MICHELS PIPE SERVICES

P.O. Box 128 • 817 West Main St. • Brownsville, WI 53006-0128
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SAMPLE SPECIFICATIONS FOR PIPEBURSTING METHOD SEWER REPLACEMENT

A. GENERAL

DESCRIPTION: This specification shall cover the rehabilitation of existing sanitary sewers using the GRUNDOCRACK PIPE BURSTING SYSTEM. Pipe bursting is a system by which the pneumatic burster unit splits the existing pipe while simultaneously installing a new Polyethylene Pipe of the same size or larger size pipe where the old pipe existed, then reconnect existing sewer service house connections, television inspection of the Polyethylene Pipe and complete the installation in accordance with the contract documents. 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 twin Capstain Winch of either 20, 10 or 5 tons, the size of the winch depends on the diameter of the pipe to be replaced. In no case is the constant tension on the winch to exceed 20 tons.

B. QUALIFICATIONS:

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.

2. Polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equip ment 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. Training shall be performed by qualified representative.

3. The Contractor shall hold the City and Engineering Firm whole harmless in any legal action resulting from patent infringements.

C. SUBMITTALS:

Submit the following Contractor's Drawings:

1. Shop drawings, catalog data, and manufacturer's tech-nical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings. Include manufac turer's recommendations for handling, storage, and repair of pipe and fittings damaged.

2. Method of construction and restoration of existing sewer service connections. This shall include:

a. Detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow and reconnection of sewer service connections.

3. Certification of workmen training for installing pipe.

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4. Television inspection reports and video tapes made after new pipe installation.

D. DELIVERY, STORAGE, AND HANDLING:

1. Transport, handle, and store pipe and fittings as recommended by manufacturer.

2. If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Engineer at the Contractor's expense, before proceeding further.

3. Deliver, store and handle other materials as required to prevent damage.

E. METHODS FOR NEW PIPE INSTALLATION:

The method approved for rehabilitation of existing sanitary sewers by pipe bursting and installation of new polyethylene pipe is T.T. Technologies GRUNDOCRACK SYSTEMS, (800-533-2078) or approved equal. See accompanying list for your closest trained contractor that is licensed by British Gas.

If we may be of any further assistance, please feel free to contact us, or Jim Hopwood, of British Gas, directly at (713) 849-6322.

F. 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.

1. Sizes of the insertions to be used shall be such to renew the sewer to its original or greater than flow capacity.

2. 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.

3. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

4. Dimension Ratios: The minimum wall thickness of the polyethylene pipe shall meet the following:

Depth of Cover (Feet)	**Minimum SDR of Pipe**
0 - 16.0	19
> 16.1	17

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5. Material color shall be white, black or whatever is specified with interior of pipe having a light reflective color to allow easier/better viewing for television inspection.

F. TESTS:

Tests for compliance with this specification shall be made as specific herein and in accordance with the applicable ASTM Specification. A certificate with this specification shall be furnished, upon request, by the manufacturer for all material furnished under this specification. Polyethylene plastic pipe and fittings may be rejected to meet any requirements of this specification.

G. EQUIPMENT:

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 pipe line. See manufacturers 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 allowed.

The pipe bursting tool shall be pulled through the sewer by a winch located at the upstream manhole. 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. A hydraulic winch shall give the burster friction by which it can be move forward. To form a complete operating system, the burster must be matched to a constant tension hydraulic winching system.

G. WINCH UNIT:

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.

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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.

H. SEWER SERVICE CONNECTIONS:

a. 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.

b. Sewer service connections shall be connected to the new pipe by various methods. The saddles should be made of a material compatible with that of the pipe.

1. Electrofusion saddles as manufactured by Central Plastics, shall be installed in accordance with the manufactures recommended procedures.

2. Conventional Fusion saddles as manufactured by Central Plastics, Phillips Driscopipe, or Plexco shall be installed in accordance with the manufacturers recommended procedures.

3. Connection of the new service lateral* to the mainline shall be accomplished by means of a compression-fit service connection. The service connection shall be specifically designed for connection to the sewer main being installed, and shall be INSERTA TEE as manufactured by Fowler Manufacturing Co. Hillsboro, Oregon, (503)357-2110: or approved equal. Install using procedures and equipment as referenced in manufacturer's written installation instructions.

