

Conventional Gravity Sewers

A conventional gravity sewer system is used to collect wastewater from multiple sources and convey by gravity the wastewater to a treatment plant or other authorized point of discharge. The sewer pipelines are designed so that the slope and size of the pipe is adequate to maintain flow without surcharging manholes or pressurizing the pipe. The collection sewer pipelines are typically eight-inch or larger in diameter. Pipes are installed with sufficient slope to keep the suspended solids moving through the system. If gravity flow is not possible throughout the system, lift stations are installed at lower elevations of the network in order to pump the sewage up to another gravity pipeline. Manholes are installed at regular intervals to provide maintenance access.

Proper maintenance includes periodic line repairs and inspection, cleaning out blockages, and repairing areas where significant infiltration is occurring. Gravity sewers in cluster or small community systems do not include septic tanks for primary treatment on each lot. Thus, the central treatment facility must provide primary treatment.



Advantages

- Conventional gravity sewer systems have been used for many years and procedures for their design are well established. When properly designed and constructed, conventional gravity systems perform reliably.
- Gravity sewers can handle grit and solids.
- Maintaining a minimum velocity can reduce the production of hydrogen sulfide which in turn reduces odors, blockages, and pipe corrosion.

Disadvantages

- The slope requirements to maintain gravity flow can require deep excavations and/or lift stations in hilly or flat terrains, driving up construction costs.
- Manholes are a source of inflow and infiltration, increasing the volume of wastewater to be carried as well as the size of pipes.
- Can be expensive for small communities.

Costs

The cost of a conventional gravity sewer system can vary greatly, based on pipe diameter, excavation depth, total length, restoration and labor. The following costs (January 2020) are typical for various items of a gravity sewer system: PVC pipe (not including excavation and backfill), 8 to 15-inch diameter, \$9-27 per linear foot; concrete manholes, \$1,500 each; trenching, pipe bedding and backfill, \$53 per linear foot.

Common Suppliers

National Rural Water Association Online Buyer's Guide - <http://nrwa.officialbuyersguide.net/>

Source

- United States Environmental Protection Agency – Collection Systems Technology Fact Sheet September 2002, “Sewers, Conventional Gravity” <https://www3.epa.gov/npdes/pubs/presewer.pdf>
- Water Environmental Research Foundation (WERF) – Performance and Cost of Decentralized Unit Processes, April 2010, “Gravity Sewer Systems” http://www.werf.org/c/DecentralizedCost/C1_Gravity_Sewers.aspx

Other Links

- United States Environmental Protection Agency. Pipe Construction and Materials – Technology Fact Sheet https://www3.epa.gov/npdes/pubs/pipe_construction.pdf