

SECTION 079
SPECIFICATIONS – PIPE-BURSTING

1.0 High Density Polyethylene Pipe

High density polyethylene sewer pipe (PE pipe) shall be used at locations specified on the plan sheets. HDPE pipe materials shall be as specified in Section 027 of these specifications.

2.0 Pneumatic Pipe-Bursting

This specification shall cover the rehabilitation of existing sanitary sewers using a pneumatic pipe bursting system. This pipe-bursting is a system by which a pneumatic burster unit breaks the existing pipe while simultaneously both expanding the backfill around the existing pipe and installing a pipe (polyethylene pipe is specified to be used in this project). Existing sewer service connections, and testing of the polyethylene pipe, shall be completed in accordance with these Specifications. Only pneumatically operated equipment, with either front or rear expanders for the proper connection to the polyethylene pipe, will be allowed for use. The pneumatic tool must be used in conjunction with a constant tension hydraulic winch, the size of the winch depending on the diameter of the pipe to be replaced. The tension on the winch is not to exceed 20 tons but must be at least 5 tons. Additionally, before the installation of the proposed piping can be considered complete, any constrictions of the inside diameter of the pipe installed, including, those constrictions caused by the butt-fusion of the joints of HDPE pipe, shall be removed to the satisfaction of the Engineer.

Additionally, the following qualifications must be met to perform the pipe bursting called for under this contract:

1. The Contractor shall be certified, by the particular pipe-bursting system manufacturer, that such a company is a fully trained user of the pipe-bursting system. Documentation of such certification shall be submitted to the Engineer.
2. Polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the polyethylene pipe.
3. The Contractor shall hold the Greater Peoria Sanitary District whole harmless in any legal action resulting from patent infringements.

The following must be submitted by the Contractor:

1. Shop drawings, catalog data and manufacturer's technical data showing complete information on material composition, physical properties and dimensions of new pipe and fittings. Include manufacturer's recommendations for handling, storage, and repair of pipe and fittings damaged.
2. The methods of construction and restoration of existing sewer service connections, if not

specified either on the plan sheets or in the specifications. This shall include:

- a. Detail drawings and written descriptions of the entire construction procedure to both install pipe and to bypass sewage flow.
 - b. Working drawings for information showing excavation locations, dimensions, sheeting and shoring, method of dewatering, and other utilities that may be affected; width and length of working area, access pit, and portion of existing sewer to be removed to conduct the work; sewage flow by-pass; and maintenance of traffic. Design of the sheeting and shoring for the excavations, dewatering shall be the Contractor's responsibility.
3. Documentation that all licensing agreements with British Gas are current and there are no legal actions pending against the licensee by British Gas.

The Contractor shall take care to handle, deliver and store all materials to be used in the performance of this project, including all piping and fittings as recommended by the manufacturers. Materials shall be stored on site so to both minimize inconveniences to local residents and to avoid traffic disruptions. If, in the opinion of the Engineer, the materials become damaged during delivery, storage or handling, the Contractor shall replace the damage materials at the Contractor's expense.

The method approved for rehabilitation of existing sanitary sewers by pipe bursting, and installation of new polyethylene pipe, shall include a reversible feature allowing exit of the bursting tool through the entry pit, or approved equal. Pipe bursting shall use Vermeer Hammerhead Mole Systems, or approved equal.

The pipe-bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate sufficient force to burst and compact the existing pipeline. Manufacturer's specifications for what size tool should be used in what diameter of pipe, as well as parameters of what size tool for percentage of upsize/downsize allowed.

The pipe-bursting tool shall be pulled through the sewer by a winch located at a location chosen by the Contractor, unless one is specified by the Engineer. The bursting unit shall pull the polyethylene pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The pipe-bursting unit shall be remotely controlled.

The pipe-bursting tool shall be pneumatic. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall not only break the pipe but also create the void into which the burster can be winched and enables forward progress to be made. At the same time the polyethylene pipe, directly attached to the sleeve on the rear of the burster, shall also move forward.

The burster shall have its own forward momentum while being assisted by winching. To form a complete operating system, the burster must be matched to a constant tension hydraulic winching system. The system must be reversible in that the bursting head must be able to be removed at the end of the

burst and both the tool and hose pulled back through the new line. Reversing in this manner will allow for saving existing manholes and structures.

