



ARTICLE X

CONSTRUCTION PROCEDURE

Section 1001 General Construction Specifications

Sewers shall be constructed in accordance with the requirements of the latest editions of the "State of Ohio, Department of Transportation, Construction and Materials Specifications" and the "City of Cincinnati, Supplement to the State of Ohio, Department of Transportation, Construction and Materials Specifications."

Section 1002 Typical Trench for Sewer Pipe

The trenches in which sewer pipe is laid shall conform to the "control dimensions" for Typical Trenches for Conduits, Standard Drawing Accession No. 49032, and the sewer pipe shall be bedded as indicated on that drawing. The trenches shall be backfilled in accordance with the requirements of 603 of the State of Ohio, Department of Transportation, Construction, and Material Specifications.

Excavation around manholes in streets that are paved or are to be paved shall be backfilled in accordance with the requirements of the appropriate public authority. Restoration of existing pavement is to be made in accordance with the requirements of the appropriate public authority.

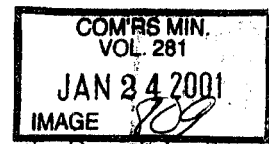
Section 1003 Leakage Tests

All conduits shall be subjected to a leakage check either by an infiltration or exfiltration test with water or by an air test.

- A. The infiltration test allowance, on conduits twenty-seven (27) inches and larger, shall be 0.079 gallon per inch of the internal diameter per 100 feet of conduit per hour. The exfiltration test allowance shall be the same as for infiltration except that an additional allowance of ten (10) percent over the basic allowance shall be allowed for each two (2) feet of head over a basic two foot minimum head.

This test, including furnishing of all appurtenances therefor, shall be performed at the Contractor's expense.

The above infiltration test requirements will continue to be allowed for conduits twenty-seven (27) inches and larger during the first six months these Rules and Regulations are in force, starting with the effective date. After six months from the effective date, infiltration tests will only be allowed for conduits larger than thirty-six (36) inches. All other conduits must be tested by the air test method as required under Item B of this Section.



- B. Air tests on the following sizes of sewers will continue to be performed by the District for the six months after the effective date of these Rules and Regulations. After six months from the effective date, the District will no longer perform air tests, and all air test requirements under Item B of this Section will become obsolete.

The air test, for conduits twenty-four (24) inches and under, consists of inserting plugs in the line, thus isolating test sections between manholes. Air is then admitted to the isolated test section until it is under pressure of 3.5 pounds per square inch. All valves leading to or from the test section are then closed and the air supply line disconnected. The time elapsing before the pressure in the test section drops to 2.5 pounds per square inch is noted and recorded.

The test section shall be considered as having passed the air test if the elapsed time as noted above is equal to or greater than the following times:

- For 8" Conduit 4 Minutes
- For 12" Conduit 5-1/2 Minutes
- For 15" Conduit 7-1/2 Minutes
- For 18" Conduit 8-1/2 Minutes
- For 21" Conduit 10 Minutes
- For 24" Conduit 11-1/2 Minutes

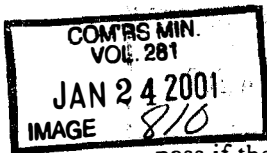
- C. All air tests starting in six months from the effective date of these Rules and Regulations shall be performed in accordance with the latest applicable ASTM or UNI-BELL PVC Pipe Association requirements for each unique pipe material for leakage test requirements and shall be performed at the contractor's expense. An air pressure adjustment shall be made if the groundwater is above the top of the pipe as outlined in the applicable ASTM or UNI-BELL PVC Pipe air test method.

Section 1003-A Deflection Test

Deflection tests shall be performed on all flexible conduits as described in the latest edition of the City of Cincinnati Supplement to the State of Ohio Construction and Materials Specifications.

Section 1003-B Vacuum Testing

The Contractor shall test all manholes leakage by means of vacuum testing. The vacuum testing cannot be done until after the manholes are set to final grade and the manhole castings are bolted down. All lift holes shall be plugged. Any other openings, such as for pressure relief valves, shall be temporarily plugged to allow the vacuum test. All pipes entering the manhole shall be plugged and care shall be taken to securely brace the plugs from being drawn into the manhole. The vacuum equipment test head shall be placed in the opening of the top slab or cone section and the seal inflated in accordance with the manufacturer's recommendations. Vacuum testing shall be in accordance with ASTM C1244. A vacuum of 10 inches mercury (10" Hg) shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine inches mercury (9" Hg). The manhole shall



pass if the time meets or exceeds the allowable times as calculated from ASTM C1244, or as approved by the Engineer.

Section 1004 Temporary Manhole Covers

In the construction of subdivisions or housing developments, the Contractor shall place a temporary manhole cover, Standard Drawing Accession No. 49045, on all sanitary manholes. This temporary cover is to remain in place from the time the manhole is constructed until a permanent casting, Standard Drawing Accession No. 49005, No. 49050, or No. 49051 is placed on the sanitary manhole.

Section 1005 Plug Subdivision Sewer at Point of Connection

Sanitary sewers in subdivisions under construction shall be sealed where they connect to the existing sewers. This work shall be done only in the presence of a District Inspector.

