

Storm Water Management Using Underground Systems

Source: US EPA "Storm Water Technology Fact Sheet"

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Overview

Storm water management is a focus for the Federal, State and Local Governments and is essential to efforts to assure clean water for drinking, recreation, agriculture, and habitat preservation. One of the major components of storm water management is flow control as well as quality control of the run off from new development, as well as existing roads, parking lots and other impervious areas that have replaced or are replacing open space.

Best Management Practices (BMPs) for management include: retention/detention ponds, wetlands, and underground storage for managing storm water volume control. These capture flow and retain it until it infiltrates into the soil or, alternatively release it slowly over time. Several of these options (stormwater wetlands, and large detention ponds) require large land area. As a result they may be less of an option where land costs are high, or where large tracts of available land is scarce. IN these areas (or as an option in any area) storing storm water on site underground may be a best option. It should be notes that any water volume control system, above or underground, will also require a related filter system so that discharged water is clean and meets current EPA and Wetlands Protection standards and requirements. As a result, BMPs will require both treatment and storage.

Advantages:

- Captures and stores runoff on site thus helping meet requirements to maintain pre-development runoff conditions at newly developed sites.
- Particularly applicable for areas where land is expensive, and there may not be available land for ponds and wetlands.
- These systems can generally be installed quickly.
- These systems are very durable. Most will last more than 50 years once installed.
- Because the water is underground they are not accessed by the public making them safer than above ground systems.
- Because they are underground, they decrease or eliminate the mosquito controls needed in above ground systems.

- Unlike with above ground systems the land over these systems can be used for other purposes such as parking lots, recreation areas etc. This fact may help to or completely offset the additional cost usually associated with underground systems.
- Storm water quality can be addressed by incorporating filtration devices into the system.
- Unlike with above ground systems, annual vegetation clearing is unnecessary.

Disadvantages:

- Depending upon design type underground systems may require more excavation than surface systems.
- Recharge from underground units could contribute contaminated water into the groundwater so will generally need pre-treatment. EPA does not recommend percolation type systems for sites with coarse soils or high groundwater tables. Note: non percolation underground system designs are available.
- These systems can be more difficult to maintain and clean than above ground systems. Access manholes should be included into the design to help offset this issue. In addition, it should be noted that the underground retention/detention systems once installed require very little maintenance. They have no moving parts and remain intact for years. The maintenance required on these systems relates to the quality filtration aspect of a complete system.

There are many underground system designs and materials possible such as: Concrete or steel vaults, concrete, steel or plastic pipes. These systems can be either retention or detention systems and may be used in treatment “trains” which consist of BMPs that provide both storm water treatment and storage.