

LATERAL PIPE REPLACEMENT

GUIDELINE SPECIFICATION: LATERAL REPLACEMENT BY PIPE BURSTING

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The following specifications are common to the industry. They are general in nature. Each job has unique circumstances. These specifications are not complete for any job and cannot be used as such. Earth Tool Company LLC makes no claim as to the completeness or accuracy of the specifications and does not represent or warrant them as such. The project engineer, city or municipality, or the contractor must provide the final specifications.

DESCRIPTION:

This specification shall cover the rehabilitation of existing 4" and 6" sanitary sewer laterals using a portable static pipe bursting system. Pipe bursting is a process by which an existing pipe in need of replacement is fractured and displaced into the surrounding ground while simultaneously is installed a new polyethylene pipe (PE or HDPE) of the same size or larger. A portable static system is operated hydraulically, with jaws gripping a cable that in turn pulls a pipe bursting head through the pipe to be replaced. The pipe bursting head features a means to securely attach HDPE without the use of bolts or specialized tools. The bursting head must be used in conjunction with the hydraulic pulling device.

METHOD FOR NEW PIPE INSTALLATION:

Pipe bursting is the process of replacing existing pipes without open-cutting a trench. The method involves bursting the existing pipe and pulling in new polyethylene (PE or HDPE) pipe through the existing line. The static method of bursting is accomplished with a bursting head and hydraulic pulling device. The bursting head fractures the existing pipe and pushes the pieces into the existing bedding surrounding the line. The hydraulic pulling device provides traction for the bursting head, and permits navigating straight pipe sections as well as bends up to 45 degrees. The new pipe can be the same size or larger than the pipe it replaces (a practice known as upsizing). The steel bursting head is of a special design that grips the new pipe and protects the leading edge of the new pipe, while allowing navigation of the 45-degree bends.

Access pits are required at the beginning and end of the run of existing pipe that is to be replaced. The size of the entry pit for the new pipe is determined based on the pipe manufacturer's specified bend radius for the pipe being inserted. The cable of the hydraulic pulling device is fed through the existing pipe and attached to the nose of the bursting head. The hydraulic pulling device pulls the bursting head through the existing line, breaking it into small pieces and pushing the pieces into the existing bedding. The bursting head is larger in diameter than the existing pipe and therefore creates an annular space that results in obstruction-free installation. The process is completed when the bursting head reaches the exit pit, a manhole or basement. The bursting head is then removed from the new PE pipe and the pipe is connected to the sewer main and house connection(s).

MATERIALS:

Polyethylene plastic pipe shall be high density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE)

Plastic Pipe (SDR-PR). Based on outside diameter, ASTM D1248, ASTM D3550.

- A. Sizes of the insertions to be used shall be such to renew the sewer lateral to its original or greater flow capacity when required.
- B. All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.
- C. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
- D. Dimension ratios: The minimum wall thickness of the polyethylene pipe shall meet the pipe manufacturer's recommendations.
- E. Material color shall be white, black or whatever is specified.

BURSTING EQUIPMENT:

The pipe bursting head shall be designed and manufactured to force its way through existing pipe material by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The hydraulic pulling device shall generate sufficient force to pull the bursting head through the existing pipe, causing it to burst and compact the existing material into the surrounding ground. (See manufacturer's specifications for the size of bursting head to be used for each diameter of pipe, as well as requirements for upsizing.) The pipe bursting head shall be pulled through the sewer lateral by a hydraulic pulling device located in the exit pit at the opposite end of the lateral. The Bursting head shall pull the polyethylene pipe with it as it moves forward. The bursting head shall be designed so that it can be disconnected from the new pipe and retrieved from the exit pit or manhole.

The bursting head shall have a larger external diameter than the existing lateral, causing the pipe material to fracture while expanding the surrounding ground. This action shall not only break the pipe but also create a void through which the bursting head can pull in the new polyethylene pipe. The bursting head shall be designed so as to securely grip the PE pipe without need for fasteners or special tools.

The bursting head shall be pulled through the existing pipe by the hydraulic pulling device. The cable of the hydraulic pulling device shall be attached to the front of the bursting head. The hydraulic pulling device must pull the bursting head with sufficient force to burst the existing pipe and provide for expansion of the surrounding ground.

PIPE HANDLING AND JOINING:

The contractor is required to transport, handle and store pipe and fittings as recommended by the manufacturer.

If new pipe or 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.

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

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and/or fusing equipment.

The butt-fused joint shall be in 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 city. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent 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 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.

Terminal sections of pipe that are joined shall be connected with Central Plastics electrofusion couplings, or approved equal, or connectors with tensile strength equivalent to that of the pipe being joined.

UNIFORM PLUMBING CODE CONSIDERATIONS

The Uniform Plumbing Code (UPC) 2000 incorporates the standard for the trenchless installation of polyethylene (PE) pipe. Copies of the UPC can be purchased on the International Association of Plumbing and Mechanical Officials (IAPMO) web site www.iapmo.org/iapmo/.

Bedding

Trench excavation is not required with pipe bursting. Compaction will remain the same as existing pipeline or increase with the pushing of existing pipe residual into the surrounding bedding. Density will remain the same. Bedding will remain the same as existing pipeline with the addition of small pieces of pipe pushed into the bedding.

Pitch

Trench excavation not required with pipe bursting, however entrance and exit access pits are required. With existing pipeline having proper pitch, the new pipe will follow and maintain existing pipeline pitch. Verifying pitch can be performed according to common industry practices. Necessary adjustments due to sag or other faults resulting from the condition of the existing pipe are corrected by potholing and repair. All work of this nature is accomplished in conformance with the existing code for the installation of lateral sewer lines.

Depth

Entrance and exit access pits are required. With existing pipeline having proper depth verified, installation of new pipe will follow and maintain existing pipeline depth.

HDPE Pipe Damage

When pipe bursting, the burst head expands the diameter of the hole, creating a larger annulus than the new pipe, allowing obstruction-free installation. The existing line is broken into small pieces and the pieces are pushed into the existing bedding. This expansion reduces the chance of gouges, cuts or deep scratches required by ASTM F585 8.3.1 not to exceed 10% (percent) of the wall thickness in depth.

Additional Notes

When trench settlement is eliminated and disturbance of the pipeline's bedding is minimized, soil compaction remains the same or is increased. Construction, load-induced and initial deflections are reduced with pipe bursting.

In all areas where trench excavation of the pipe occurs, all applicable standard practices, requirements and regulations regarding trench excavation of gravity sewer shall be followed.