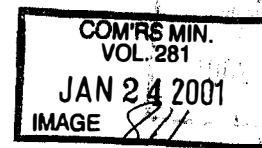
After construction has been completed and the sewers in the subdivision have been inspected, tested and found to be substantially completed and operational by the District, the seal(s) shall be removed by the developer. Again, this work may be performed only in the presence of a District Inspector.

Section 1006 Sewer Tap Permits for Substantially Complete and Operational Sewers

No sewer tap permits shall be issued until (1) the sewer or sewers to be tapped and the wastewater treatment plant, and/or lift station, have been inspected, tested and found to be substantially completed and operational by the District; (2) the engineer for the Developer has furnished to the District a mylar copy of the Development Plan showing all information as required in Section 1007 of these Rules and Regulations; and (3) all applicable requirements of the agreement between the Developer and the Board have been met.

Section 1007 "As Built" Plans

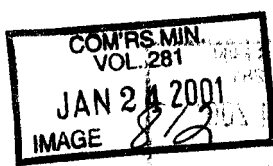
- A. After completion of construction of a wastewater treatment works and before acceptance of the wastewater treatment works by the Board, the Developer's engineer shall furnish to the District complete "as built" plans of these wastewater treatment works; drawn on 24" x 36" Mylar and containing the following information:
1. Elevations are to be referenced to U.S. Coast and Geodetic Survey Triangulation Stations and Bench Marks.



2. A tie-in to the invert of the existing sewer system (except in cases where a temporary wastewater treatment plant or lift station serve to isolate the new sewer system from the existing system). The existing sewer shall be identified by its number.
3. Rim elevation and invert elevation(s) taken at the center of the manhole to the one-hundredth of a foot.
4. Depth of manhole shown shall be the difference between the rim elevation and the mid-point of the trough between influent and effluent inverts.
5. In the case of a drop manhole or a manhole with a pipe entering on a steep grade, elevations should be taken at the center of the manhole, and at a point on the invert that will be most representative of the true grade of the existing pipe. Sketch showing location of elevations and distances should be included with the plans.
6. Distances between manholes to the one-hundredth of a foot taken at the center of the casting.
7. Angles to the nearest minute.
8. Angular ties between existing and new sewers shall be shown on the plans.
9. New distances and angle of a new installed manhole on an existing sewer.
10. Grade of the conduit.
11. Size of the conduit.
12. Pipe material.
13. Lateral locations shall be shown by dimensioning from the downstream manhole at the main sewer and an offset distance to the end of the lateral at the right-of-way or property line.
14. All major changes in location.

This information shall be shown in red ink on the approved plan and profile tracing.

- B. In lieu of the Developer providing the "as built" plans, the Developer may opt to have Metropolitan Sewer District survey personnel provide sanitary sewer "as built" for a fee, as specified in Section 2501. The following procedure will apply:
 1. Once a sewer project passes a final inspection, an "as built" survey will be scheduled and completed within ten working days. All revisions to the improvement plans are to be submitted and approved prior to scheduling.



2. If the survey information proves satisfactory, the "as built" can be processed for approval.
 3. MSD engineering personnel will add the "as built" data to the project mylars.
 4. Immediate notification will be sent in instances where the sewer does not meet the District's minimum grade requirements, as defined in the Rules and Regulations. Additional tap permits will be withheld until this issue is resolved. Disputes that may arise will be resolved through a joint meeting at the job site between MSD engineering personnel and the developer's professional surveyor.
- C. An option must be selected at the time detail plans for a sewer project are submitted. Payment for MSD-provided "as built" is required prior to the issuance of tap permits beyond the allowable 10%.

Section 1008 Prefabricated Wastewater Lift Stations and Treatment Plants

Prefabricated Wastewater Lift Stations and/or Treatment Plants shall be placed on and anchored to reinforced concrete slabs.

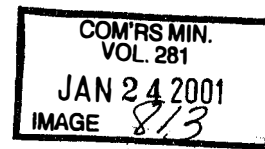
Metal tanks shall be thoroughly protected against corrosion by special corrosion resistant paints and cathodic protection.

Section 1009 Contractor License

All work done on sanitary and/or combined sewers within the jurisdiction of the District must be done by a contractor who is an approved sewer tapper properly licensed and bonded by the District.

Section 1010 Sewer Grade Variance Policy

- A. **GENERAL.** The Metropolitan Sewer District will review and approve all plans for the extension of the public, and private sewer system, prior to issuing authorization to construct. Public and private sewers shall be constructed in strict accordance with the approved plans, to the extent possible. All variations from approved alignments or grades must be identified and submitted to the Director for review, consideration and approval or disapproval prior to acceptance of the sewer extension as part of the public sewer system.
- B. **MINIMUM SEWER GRADES.** The Metropolitan Sewer District has established in its Rules & Regulations minimum sewer grades for each sewer size and for limited service sewer sections based on the required grades to keep solids flowing (minimum cleaning velocities). Sewers installed at less than these minimum grades increase the risk of sewer stoppages and necessitate more frequent cleaning schedules.



- C. REQUIRED SEWER CAPACITY. The Metropolitan Sewer District requires that the sewers be sized and placed on a grade that will provide adequate carrying capacity to serve the total upstream watershed, at full development and at peak flow conditions.

- D. VARIATIONS FROM APPROVED GRADES. Should a sewer be installed at less than the approved minimum grade or critical grade, as defined above, the Metropolitan Sewer District may require the sewer to be relayed at the required grade or increased in size.