



# MICHELS PIPE SERVICES

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P.O. Box 128 • 817 West Main St. • Brownsville, WI 53006-0128  
920.583.3132 • Fax: 920.583.3429  
www.michels.us

## SPECIFICATION FOR TESTING AND CHEMICAL GROUT REHABILITATION OF SANITARY SEWER SERVICE CONNECTIONS

### OBJECTIVE

The objective of this program is to inspect and eliminate ground water infiltration into the sanitary sewer system from the service connection.

### SCOPE

The work covered by this project shall consist of furnishing all labor, equipment, materials and supervision to perform all work necessary to clean, inspect with closed-circuit television, test lateral connections and seal defective service connections in the designated sanitary sewer lines.

### PRE-QUALIFICATION

Only bids from pre-qualified products and contractors will be read. Bids submitted on products or from contractors that have not been pre-qualified will be returned unopened. The contractor and the proposed method of reconstruction shall be clearly and legibly identified on the bid envelope.

The prime contractor must perform better than 80% of the contracted work with his own in-house forces.

### AREA OF WORK

The area of work shall be shown on the drawings and shall be confined to \_\_\_\_ inch diameter through \_\_\_\_ diameter sanitary sewer pipe.

### GENERAL

All work will be performed by experienced and pre-qualified personnel utilizing equipment and materials which meet the requirements hereinafter specified.

The elimination of ground water infiltration as used in these specifications shall mean the elimination of infiltration of soil and water through any sewer service connection as determined from earlier surveys, the television monitor and specified testing procedures. A sewer line service connection shall be the junction of the service connection and the sewer main.

The term "Clean" as used in these specifications, shall be defined as the removal of sufficient materials to render the sewer line to 95% of its original capacity or to allow passage of the necessary inspection, testing and sealing equipment, whichever is greater.



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Since the success of the other phases of work depends a great deal on the cleanliness of the lines, the importance of this phase of the operation cannot be stressed too strongly. Particular emphasis is made to the removal of accumulations of grease so that cracks and breaks can be observed during TV inspection and the sealing equipment can successfully isolate joints during testing and/or sealing.

## **A. Low Pressure Hydraulic Cleaning Equipment**

This equipment is normally designed to utilize the existing sewer flows, but additional water may be needed in order to expedite the cleaning operations. Consideration is given to two kinds of low pressure hydraulic cleaning equipment: the movable dam-type and the inflatable element or balling-type equipment. Movable dam-type equipment shall be of equal diameter to the pipe being cleaned, and shall provide a flexible scraper around the outer periphery to insure the total removal of debris and grease. Balling-type equipment shall be inflated so that a tight contact is made with the pipe wall to restrict the movement of water around the ball and to assure the removal of all debris from the invert of the pipe, as well as grease from the pipe wall.

## **B. High-velocity Hydro-cleaning Equipment:**

All high-velocity sewer cleaning equipment shall be truck-mounted for ease of operation. The equipment shall have a minimum of 500 feet of one inch ID high-pressure hose with a selection of two or more cleaning nozzles.

The equipment shall have a minimum capacity of 60 gallons per minute and a working pressure of 1,200 pounds per square inch. The nozzles shall be capable of producing a scouring action from 15° to 45° in all size lines designated to be cleaned. The equipment shall also include a high-velocity gun for washing and scouring manhole walls and floors.

The equipment shall carry its own 1,200 gallon water tanks, capable of holding corrosive or caustic cleaning or sanitizing chemicals, auxiliary engines, pumps and a hydraulically-driven hose reel.

All controls shall be located so that the equipment can be operated above ground at minimal interference to existing traffic and/or danger to the operator.

## **C. Mechanical Cleaning Equipment:**

Bucket machines shall be operated in pairs with each machine powered by an engine with a minimum of 16 horsepower to insure sufficient pulling power.

Power rodding machines shall be of a continuous rod-type capable of holding a minimum of 1,000 lineal feet of rod. The machine shall have a positive rod drive to produce a 2,000 pound rod pull. To insure safe



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operations, the machine shall have a fully enclosed body and an automatic safety throw-out clutch and other safety equipment required by law.

Bucket machines and rodders shall be equipped with proper tools for all types of cleaning in the sizes of pipe in which work is to be performed.

All designated sewer manhole sections shall be cleaned using mechanically-powered, hydraulic propelled or high-velocity sewer cleaning equipment as specified and the selection of equipment used shall be based on the condition of the lines at the time the work commences. The equipment and the methods selected for cleaning shall be capable of removing all dirt, grease, rocks and other deleterious materials from the sewer lines and manholes.

Whenever lines to be cleaned show evidence of being more than one-half filled with solids, bucket machines and rodding machines shall be utilized to remove the major portion of the materials before hydraulic equipment is brought into use for finishing.

The contractor shall also be required to provide and utilize bucket machines and rodding machines in instances to facilitate the removal of roots or heavy grease.

