

## SECTION 811 PIPE BURSTING

**811-1 DESCRIPTION:** The Pipe Bursting process is defined as the reconstruction of sewer pipe by installing an approved pipe material, by means of one of the approved processes set forth in this specification. Existing pipe is broken with a “moling” device (hydraulic, pneumatic, or boring “knife”) and moved into the surrounding soil. The replacement pipe is either pulled or pushed by means of hydraulic force into place. The size hammer to be used shall be the minimum diameter necessary to facilitate the process. Oversized hammers shall not be allowed. No Pipe Bursting restoration will be accepted that has created a sag in the restored line by oversized hammers or other procedures. The Contractor shall be responsible for correcting existing sags (as defined in Section 811-5.2e) and any sags that are created by the new construction.

### **811-2 MATERIALS:**

a. Materials shall conform to the following Sections and Subsections:

1. Pull Method:

i. Non-metallic Restrained Joint Polyvinyl Chloride (PVC) Pipe

A. Gravity applications 1016-1.1.1.2

ii. Fusible Polyvinylchloride (FPVC) Pipe

A. Gravity applications 1016-1.1.1.3

B. Force main applications 1016-2.1.1

iii. High Density Polyethylene (HDPE) Pipe

A. Gravity applications 1016-1.1.2

B. Force main applications 1016-2.2

2. Push Method:

i. Ductile Iron Pipe and Fittings 1016-1.2

ii. Heavy Duty Clay Pipe and Fittings 1016-1.5

iii. Fiberglass Reinforced Polymer  
Pipe and Fittings 1016-1.6

b. Pipe Manufacturers: Manufacturers shall be those listed in the Qualified Products List (QPL) or approved equal.

c. Workmanship: Furnish pipe and fittings that are homogeneous throughout and free from visible defects such as foreign inclusions, concentrated ridges, discoloration, pitting, varying wall thickness, cracks, holes, foreign material, blisters, and other deformities. Pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage and/or handling that are larger/deeper than 10% of the wall thickness shall not be used and shall be removed from the construction site. Provide pipe as uniform as commercially practical in color, opacity, density, and other physical properties.

### **811-2.1 Delivery, Storage, and Handling:**

- a. Transportation, handling, and storage of the pipe and fittings shall be as recommended by manufacturer.
- b. If new pipe and fittings become damaged before or during installation, they shall be repaired as recommended by the manufacturer or replaced as required by the Engineer at the Contractor's expense, before proceeding further.
- c. Deliver, store, and handle other materials as required to prevent damage.

**811-3 QUALIFICATIONS:** The specific pipe bursting process must be approved by Engineer. Work is to be performed by a Contractor that is Licensed by the State of Louisiana and authorized to perform this process. The Contractor shall hold the Owner harmless in any legal action resulting from patent infringements.

- a. Personnel directly involved with installing the new pipe shall have received training from a qualified representative of the pipe manufacturer in the proper methods for handling and installing the pipe and connections associated with pipe bursting.
- b. Only personnel certified as fusion technicians by a manufacturer of HDPE pipe shall perform HDPE pipe jointing. They shall be trained, certified, and experienced in the operation of butt-fusing equipment and the installation of electrofusion fittings by a manufacturer of HDPE pipe.
- c. The Contractor shall certify in writing that he is a fully trained licensee of an approved pipe bursting system.

### **811-4 SUBMITTALS:**

- a. The Contractor shall submit a work plan to the Engineer for review and acceptance. The work plan shall address the following minimum preparation/steps, unless directed otherwise by the Engineer:
  - 1. Safety
  - 2. Pre-installation CCTV Inspection
  - 3. Bypass Pumping
  - 4. Line Obstructions
  - 5. Sags In Line
  - 6. Description of bursting method
  - 7. Type of bursting tool and pulling unit
  - 8. Equipment operating procedures
  - 9. Type of lubricant and MSDS
- b. A Traffic Control Plan will be submitted to DPW. The plan shall include an outline of the permit acquisition procedure for lane closure, methods for proper signing and barricades, which complies with local requirements and the MUTCD, and site Contractor telephone numbers for emergencies.
- c. Copies of all the training certifications for the personnel fusing HDPE pipe and fittings working on the project must be submitted to the Engineer prior to commencing work. Copies of any required technology licenses.
- d. All sewer service connections shall be identified, located, excavated, and

disconnected prior to the pipe insertion to expedite reconnection. The complete list of service laterals, including relevant footage and diameter of lateral, shall be submitted to the Engineer, prior to pipe bursting, for informational purposes only.

