

SANITARY SEWER DESIGN NOTES
September 1994

In response to recent inquiries, we offer the following design notes on gravity sewers. These summarize generally accepted design practice, and reflect criteria currently employed by DEQ staff in review of sanitary sewer projects:

1. Erosion Control. Erosion controls should be noted or referenced on all plans for a sewer design. Controls must be adequate to prevent violations of water quality rules, which limit turbidity increases to 10% over background. This may require significant erosion controls on projects near feeder streams, ditch crossings, gullies, waterways, and any steep terrain where vegetative cover will be disturbed. The project engineer is obliged to report water quality violations due to inadequate or failed erosion controls to the nearest DEQ regional office.

The engineer also needs to make sure that there is a 1200-C erosion control permit for every project exceeding 1 acre, and that the contractor adheres to its provisions. Note that the 1-acre permit requirement is based on cumulative project size, not per phase. Incremental phasing under 1 acre cannot be used to avoid 1200-C permitting, so a permit must be obtained as soon as the cumulative area of current and previous phases exceeds 1 acre.

2. Common Sewers. All common sewers must be public sewers. Shared building drains (service laterals) between adjacent lots are discouraged. If allowed by a city, none shall be privately owned or maintained. Any which are accepted by a city shall be provided with recorded public sewer easements.

If a city allows shared building drains between adjacent lots, the city should issue design standards for them showing wye connections instead of tees, cleanout locations, and the public easement width. A width of 15 ft. should be considered the minimum for sewers of normal depth on flat ground.

3. Design Guidelines. The guidelines for design of gravity sewer pipelines published in OAR 340-52, Appendix A, dated January 1981, remain valid and should be followed. Pipe sizing above 8" should be based on anticipated flows and master planning, not minimum slope considerations. At its discretion, a city may waive minimum slope requirements to avoid arbitrary upsizing, provided sewer service can be maintained through the city's commitment to periodic flushing, rodding, etc.
4. Materials, Workmanship, and Testing. Minimum acceptable standards are the 1990 Oregon APWA Standard Specifications, Division III Sanitary Sewers, including drawings, latest edition.

5. Manholes. The following should be covered in the design guidelines for manholes:

- All manholes should be constructed with a drop to self-cleanse. The minimum drop for an outlet at right angles to an inlet of the same diameter should be 0.2 ft.
- All manholes in drainage, gutter, or similar low-lying points outside the crown of the street should be fitted with water-tight gasketed covers.
- All manholes on easement outside travelled rights-of-way such as sidewalks, side-lot, and back-lot areas should be fitted with tamper-proof locking lids. Locking manholes on easement in parking lots or along public roadways could be waived at the city's discretion.
- Connections to existing manholes where no stubout is available should be made with a core drill or concrete saw, never with a jack-hammer. The new invert elevation should conform with 0.8 depth, and a minimum of 0.2 ft above the existing manhole outlet. It will help avoid delays and disputes to add a note by each manhole tap in the plans with words to the effect of " Tap existing manhole by core-drilling or sawing. Install approved commercial boot adapter with latex concrete bonding agent and non-shrink grout per specs. Rechannel manhole base per standard drawing.
- Wherever manholes are to be constructed over existing sewers, the existing pipe material and diameter should be determined in the field and shown on the plans.
- Building drains (service laterals) should be connected to wyes or tees, instead of manholes. At the city's discretion, house connections to new pre-cast manhole bases could be allowed using the specified manhole adapters and casting self-cleansing channels in the pre-cast base. If allowed, house connections per manhole should not exceed 2.
- Preliminary rim elevations for manholes should be shown. Manholes under 6' deep from invert to rim should be flattop to facilitate access for inspection and maintenance.
- Installing toning wire into manholes is discouraged because the holes through each manhole are too often a source of groundwater leakage. Sewer pipe installations between manholes normally do not require toning wire to locate

the sewer or services. Where necessary, commercial metallic tracer tape could be used.

- The manholes on the project should be numbered on both plan and profile, using a consistent system of designation.
- Whether to use or exclude alternative manhole materials such as plastic is the prerogative of the city or district responsible for maintenance of the system, and of the engineer stamping the plans.

6. Manhole Test Procedures. We endorse the provision in the 1990 Oregon APWA standards, Section 306, which requires paving to be completed prior to manhole acceptance testing. However, many cities allow manhole testing after the first lift of asphalt-cement, instead of requiring total completion of all the paving. We have no objection to this practice.

Sometimes postponing manhole tests until paving may be unreasonable, as when bad weather prevents paving for an extended period. Some cities will now test for acceptance prior to paving if the contractor will first anchor the manhole neck and casting with a substantial concrete collar. Collars 12" thick by 6' to 8' square or 6' to 8' diameter have been used. We have no objection to making this accommodation, which may allow the sewer to be placed in service sooner than would otherwise be possible.

7. Existing utilities. Any utilities which overcross or undercross the trenchline should be shown in profile as well as plan view, especially significant hazards such as gas lines, phone lines, power cables, and fibre-optic cables.
8. Easements. For the sake of facilitating future or emergency maintenance work on private property, all existing and proposed sewer easements need to be shown on the sewer plans themselves, in addition to being shown on a plat or overall utility map.
9. Location. All sewer plans need to include a vicinity map to help DEQ staff and others find projects in the field.
10. Plan Review. Unless formally exempted from plan submittal requirements under OAR 340-52-045, all cities must obtain plan approval prior to construction. Submittals should be made by each city and should reflect city approval. Direct plan submittals by developers or their design engineers are discouraged.

Plan submittals should reflect city acceptance of the proposed design. The city's transmittal letter to us should also:

- Summarize the quantities in the project which the city is approving with respect to mainline pipe and number of manholes
- Name the registered person who will be responsible for inspection and certification of construction per OAR 340-52-015 (normally the design engineer)
- Indicate the construction schedule or urgency of the project, so that we can provide a timely and responsive review.

11. Fee Submittal. The technical activities fee should be paid at the time of plan submittal. The fee is \$120 for small gravity sewer extensions consisting of less than 5 sheets of designed sewer plans, excluding cover sheet, overall utility map, and details. The fee is \$420 for major gravity sewer extensions.

NOTE: Review of sewage pump stations is addressed in a separate guideline. Copies are available on request from DEQ regional plan review engineers.

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