Whenever bucket machines are used, the bucketing process shall be in one manhole section at a time. A bucket of proper size shall be placed in the downstream manhole and pulled at intervals toward the upstream manhole until the entire manhole section has been cleaned. Upon completion of the bucketing operation, hydraulically-propelled or high-velocity sewer cleaning equipment shall be used to insure that all sand, grease and other fine materials have been removed. Satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by the improper use of cleaning equipment. Whenever hydraulically-propelled cleaning tools which depend on water pressure to provide the cleaning force, or any tools which retard the flow of water in the sewer line are used, caution shall be taken to insure that the water pressure created does not cause any damage or flooding to public or private property being serviced by the manhole sections involved. The flow of sewerage in the sewer system shall be utilized to provide necessary pressure for hydraulic cleaning devices whenever possible. When an additional quantity of water from fire hydrants is necessary, to avoid delay in normal working procedure, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed. All sludge, dirt, rocks, sand, grease and other solids or semisolid materials resulting from all types of cleaning operations shall be trapped and removed at the downstream manhole of the section being cleaned. Passing materials from manhole section to manhole section, which could cause line stoppage, accumulations of sand in wet wells or damage to pumping equipment, shall not be permitted. All solids or semisolids resulting from the cleaning operation shall be removed from the site and disposed of in a manner and at a site designated by the engineer.

Final acceptance of the cleaning work shall be made upon completion of the television inspection.



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## LATERAL SEALING

A sewer camera is used to position the lateral injection packer at the lateral connection. A D.C. motor rotates the packer to align it with the connection. Air pressure is applied to inflate and extend the grouting plug from the housing into the lateral connection.

The end bladders are inflated and expanded against the mainline pipe wall, thereby isolating the lateral connection. The lateral plug bladder shall extend \_\_\_\_ feet into the service connection for testing and grouting. After testing or grouting, the plug is retracted by vacuum and the two end bladders are deflated. The packer is then pulled to the next lateral connection, where the process is repeated.

## SEALING MATERIALS

Sealing materials shall be a chemical grout and catalyst system having a documented service of satisfactory performance to similar usage.

The materials shall be AV-100, or an approved equal. The equipment employed by the contractor shall be compatible with the requirements of mixing, pumping and placing the specified chemical grouting materials. The materials shall have the ability to accept suspended additives for increased strength.

This material must be agitated to remain in suspension. Equipment which will not properly mix and continuously agitate the solution and suspended additives will not be approved for this project. All mixing and agitation equipment shall be power-operated with variable speed controls.

*The chemical grout shall have the following properties:*

1. A controllable reaction time, from ten seconds to one hour at temperatures from ambient to freezing.
2. It shall be a true solution with a viscosity of 1.2 centipoise (a 10% solution) which remains constant until gelatinization occurs.
3. The ability to tolerate ground water dilution and react in moving water.
4. The final reaction shall produce a continuous irreversible impermeable stiff gel, which is not rigid or brittle.
5. The base solution can be varied by an addition of suspended solids, such as diatomaceous earth (such as Celite 209) or other inactive solids. The effect of additives not specifically mentioned here must be determined by test prior to approval for field use.



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6. A documented service of satisfactory performance in similar usage with an in-place location of over ten years.

AV-100 chemical grout is toxic and may poison by passing through unbroken skin, by inhalation of dust or droplet materials or by swallowing. Therefore, the handling and mixing shall be performed with proper equipment and personnel thoroughly familiar with the chemical involved and in accordance with the provisions of the Occupational Safety and Health Act of 1970 of the U.S. Department of Labor.

The contractors' equipment shall be constructed so that he can furnish representative samples of the grout material at the request of the engineer. These samples shall be used to test the composition of the material and to ascertain that it is in conformance with the specifications. The contractor shall gather the samples under the direction of the engineering packages suitable for shipment to a certified laboratory for analysis. The analysis of the grout samples shall include a certified report of the percentage amount by weight of AV-100, diatomaceous earth, and any other additives which have been specified for this project. All costs for the collection and analyzation of these samples shall be borne by the contractor and shall be considered incidental to other items of work contained in this project. Service lateral sealing shall be measured on a per each basis. Payment will be at the contract price for the bid item "Service Lateral Sealing" for each lateral that is sealed. Payment shall constitute full compensation for all materials, equipment and labor required seal service laterals.

## RESPONSIBILITY OF THE OWNER

*Upon request from the contractor, the owner will furnish at no cost, the items listed below:*

1. Location and exposure of all manholes in the project area.
2. Access to all manholes with sufficient area for the placement of the required equipment and personnel.
3. All necessary water to perform the work from the nearest fire hydrant to the site of the work.
4. Adequate storage area for the contractor's equipment and material.
5. Disposal area for all materials removed from the sewers during the cleaning operations.
6. All local licensing and permits required to perform the work specified.



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## MEASUREMENT AND PAYMENT

Service lateral testing shall be measured on a per each basis. Payment will be at the contract price for the bid item "Service Lateral Testing" for each lateral that is tested. Payment shall constitute full compensation for all materials, equipment and labor required to test service laterals.

Service lateral sealing shall be measured on a per each basis. Payment will be at the contract price for the bid item "Service Lateral Sealing's for each lateral that is sealed. Payment shall constitute full compensation for all materials, equipment and labor required to seal service laterals.

## OWNER'S RIGHTS

The owner reserves the right to accept or reject any or all bids and award the contract to the contractor who, in the owner's opinion, can satisfy all the requirements for these specifications and accomplish the objective of this project, which is to eliminate amounts of ground water and infiltration from the sanitary sewer system.