

SECTION 33 11 00.19**ABANDONMENT OF WATER MAINS****PART 1: GENERAL**

1.01 SCOPE

- A. Abandonment in place, by cutting and capping, of existing water mains, hydrants, service lines, and valves.
- B. Abandonment in place of water mains using flowable fill. Flowable fill will be utilized when abandoning water mains underneath roadways and paved areas, and at the direction of the AW Project Manager as field conditions dictate, or as specified on the Drawings.

1.02 SUBMITTALS

- A. Conform to requirements of Section 01 33 00 - Submittals.
- B. Submit product data for proposed plugs and clamps for approval.
- C. Technical information for equipment and operational procedures including projected slurry injection rate, grout pressure, method of controlling grout pressure, bulkhead and vent design, and number of stages of grout application.
- D. At least 15 days prior to commencing flowable fill abandonment activities, submit plan for abandonment, describing proposed grouting sequence and other information pertinent to completion of Work.

PART 2: PRODUCTS

2.01 GENERAL MATERIALS

- A. Concrete for reaction blocks: Minimum 3,000 psi concrete conforming to requirements of Section – Cast-In-Place Concrete.
- B. Plugs and clamps: Applicable for type of pipe to be plugged.

2.01 FLOWABLE FILL REQUIREMENTS

- A. Unconfined compressive strength: minimum 75 psi and maximum 150 psi at 56 days as determined based on an average of three tests for same placement. Present at least three acceptable strength tests for proposed mix design in mix design report.
- B. Placement characteristics: self-leveling.
- C. Shrinkage characteristics: non-shrink.

- D. Water bleeding for fill to be placed by grouting method in sewers: not to exceed 2 percent according to ASTM C940.
- E. Minimum wet density: 90 pounds per cubic foot.

2.02 BALLAST

- A. Ballast Material: Natural rock or concrete pieces with minimum size equal to at least 10 times maximum aggregate size of flowable fill and maximum size of 24 inches. Maximum dimension shall not be more than 20 percent of minimum dimension of space to be filled.
- B. Ballast Composition: Free of regulated waste material.

PART 3: EXECUTION

3.01 DEMOLITION OF FIRE HYDRANTS, VALVES, AND PIPELINE STRUCTURES PRIOR TO ABANDONMENT

- A. Remove all watermain appurtenances, such as hydrants, valves, and valve boxes. Appurtenances shall be returned to AW for future use.
- B. Demolish and remove precast concrete adjustment rings, concrete vaults and covers, or other pipeline structures, to minimum depth of 4 feet below finished grade. Structure may be removed to greater depth, but not deeper than 18 inches above crown of abandoned water main. Poke holes in floor prior to filling.
- C. Until a fire hydrant is physically removed, any hydrant that becomes non-usable during abandonment procedures shall have a heavy duty cover placed over it and secured and marked "Abandoned" so that fire department personnel know its status.

3.02 CUTTING AND CAPPING OF MAINS

- A. Do not begin cut, plug, and abandonment operations until replacement water main has been constructed and tested, all service connections have been installed, and replacement main is approved for use.
- B. Install plug, clamp, and concrete reaction block and make cut at the water main and/or at the location shown on Drawings.
- C. Main to be abandoned shall not be valved off and shall not be cut or plugged other than as shown on Drawings.
- D. After main to be abandoned has been cut and capped, check for other sources feeding abandoned water main. When sources are found, notify AW Project Manager immediately. Cut and cap abandoned main at point of other feed as directed by AW Project Manager.
- E. Plug or cap ends or opening in abandoned main in manner approved by AW Project Manager. Install concrete around cap and over pipe to ensure it is not penetratable by groundwater.

- F. Backfill excavations in accordance with Section – Excavation and Backfill for Utilities.
- G. Repair street surfaces in accordance with local base and DPW regulations.
- H. Mark location of abandoned water service laterals on Drawings and provide to AW Project Manager.