## **811-5 CONSTRUCTION:**

**811-5.1 Responsibility for Overflows or Spills:** It shall be the Contractor's responsibility to address all overflows and/or spills according to Section 813 Sewer Flow Control.

**811-5.2 Preparations:** The Contractor shall perform the following minimum preparation/steps, unless directed otherwise by the Engineer:

- a. **Safety:** The Contractor shall carry out operations under this section in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and entry into a confined space. It shall be the Contractor's responsibility to comply with OSHA Standards and Regulations pertaining to all aspects of the Work.
- b. **Noise Impact:** Equipment used to perform the Work shall be located away from buildings so as not to create noise impact. Provide a silent engine compartment with the winch to reduce machine noise as required to meet local noise ordinance.
- c. **Pre-installation CCTV Inspection:** It shall be the responsibility of the Contractor to televise the sewer pipe immediately before the pipe bursting to assure that the existing pipe conditions are acceptable for pipe bursting. CCTV inspections, DVDs, and reports, etc., shall be in accordance with Section 815. Original DVDs shall be the property of the Owner. The Contractor shall retain a copy for a record. The costs associated with this inspection shall be incidental to the installation of the replacement pipe.
- d. **Bypass Pumping:** When required for acceptable completion of the pipe bursting process, the Contractor shall provide for continuous sewage flow around the section(s) of pipe designated for the installation of replacement pipe. Bypass pumping shall be in accordance with Section 813 and shall be considered incidental to the installation of the replacement pipe.
- e. **Line Obstructions:** If Pre-Installation CCTV inspection reveals an obstruction in the existing sewer that was not evident in the Survey inspection (heavy solids, dropped joints, collapsed pipe, etc.) that will prevent completion of the pipe bursting process, and the obstruction cannot be removed by conventional sewer cleaning equipment, then an obstruction removal will be performed by the Contractor, with the approval of the Engineer, and paid for under the bid item for Sewer Point Repair Excavation, Backfill, and Compaction (see Section 801).
- f. **Sags In Line:** If Pre-Installation CCTV inspection reveals a sag in the existing sewer that is equal to or greater than one-quarter of the diameter of the existing pipe, it shall be the Contractor's responsibility to install the replacement pipe to result in an acceptable grade without the sag. The Contractor shall take the necessary measures to eliminate these sags by the method of pipe replacement, digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with the existing pipe invert, or by other measures. If a sag elimination pit is required, the Contractor shall utilize it as the insertion pit for that segment of pipe replacement.

**811-5.3 Installation Process:** The Contractor shall submit information, in detail, of the procedure and the steps to be followed for the installation of the pipe bursting method selected, even if the process is named in the specification. All instructions and procedures submitted shall be carefully

followed during installation. Any proposed changes in installation procedures shall require submittal of revised procedures and acceptance by the Engineer.

The Contractor shall install equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances shall the pipe be stressed beyond its elastic limit. The winch line must be centered in the existing pipe to be burst with an adjustable boom. Upon commencement, pipe insertion shall be continuous and without interruption from one manhole to another manhole or insertion pit, except when approved by the Engineer.

The replacement pipe in the manhole shall be sealed and restrained as specified in Section 811-5.3.1 before proceeding on to the next manhole section. All manholes shall be individually inspected for replacement pipe cut-offs, benches, sealing, restraints, and dye tested.

