, the slope shall not exceed one-half inch per foot, except for a change in elevation, which shall be made by use of 45-degree fittings.

K. When not connecting to existing lateral, install watertight plug, braced to withstand pipeline test pressure thrust, at termination of lateral.

L. All existing sewer services shall be reconnected with PVC SDR 35 pipe and a suitable PVC coupling unless otherwise specified or directed by the Engineer.

M. Contractor shall note the condition of the existing lateral beyond the reconnection point and notify the Engineer of the condition.

3.9 LOCATION OF EXISTING SEWER SERVICES

A. The Contractor will be furnished available recorded measurements for the location of existing sewer services. Evidence of existing trenches and any other pertinent evidence also shall be used in their location.

B. The Contractor is responsible for locating live laterals.

3.10 ABANDON EXISTING SANITARY MAINS & MANHOLES

A. All existing sewer mains shall be properly abandoned at all locations where the new sewer replaces the existing. The abandoned sewer pipe shall be plugged with cellular concrete in accordance with the pertinent requirements of Section 204 of the Wisconsin Department of Transportation Standard Specifications and as directed by the engineer. The abandoned manholes shall have the walls removed at least 2 feet below subgrade within the roadbed and at least 2 feet below grade outside the roadbed. Fill remaining sections of manholes with acceptable fill material.

3.11 BACKFILLING

A. Backfill around sides and to top of pipe with cover fill in maximum lifts of 6 inches, tamp in place and compact to 95 percent. Place and compact material immediately adjacent to pipes to avoid damage to pipe and prevent pipe misalignment.

3.12 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Pressure Test: Test in accordance with Section 33 01 32.

C. Infiltration Test: Test in accordance with Section 33 01 32.

D. Deflection Test: Test in accordance with Section 33 01 32.

E. Compaction Testing: In accordance with ASTM D1557 AASHTO T180 ASTM D2922 ASTM D3017.

F. When tests indicate Work does not meet specified requirements, remove work, replace and retest.

G. Frequency of Compaction Tests: one test per 400 feet of trench per 2 foot lift.

3.13 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

3.14 SCHEDULE

END OF SECTION