3.03 CUTTING AND CAPPING OF WATER SERVICES

- A. Do not begin cut, plug, and abandonment operations until replacement service, if necessary, has been constructed and tested, and all service connections have been installed.
- B. Service lines shall be cut and capped at the water main and/or as directed by AW Project manager.
- C. Before backfilling of a capped service line is started, the capping must be observed by a representative of AW.
- D. After service to be abandoned has been cut and capped, check for any other sources feeding abandoned water service. When sources are found, notify AW Project Manager immediately. Cut and cap abandoned main at point of other feed as directed by AW Project Manager.
- E. Plug or cap ends or opening in abandoned service in manner approved by AW Project Manager. Install concrete around cap and over pipe to ensure its not penetratable by groundwater.
- F. Remove all water service surface identifications and appurtenences such as valves and valve boxes, meters, and backflow devices. Return appurtenences to AW.
- G. Backfill excavations in accordance with Section 31 23 33 – Excavation and Backfill for Utilities.
- H. Repair paved surfaces in accordance with local base and DPW regulations.
- I. Mark location of abandoned water services on Drawings and provide to AW Project Manager.

3.04 PREPARATION FOR ABANDONMENT VIA FLOWABLE FILL

- A. Have fill mix design reports and other submittals required by Paragraph 1.05 accepted by the AW Project Manager prior to start of placement. Notify the AW Project Manager at least 24 hours in advance of grouting with flowable fill.
- B. Select fill placement equipment and follow procedures with sufficient safety and care to avoid damage to existing underground utilities and structures. Operate equipment at pressure that will not distort or imperil portion of work, new or existing.
- C. Clean water lines and video with closed circuit television to identify connections, locate obstructions, and assess condition of pipe. Locate previously unidentified connections, which have not been redirected and reconnected as part of the Work,

and report them to the AW Project Manager. During placement of fill, compensate for irregularities in water pipe, such as obstructions, open joints, or broken pipe to ensure no voids remain unfilled.

- D. Perform demolition work prior to starting fill placement. Clean placement areas of water mains of debris that may hinder fill placement. Remove excessive amounts of tuberculations and other substances that may degrade performance of fill. Do not leave debris in place if filling more than 2 percent of placement volume.
- E. Remove free water prior to starting fill placement.

3.05 EQUIPMENT FOR ABANDONMENT VIA FLOWABLE FILL

- A. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design.
- B. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

3.06 INSTALLATION OF FLOWABLE FILL

- A. Abandon existing water lines underneath roadways, paved areas and other required locations by completely filling water mains with flowable fill.
- B. Place flowable fill to fill volume between abandonment points. Continuously place flowable fill with no intermediate pour points, but not exceeding 500 feet in length.
- C. Have filling operation performed by experienced crews with equipment to monitor density of flowable fill and to control pressure.
- D. Pump flowable fill through bulkheads constructed for placement of two 2-inch PVC pipes or use other suitable construction methods to contain flowable fill in lines to be abandoned. These pipes will act as injection points or vents for placement of flowable fill.
- E. Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction and to fill water main from downstream end, to discharge at upstream end.
- F. Inject flowable fill through replaced ballast using grouting equipment and series of grout pipes discharging at bottom of placement, allowing fill to rise through ballast effectively filling all voids. Alternatively, sequentially place individual pieces of ballast at same time as flowable fill is placed. Do not fill with ballast more than 50 percent of volume at any level, to prevent nesting and void formation.
- G. Remediate placement of flowable fill which does not fill voids in water main or where voids develop due to excessive shrinkage or bleeding of fill, by using pressure grouting either from inside watermain or from surface.
- H. Plug each end of the water main being abandoned.
- I. Backfill to surface, above pipe left in place. Place and compact backfill in compliance with Section - Excavation and Backfill for Utilities.

- J. Collect and dispose of excess flowable fill material and other debris in accordance with waste material disposal or as directed by the AW Project Manager.

3.07 PROTECTION OF PERSONS AND PROPERTY

- A. Provide safe working conditions as required by OSHA and applicable State and local laws for employees throughout demolition and removal operations. Observe safety requirements for work below grade.
- B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to work.

3.08 ASBESTOS CONCRETE PIPE

- A. Any work involving or impacting asbestos concrete pipe must be in accordance with the EPA's document titled "Demolition Practices Under the Asbestos NESHAP".

END OF SECTION 33 11 00.19