#### **811-5.3.1 Pull Method:**

- a. The installed pipe shall be allowed to relax and cool following installation, for a minimum of twelve (12) hours, prior to any reconnection of service lines, scaling of the annulus, or backfilling of the insertion pit. Sufficient excess length of new pipe, not less than four (4) inches or greater than six (6) inches, shall be allowed to protrude into the manhole to provide for further length reduction with the use of electrofusion flex restraints.
- b. Following the relaxation period, a tight fitting seal with the existing or new manhole shall be installed with non-shrink grout and electrofusion flex restraints and then dye tested. The channel in the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other lines or channels, if any. Channel cross-section shall be U-shaped with a minimum height of half pipe diameter to three-fourths of the pipe diameter for fifteen (15) inches and larger. The side of the channels shall be built up with mortar/concrete, as specified, to provide benches at a maximum of 1:12 pitch towards the channel.

#### **811-5.3.2 Push Method:**

- a. After the jacking frame and thrust block are aligned in the work pit the lead assembly will be inserted into the host pipe. The insertion equipment will have the capability of advancing the lead sections forward through the existing sewer.
- b. The equipment shall include monitors which will measure the thrust on the front hydraulic cylinder and main (rear) jacks. This thrust shall not exceed the maximum allowable thrust stated in the project submittals. The segmented rigid replacement pipe shall be inserted and pushed into place by the main jacks.

#### **811-5.4 Process Limitations:**

- a. Though the installation process may be licensed or proprietary in nature, the Contractor SHALL NOT change any material, thickness, design values, or procedures stated or approved in the submittals without the Engineer's prior knowledge and pre-approval. The Contractor shall submit, in writing, full details about component materials, their properties, and installation procedures. He shall abide by them fully during the entire course of the project.
- b. All sewer rehabilitation by pipe bursting methods must be structurally equal to or exceed the properties of the host pipe. The minimum required performance criteria, and/or standards, physical/structural properties, chemical resistance tests, and the

replacement pipe thickness, as given in this specification, shall be strictly complied with. It shall be the responsibility of the Contractor to comply with the specifications in full without any request for any change after the award of the contract. The Owner reserves the right to accept, reject, or modify any later requests for change at no additional cost to the Owner, even to the extent of asking for credit from the Contractor.

- c. It is the Contractor's responsibility to examine the surface and subsurface path of the proposed line segment and notify the Engineer if conditions exist that could cause problems with the pipe bursting method. These could include utilities and nearby services that could be damaged by the operations, existing slabs that could be damaged, or less than acceptable depth of cover.

**811-6 INSERTION OR ACCESS PITS:** Contractor shall plan the location of the insertion pits in conjunction with the location of the required sag elimination pits as shown on the Contract Documents. The location and number of insertion pits shall be planned by the Contractor and submitted in writing for approval by the Engineer prior to excavation. The pits shall be located so that the total number shall be minimized and the length of replacement pipe installed in a single pull/push shall be maximized.

**811-7 BEDDING:** In all excavations where the replacement pipe is uncovered (i.e. insertion pits, sag elimination pits, etc.), bedding, backfill, and compaction shall be installed as specified in Section 801. Visual inspection by the Engineer is required for approval of bedding before backfill is completed.

**811-8 HDPE PIPE JOINTING:**

- a. Sections of replacement pipe shall be assembled and jointed on the job site above the ground. Jointing shall be accomplished by the heating and butt-fusion method in strict conformance with the manufacturer's printed instructions. Threaded or solvent-cement joints and connections are not permitted. Personnel certified as fusion technicians by the manufacturer of pipe being fused, using equipment designed for this task, shall accomplish fusing.
- b. Joints shall have a smooth, uniform, double rolled back bead made while applying the proper melt, pressure, and alignment. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to the pipe.
- c. It shall be the sole responsibility of the Contractor to provide an acceptable butt-fusion joint. Prior to insertion, the Engineer will inspect all joints. All defective joints shall be cut out and replaced at no additional cost to the Owner. The replacement pipe shall be joined on the site in appropriate working lengths near the insertion pit. The maximum length of continuous replacement pipe that shall be assembled above ground and pulled on the job site at any one time shall be approximately 400 linear feet.
- d. Where excavations for the insertion of HDPE replacement pipe are made between two manholes, the terminal sections of the HDPE pipe shall be connected with Central Plastics Electrofusion Couplings, or approved equal as identified in the QPL. The coupling shall have a tensile strength equivalent to that of the pipe being joined. Installation of all electrofusion couplings shall be carried out in strict conformance with the manufacturer's printed instructions and by personnel certified by a manufacturer of HDPE pipe in the proper methods of installing electrofusion fittings.

