



# DENVER

## THE MILE HIGH CITY

CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS | ENGINEERING DIVISION

## Storm Drainage and Sanitary Sewer Construction Detail and Technical Specifications

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### 15.0 Manhole Rehabilitation

#### 15.0.1 General

Manhole rehabilitation shall conform to this specification and one of the specific product subsections contained within these detail and Technical Specifications, as specified in the Contract Documents.

The purpose of manhole rehabilitation is to add structural stability to existing brick manholes and to stop infiltration / exfiltration of water/ sewage in the manhole

#### 15.0.2 Preparation

- a. Safe access to the manhole shall be secured using appropriate traffic control devices. Gases within the manhole and associated sewer lines shall be checked for hazardous conditions. A positive flow ventilation system shall be installed to ventilate the manhole during construction.
- b. Prior to manhole barrel rehabilitation, a cover shall be placed over the manhole invert to prevent extraneous material from entering the sewer.
- c. All foreign materials shall be removed from the manhole walls and bench creating a sound surface for product application. Loose and protruding brick, mortar and concrete shall be removed and all voids filled using products specifically designed for that purpose and according to manufacturer's recommendations.
- d. Active leaks into or out of the manhole shall be stopped using mortar, grout or other products specifically designed for that purpose and in accordance with manufacturer's recommendations.

### **15.0.3 Manhole Barrel Rehabilitation**

- a. All loose and broken concrete and brick will be removed from the manhole barrel prior to rehabilitation. No debris shall be allowed to enter the sanitary sewer.
- b. Remove manhole steps by cutting flush with vertical face of manhole wall prior to rehabilitation product application.

### **15.0.4 Manhole Invert Rehabilitation**

- a. All loose and broken concrete and brick will be removed from the manhole invert prior to shaping. No debris shall be allowed to enter the sanitary sewer.
- b. The manhole invert shall be shaped per Wastewater Management Division Standard Detail Drawings.
- c. At a minimum, the material to be used for manhole invert rehabilitation shall be mortar or grout consisting of one part Type II Portland Cement and two parts of fine, clean sand. Only sufficient water shall be added to provide a stiff, workable cement mixture for proper trowelling. Hydrated lime or masonry cement shall not be used. Where thin layers of grout or mortar are to be applied in the manhole invert rehabilitation process, an approved epoxy coating shall be applied to the exposed concrete surfaces prior to grouting.

### **15.0.5 Manhole Testing and Inspection**

- a. During application of the rehabilitation product a wet film thickness gauge shall be used to ensure a monolithic coating with uniform thickness.
- b. The Contractor, at his expense, shall provide all necessary labor, equipment and materials to re-inspect all rehabilitated manholes at two intervals: once at eighteen (18) months after the date of Final Inspection, and once an thirty-four (34) months after Final Inspection. A City and County of Denver representative will schedule the above inspections.