FILTER MAINTENANCE

Sand filters vs. media filters

Recent flooding in the Midwest brings to mind what a dirty job it is to clean up after a storm. Urban best management practices (BMPs) are designed to bypass floods and treat runoff from the average annual rainfall event—or similar amount depending on local criteria—but these smaller, frequent storms comprise the majority of runoff in urban areas.

Most BMPs are designed to remove sediment in runoff, with some providing removal of dissolved constituents. At some point, a BMP becomes clogged or filled with sediment and must be cleaned. Following a flood or large rainfall, inspectors are always prudent, regardless of the planned maintenance schedule, to check the operational status of the BMP.

Sand and media filters have been accepted as BMPs and generally provide similar performance. Sand filters are comprised of a horizontal bed of sand, underlain by filter cloth/aggregate and a perforated drain pipe, with surcharge storage above the bed. Sediment in runoff is deposited on top of the sand layer. The fine-grained sediment deposit, or smutzdecke layer, eventually occludes the sand and inhibits percolation.

Maintenance of underground sand filters can be difficult. Scraping the surface (minor maintenance) can extend the onset of clogging, but only for a time. Experience has shown that smutzdecke is easier to remove when dry. It cracks and separates as a cake layer that can be scraped. If not allowed to dry, standing water and smutzdecke must be vacuumed along with a sacrificial depth of sand, which must be replaced. Although working in the dry is much easier, getting it dry is problematic. Cleaning the entire sand bed and underdrain system (major maintenance) is necessary about once every five years.

Media filter maintenance is straightforward. Media are contained in rechargeable cartridges; fine particulates and adsorbed constituents are trapped within the media, while coarser materials are deposited in the vault. Spent cartridges can either be lifted out individually, or their contents tipped and vacuumed from the vault. The vault floor is readily accessible for cleaning and replacement of cartridges. Because the system is maintained in the dry, liquid handling is reduced and can be performed on a set schedule without delay during one visit. The cartridge exchange rate varies with mass loading and ranges from one to three years.

Costs for maintenance of an underground sand filter where both minor and major maintenance are represented on an annualized basis are estimated to average approximately $2,000 per impervious acre, according to data reported by the Northern Virginia Planning District Commission.

Maintaining a media filter where maintenance is represented on an annualized basis is estimated to cost approximately $1,000 per impervious acre in Northern Virginia. This number applies to systems with maintenance performed every two to three years.

Practical considerations must be considered as well as costs when addressing maintenance. Many communities see a benefit of media filters over sand filters when it comes to both relative ease and maintenance costs. SWS

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