MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**WATER MAIN MATERIALS AND CONSTRUCTION**

BAY:KSH 1 of 4 APPR:CJD:NJM:12-05-22

**a. Description.** This work consists of installing the following materials as part of the Monitor Township water system that is operated and maintained by Bay County Department of Water and Sewer (BCDWS). Unless otherwise noted below, ensure all work, materials, construction requirements, and methods of measurement and payment are in accordance with the standard specifications and *AWWA*.

**b. Submittals**. Submit PDF product data consisting of shop drawings and manufacturer’s literature to the Engineer and BCDWS for approval at least 10 working days prior to construction.

Submit a general work plan outlining the procedure and schedule to be used for installation of the water main.

**c. Materials.** Furnish the listed materials below.

1. Pipe and Fittings. Furnish Class 52 DI pipe in accordance with *ANSI/AWWA C151/A21.51*. Furnish mechanical joint or push-on type fittings, either cast iron or DI as follows: Cast iron fittings must meet the requirements of *ANSI/AWWA C110/A21.10* and be rated for 350 psi working pressure. DI fittings must meet *ANSI/AWWA C153/A21.53* and be class 350. Ensure fittings are cement-lined in accordance with *ANSI/AWWA C104/ A21.4*. Rubber gasket joints must meet *ANSIAWWA C111/A21.11*. Furnish electrical conductivity at each joint.

2. Restrained Joints. Furnish restrained mechanical joints from EBAA Iron, Inc. Megalug 1100 Series, U.S. Pipe TR Flex, or Engineer-approved equal. Ensure restrained push-on joint pipe is American Lok-Ring or Flexring, US Pipe Field-Lok TR-Flex, or Engineer-approved equal. Ensure joints are in accordance with *ANSI/AWWA C111/A21.11*. Ensure all bolts for mechanical joints are made of low-alloy weathering steel in accordance with *ANSI/AWWA C111/A21.11*.

3. Gate Valves. Furnish valves manufactured by EJ, Mueller, or Engineer-approved equal. Ensure gate valves are iron body, bronze trim, resilient seat, and single-wedge type in accordance with *AWWA C509/C515*. Furnish valves with a standard *AWWA* 2-inch square operating nut that turns right (clockwise) to open, is painted red, and has the direction of opening indicated by an arrow cast on the nut skirt.

4. Valve Boxes. Ensure the overall length of valve boxes is sufficient to permit the top to be set flush with the final ground surface grade. Furnish valve boxes manufactured by Mueller, Clow, EJ, or Engineer-approved equal.

5. Hydrants. Ensure fire hydrants are traffic type and meet the requirements of *ANSI/AWWA C502* and are certified to *ANSI/NSF 61* and *ANSI/NSF 372*. Ensure hydrants are EJ WaterMaster 5CD-250 Hydrant as manufactured by EJ Co. Ensure hydrants have the following:

● A 5¼-inch main valve opening with a 6-inch mechanical joint inlet as shown on the plans;

● Two 2½-inch National Standard hose connections (33/32-inch major diameter by 8 threads per inch)

● One nozzle pumper connection (4½-inch diameter, Thread 4.5-4NH, National Standard).

Ensure the hydrant is a safety coupling and breakaway traffic flange construction, 16-inch minimum. Ensure caps are a 7/8-inch square nut type with no chains. Ensure the operating nut is “left opening,” 1½-inch penta nut type. Ensure hydrant barrels are non-drainable and supplied without drain valves. Ensure hydrants are primed and painted with two coats of red heavy-duty exterior enamel above the grade line and asphalt varnish per *AWWA* below the grade line. Ensure the stem seal is a “O” ring. Ensure each hydrant has 6-foot 6-inch depth of burial. No more than one extension per hydrant is acceptable. Ensure nozzle height above finished grade is 16½-inches.

**d. Construction.**

1. Water Main. Ensure construction is in accordance with *AWWA* standards, the standard specifications, manufacturer requirements, as detailed on the plans, and as modified herein.

After completing disinfection, initially flush the water mains with water at a velocity of at least 3 feet per second to replace the entire volume of chlorinated water in the pipeline.

2. Install fire hydrant, valves, and pipes as detailed on the plans and as described in section 823 of the Standard Specifications for Construction. Thoroughly clean hydrants of dirt or other foreign matter before setting. Ensure hydrants stand plumb with hose nozzles parallel to curb and the pumper nozzle facing the curb, braced, and blocked to prevent disturbance during backfilling and operation.