A winch shall be attached to the front of the bursting unit. The winch shall provide a constant tension to the burster in order that it may operate in an efficient manner. The winch shall ensure directional stability in keeping the unit on line. The winch shall be hydraulically operated providing a constant tension throughout the operation. The winch shall be of the constant tension type but shall be fitted with a direct reading load gauge to measure the winching load. The winch must automatically maintain a constant tension at a set tonnage reading. The constant tension winch shall supply sufficient cable in one continuous length so that the pull may be continuous between approved winching points. The winch, cable and cable drum must be provided with safety cage and supports so that it may be operated safely without injury to persons or property. The Contractor shall provide a system of guide pulleys and bracing at each manhole to minimize cable contact with the existing sewer between manholes. The supports to the trench shoring in the insertion pit shall remain completely separate from the winch boom support system and shall be so designed that neither the pipe nor the winch cable shall be in contact with them.

All sewer service connections shall be identified and located prior to the pipe insertion to expedite reconnection. Upon commencement, pipe insertion shall be continuous and without interruption from one manhole to another, except as approved by the Engineer and/or his Representative. Upon completion of insertion of the new pipe, the Contractor shall expedite the reconnection of services so as to minimize any inconvenience to the customers. The Contractor shall reconnect a building sewer service the same day it is disconnected unless pre-approved by the building owner and the Engineer. Connection of the new service lateral to the mainline shall be accomplished by means of a Geneco saddle in accordance with both the specification for Building Inlets, in Section 031 of these specifications, and the details shown on the plan sheets.

If Bypass Pumping is required:

1. The Contractor, when and where required, shall provide diversion for the pipe bursting and the replacement process. The pumps and by-pass lines shall be of adequate size to handle design capacity of the piping in question. All costs for by-pass pumping shall be incidental to the unit price of the pipe-busting and pipe replacement.
2. The Contractor shall be responsible for continuity of sanitary sewer service to each facility connected to the section of sewer during the execution of the work.
3. If sewage backup occurs and enters buildings, the Contractor shall be responsible for clean-up, repair, property damage cost and claims.

The Contractor shall be responsible for televising the sewer both prior to reconstruction, to verify the condition of the existing pipe, and after work is completed, including reinstatement of all sewer services, so that the Engineer may both use the televising to either accept, or deny, the work performed and keep the televising for records. Cost of televising shall be incidental to the cost of the pipe-bursting. All videotapes are to be the property of the Engineer, exclusively.

With regard to the methods to be used:

1. 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 requirements.
2. The Contractor shall install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubricating may be used as recommended by the manufacturer. Under no circumstances will the pipe be stressed beyond its elastic limit. Winch line is to be centered in the pipe to be burst with an adjustable boom.
3. The installed pipe shall be allowed the manufacturer's recommended amount of time, but not less than four (4) hours, for cooling and relaxation due to tensile stressing prior to any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Sufficient excess length of new pipe, but less than four (4) inches, shall be allowed to protrude into the manhole to provide for relaxation of the pipe. Restraint of pipe ends shall be achieved by means of Central Plastics Electrofusion coupling. The Electrofusion couplings shall be slipped over pipe ends against manhole wall and fused in place. Installation of Electrofusion couplings shall be done in accordance with the manufacturer's recommended procedures.
4. Following the relaxation period, the annular space may be sealed. Sealing shall be made with Preco hydraulic cement, or a material approved by the Engineer, and shall extend throughout the manhole wall in such a manner as to form a smooth, uniform, watertight joint. The terminating pipe ends, in manholes, shall be connected by Central Plastics Electrofusion Couplings to eliminate groundwater infiltration.

3.0 Pipe Joining

The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak-proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by Personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. 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 that of the pipe. All joints shall be subject to acceptance by the Engineer and/or his Representative prior to insertion. All defective joints shall be cut out and replaced at no cost to the District. Any section of the pipe with a gash, blister, abrasion, nick, scar or other deleterious fault greater in depth than ten percent (10 %) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as

determined by the Engineer and/or his Representative shall be discarded and not used.

After joining Sections of PE pipe by the butt-fusion method, the specified internal diameter shall be restored to allow for ease of future maintenance. The internal diameter shall be restored with a McElroy Internal Bead Remover, as manufactured by McElroy Manufacturing, Inc. No constriction of the internal diameter, caused by butt-fused joints, shall be allowed upon final acceptance of new pipe.

4.0 Testing

The reconstructed sewer shall meet the air testing requirements of Section 039 of these specifications. In addition, the sewer shall perform the flexible pipe deflection test specified in Section 039. However, if any portion of the newly installed pipe fails the deflection test, the Contractor shall not be required to repair the failed pipe, unless otherwise specified. The results of the deflection testing are the property of the Engineer and shall be provided to the Engineer in writing.

Any defects which may affect the integrity, or strength, of the pipe in the opinion of the Engineer shall be repaired or the pipe replaced at the Contractor's expense.

END OF SECTION

