

Metropolitan Sewer District of Greater Cincinnati Wastewater Engineering Division

Wastewater Collection System Supplemental Design Standards for Capital Improvement Program Projects

August 2022

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Capital Improvement Program Projects

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Introduction

These standards are supplemental to the current version of the *Rules and Regulations of the Metropolitan Sewer District of Greater Cincinnati Governing the Design, Construction, Maintenance, Operation and Use of Sanitary and Combined Sewers*. The *Rules and Regulations* are considered “minimum standards” for the design of MSD assets. In addition to these *Rules and Regulations*, the planning and design of collection system assets provided under direction of MSD’s Business & Project Development and Project Delivery Divisions are to incorporate, to the extent practical and prudent, the following requirements.

When, in the opinion of the Planning or Design Professional, it is not practical or prudent to incorporate any of the following requirements, the Planning/Design Professional is required to identify Design Exceptions. During the planning phase, the Business Case Evaluation should list any apparent Design Exception. During the design phase, Design Exceptions are listed on the Title Page of the Construction Drawings. (Refer to page 4 for the Title Page Exceptions note.)

Gravity Sewers

1. Regarding conduit sizes and their corresponding slopes (percentages), refer to Article VI of MSDGC’s Rules & Regulations on the Department’s public website:

[Rules & Regulations for the Metropolitan Sewer District](#)

2. Regarding manhole requirements, refer to Article VI of MSDGC’s Rules & Regulations on the Department’s public website:

[Rules & Regulations for the Metropolitan Sewer District](#)

3. All manholes and junction chambers that will result in a change in flow direction shall be designed to maintain hydraulic efficiency and promote a uniform laminar type flow through the anticipated range of diurnal and peak flows.
4. When no utilities are involved, avoid the use of drop connections. If utilities or existing drop connections are involved, these are considered and approved on a case-by-case basis. While there are many variables to consider, cost may be one of those factors.
5. Precast manhole riser sections and base sections are to have a minimum of 12 inches between wall penetrations (inverts) with a minimum of 50 percent uninterrupted wall area on any horizontal plane.
6. All creek crossings shall be designed in accordance with Section 611 of the rules and regulations.
7. To the extent possible, separation from water mains shall be in accordance with the Ten State Standards Section 38.3 – *Relation to Water Main*.
8. DIP ductile iron pipe is to be provided on all sewer main Jack and Bore sections.
9. Provide cleanouts on proposed laterals at the Right-of-Way or permanent easement (when feasible).

10. Existing sewers to be abandoned that are 12 inches or greater in diameter are to be filled, sealed and abandoned.

Force Mains

1. The use of 90-degree bends to make horizontal or vertical changes in alignment is NOT permitted under any circumstance. Additional manholes are required to limit the changes in flow direction through manholes.
2. To the extent possible, separation from water mains shall be in accordance with the Ten State Standards Section 38.3 – *Relation to Water Main*.
3. Isolation valves are to be installed immediately upstream of all steel casings and aerial crossings.
4. Force Main Discharge Manholes (receiving manholes) and all manholes within 400 feet of the force main discharge are to be equipped with one of the following approved lining systems:
 - a. Reinforced Epoxy Lining Systems (with fiberglass fabric):
 - 1) Protective Liner Systems
 - 2) Epoxytec
 - b. Cured-in-Place Lining Systems:
 - 1) Polytriplex Lining Systems
 - 2) Terre Hill Lining Systems
 - 3) Reinforced CIPMH – Chimney Lining System

NOTE: Manholes less than 400 feet Force Main discharges may be an approved fiberglass manhole, or other H₂S resistant manhole in lieu of coating precast concrete manholes with one of the approved lining systems.
5. Provide an isolation valve and pig-port immediately downstream of each pump station.
6. Provide air release valves at all high points along the force main.
7. Design of air release valves:
 - a. The valve manufacturer is approved by the Wastewater Collection Division on a case-by-case basis.
 - b. Valve sizing software and assistance is to be accessed through the manufacturer's website.
 - c. The valve is to be installed on the Force Main via a full-sized tee with a full port 316 stainless steel ball valve after the tee, but before the air relief valve. All piping components after the tee are required to be 316 stainless steel.
 - d. A key issue in design of the relief point for installation of the air relief valve is the height of the valve. The valve must fit in the valve manhole, or alternatively, the Force Main bury depth must be increased. Contract documents are to require the Contractor to submit shop drawings of the valve manhole with the valve mounted drawn to-scale.

- e. The tee fitting is to be equal to the pipe diameter with a reducer fitting (pipe x air valve size) for connection of the air valve. This requirement does add to the manhole height/depth of bury.
- f. Force main air release valve manholes are to be drained to adjacent sanitary sewers where possible to prevent sewage discharges in the event of air valve failure.