**811-9 SERVICE LINE CONNECTION RESTORATION:** All sewer service connections shall be identified, located, excavated, and disconnected prior to the pipe insertion. The complete list of service laterals, including relevant footage and diameter of lateral, shall be submitted to the Engineer, prior to pipe bursting, for informational purposes only. Upon completion of insertion of the new pipe, the Contractor shall expedite the reconnection of services with saddle connections, clean outs, and pads in accordance with Section 802-7, to minimize any inconvenience to the customers. However, the Contractor shall allow sufficient time for the newly installed pipe to “relax” as specified. All coupon materials cut from the new pipe shall be retrieved at the next downstream manhole and submitted to the Engineer. The Contractor shall be responsible for any sewer flow control and sewer backups during pipe bursting operations. These issues shall be addressed as directed in Section 813 Sewer Flow Control.

**811-10 TESTING:**

- a. **Leakage Test:** Leakage test shall be performed in accordance with Section 802-8.1 after installation but prior to service line reconnections.
- b. **Post CCTV of Completed Pipe Sections:** A post CCTV inspection of completed pipe lines shall be performed in accordance with Section 815.
- c. **Smoke Testing of Service Lateral Connections:** Once the pipe bursting operation is complete and services re-established, the Contractor shall perform a smoke test of the service laterals prior to backfilling in accordance with Section 814. Leaks detected during testing must be repaired as part of the pipe bursting operation and shall be considered incidental and included in the cost of pipe bursting.
- d. Any sags, leaks or defects discovered in consequence of any of the above tests shall be replaced with sound material in the manner acceptable to the Engineer at no cost to Owner. The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the Engineer.

**811-11 MEASUREMENT:** Measurement for the replacement of the existing sewer line by pipe bursting shall be made on a linear foot basis, measured horizontally to the nearest whole foot, from the center of manhole to center of manhole, for the size of pipe specified.

**811-12 PAYMENT:** Payment for this Item will be full compensation for pre and post CCTV inspection, bypass pumping, pipe, fusible fittings and restraints, preparation of the host pipe to receive the new pipe, bedding, backfill material, lubrication, sealing material, coupon retrieval, equipment retrieval, all insertion, access, or sag elimination pits (and all associated surface restoration), cleaning, testing, traffic control, fencing, miscellaneous work and cleanup, any necessary material, labor, equipment, or technique necessary to deal with any and all manner of difficulty encountered, (e.g., water, access arrangements, erosion control, reinstatement of disturbed property, suppression of noise and air pollution, etc.). Payment for line obstruction removal shall be paid for under Sewer Point Repair Excavation, Backfill and Compaction by depth in accordance with Section 801, Excavation Backfilling and Compaction for Sanitary Sewer and with prior approval of the Engineer.

**811-13 PAY ITEMS:**

Pipe Inner Diameter (I.D.) Schedule  
(as Shown on Drawings)

A = 4" Pipe	N = 27" Pipe
B = 6" Pipe	O = 30" Pipe
C = 8" Pipe	P = 32" Pipe
D = 10" Pipe	Q = 36" Pipe
E = 12" Pipe	R = 42" Pipe
F = 14" Pipe	S = 48" Pipe
G = 15" Pipe	T = 54" Pipe
H = 16" Pipe	U = 60" Pipe
I = 18" Pipe	V = 64" Pipe
J = 20" Pipe	W = 66" Pipe
K = 21" Pipe	X = 72" Pipe
L = 24" Pipe	Y = 76" Pipe
M = 26" Pipe	Z = 80" Pipe

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
811100_	Pipe Bursting (diameter)	Linear Foot