3. Chlorination and Disinfection. Chlorinate and disinfect new main in accordance with *AWWA C651*, with the following additional requirements:

A. Submit a testing plan, including site prints with injection point and copper sampling points clearly marked to the Engineer and the BCDWS Water Superintendent for review at least 10 days prior to start of groundbreaking. Changes in materials or procedures must be approved by the Engineer and the BCDWS Water Superintendent. Submit any change to the site prints to the Engineer and the BCDWS Water Distribution Superintendent 5 days prior to chlorination and testing.

B. Pigging is the responsibility of the Contractor. Pigging is required as directed by the Engineer.

C. Upon completion of the new water main installation, BCDWS Water Distribution personnel will inspect the project to determine the following criteria are met: the first sample point is within 10 feet of the connection point, no sample points are greater than 1200 feet apart, and sample points are located on each branch. Water samples for analysis must not be drawn from fire hydrants.

D. The Contractor is responsible for the chlorination and flushing of the new water main installation. The BCDWS Water Distribution Department must witness all disinfection processes of the new water main. The Contractor must not operate valves that connect the newly installed water main to the public water supply system. The Contractor will operate all other valves within the new construction.

E. Measure and record free chlorine residual after chlorination. Ensure chlorine residual is between 25-50 PPM at each sample point to proceed. If all sample points are in this range, a 16 to 24-hour contact time starts after the last sample point was checked.

F. Recheck all sample points after 16 to 24 hours. Free chlorine must be above 10 PPM for acceptance. Re-chlorinate and flush the water main as necessary to meet the minimum 10 PPM requirement.

G. Thoroughly flush the water main until free chlorine residual at each sample point is no higher than the distribution system free chlorine residual. Ensure flushed water is dechlorinated and disposed of in accordance with all environmental regulations. Allow the water main to rest for a minimum of 16 to 24 hours.

H. BCDWS Water Distribution personnel will collect the initial samples, including an upstream sample point. Schedule samples for collection on Monday-Friday, to allow the Municipality to transport to a State of Michigan approved lab on these days between 8:00 a.m.-4:00 p.m. Samples will be analyzed for total coliform and E coli using the 24-hour Colilert method, along with the 48-hour Heterotrophic Bacteria (HPC) test. Ensure total coliform and E coli sample results are negative, and HPC counts are representative of the incoming water.

I. A second round of bacteriological sampling will be collected 24 hours after the first round of sampling. If chlorine is found to be higher than the first round of sampling, ensure the new construction is flushed, and sampling must start over. The Distribution Supervisor/Operator in Charge will notify the Contractor of passing/failing bacteriological results. When two consecutive samples have passed all tests, the Contractor may then proceed to pressure testing.

4. Pressure testing for DI pipe. Pressure test all new main and appurtenances in accordance with *AWWA C600*, with the following additional requirements:

A. Once the main has passed the disinfection requirements, perform pressure leakage tests on the installed main and appurtenances.

Ensure all equipment used in the pressure leakage test is clean and properly disinfected to avoid introduction of contaminants into the water main during testing procedures.

WARNING: The testing methods described in this section are specific for water pressure testing. These procedures should not be applied for air pressure testing because of the serious safety hazards involved.

B.The hydrostatic test pressure must be 150 psi or twice the operational system pressure, whichever is greater.

C.Perform pressure testing between two valves to limit the amount of water main tested at one time and isolate leaks if present. Raise the water pressure to 150 psi and maintain this pressure for a period of at least 2 hours. Ensure pressure testing is witnessed by BCDWS Water Distribution personnel to ensure proper testing procedures are followed. No pipe installation will be accepted if the amount of makeup water is greater than that determined by Table 1 below.

**Table 1**

|  |  |
| --- | --- |
| Pipe Size (dia) | 12 |
| Allowable Leakage:  Gallons per 2 hours/1000 ft.  Test pressure: 150 psi | 1.98 |

D. If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

E. If the pipeline fails the pressure test, ensure the reason behind failure is identified and repaired. Joints that indicate an undue amount of leakage by either showing up on the surface or by indication with sound testing equipment, must be uncovered and repaired before other tests are made. Ensure the water main is rechlorinated, and passes additional bacteriological testing before any pressure above normal system pressure is placed on the water main.

F. Remove all sample lines and points once it is determined that the main has passed pressure testing requirements. BCDWS Water Distribution Department will assume possession of the water main after all sample lines and points have been removed.

**e. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price in accordance with subsection 823.04 of the Standard Specifications for Construction.