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TYPES AVAILABLE FOR ALL MAINLINES:

TYPES	GASKETTED BELL SDR 35	GASKETTED BELL IPS/SCH 40
PVC Hub	ASTM D3034 SDR 35	ASTM D3034 SDR 26
Rubber Boot	ASTM C443	ASTM C443
Band	301 SS	301 SS
Screw	305 SS	305 SS
Housing	301 SS	301 SS
Gasket	ASTM F477	ASTM F477

PREPARATION

BY PASSING SEWAGE:

1. By-Pass Pumping: The Contractor, when and where required, shall provide diversion for the pipe bursting/replacement process. The pumps and by-pass lines shall be of adequate capacity and size to handle all flows. All costs for by-pass pumping, required during installation of the pipe shall be subsidiary to the pipe reconstruction item.

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.

J. TELEVISION INSPECTION:

Television inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit color television. Television inspection shall include the following:

1. Video tapes (post) to be submitted to the city before final invoice.

2. Video tapes to remain property of the city; Contractor to retain second copy for his use.

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3. All flows tributary to reach of sewer being inspected are to be completely by-passed around the reach during inspection if necessary and required by the City.

4. Post construction video tape upon completion of reconstruction of each reach of sewer with the voice description, as appropriate with stationing of services indicated. Data and stationing to be on video.

5. Should any portion of the inspection tapes be of inadequate quality or coverage, as determined by the City the Contractor will have the portion reinspected and video taped at no additional expense to the City.

K. CONSTRUCTION METHOD:

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. Lubrication 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 pipe to be burst with 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 stress-ing prior to any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Sufficient excess length of new pipe, but not less than four (4) inches, shall be allowed to protrude into the manhole to provide for occurrence. Restraint of pipe ends shall be achieved by means of Central Plastics Electrofusion couplings (800)654-3872. 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 manufacturers recommended procedures.

4. Following the relaxation period, the annular space may be sealed. Sealing shall be made with material approved by the Engineer and/or his representative and shall extend a minimum of eight (8) inches into 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 ground water infiltration. Installations of electrofusion couplings shall be done in accordance with the manufacturers recommended procedures.

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5. Pit Placement Issues

A. Windowing Method

Up to 12" diameter PE pipe, the Contractor shall use the "windowing" method where necessary, to prevent damage to surrounding infrastructure. This method is described in T. T. Technologies, Inc.'s "Pipe Bursting Operation Manual". Both entrance and exit procedures may be conducted.

Underground utility locates must be performed prior to determining the necessity and feasibility of the "windowing" method.

B. Tool Removal Back to Starting Pipe via Being Pulled Back Out of the newly Installed PE Pipe

Contractor shall use the GRUNDOCRA.CK PCG System when an exit pit is difficult due to underground utility placement or surrounding infrastructure. The PCG System uses a pneumatic tool with a special head expander. The PCG tool also uses a remote controlled reverse procedure to allow reversing the GRUNDOCRACK tool for removal back through the newly installed HDPE. In all cases, the tool must have the ability to operate in reverse to prevent dauege to the HDPE during removal.

L. FIELD TESTING:

1. After the existing sewer is completely replaced, internally inspect with television camera and video tape as required. The finished tape shall be continuous over the entire length of the sewer between two manholes to be free from visual defects.

2. 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.

M. PIPE JOINING:

1. 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.

2. 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 City. 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.

3. Terminal sections of pipe that are joined within the insertion pit shall be connected with Central Plastics Electrofusion Couplings or connectors with tensile strength equivalent to that of the pipe being joined.

N. MEASUREMENT AND PAYMENT:

1. The inserted pipe shall be paid for per linear foot of the size pipe specified and shall include all pipe bedding, backfill material, annulus sealing material and launching pits. Locating and reconstruction of services and all reconnections of services shall be paid for per each connection made, including fittings and pipe.

2. The work performed as prescribed by this item will be paid at the unit price per linear foot of sanitary sewer by pipe bursting/replacement for the specified pipe diameter and location, per each for “Locate, reconstruct and reconnect” for the specified pipe diameter, which price shall be full compensation for the installation of the new pipe, furnishing and placing of all materials, labor, tools, equipment, cleaning, and preparation of the existing pipe to receive the new liner, and any other necessary to complete the project.

3. Video inspection of final installed pipe shall be paid based on the cost per linear feet to T.V. the entire length of new pipe.

4. The cost of any necessary by-pass pumping shall be considered subsidiary to the cost of pipe installation and shall not be a separate pay item.