

**#13 – Maintenance Standards for Sand Filters (BMP MF.01: Sand Filter Basin, BMP MF.02: Sand Filter Vault, BMP MF.03: Linear Sand Filter):**

√	Drainage System Feature	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	Above ground (open sand filter)	Sediment and Silt Accumulation On Top Layer	Sediment and silt depth exceeds one- half inch over 10 percent of surface area of sand filter.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section. Silt scraped off during dry periods using steel rakes or other devices. Surface layer of the media striated.
	Above ground (open sand filter)	Trash and Debris Accumulations	Trash and debris accumulated on sand filter bed.	No trash or debris present. Any trash and debris removed from sand filter bed.
	Above ground (open sand filter)	Sediment/ Debris in Cleanouts	When the cleanouts become full or partially plugged with sediment and/or debris.	No sediment or debris present. Any sediment and debris removed from cleanouts and/or drainpipes.
	Above ground (open sand filter)	Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, flow through the overflow pipes occurs frequently, or hydraulic conductivity is less than 1 inch per hour.	Sand filter infiltrates as designed. Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging and influent suspended solids loads (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). <i>Other options include removal of thatch, aerating the filter surface, tilling the filter surface, replacing the top 4 inches of filter media, and inspecting geotextiles for clogging.</i>
	Above ground (open sand filter)	Prolonged Flows	Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities. (Consider 4-8 hour drawdown tests).	Low, continuous flows are limited to a small portion of the facility by using a low wooden divider or slightly depressed sand surface.
	Above ground (open sand filter)	Short Circuiting	Drawdown greater than 12 inches per hour. When flows become concentrated over one section of the sand filter rather than dispersed. (Consider 4-8 hour drawdown tests).	Flow and percolation of water through sand filter is uniform and dispersed across the entire filter area. No leaks in the cleanouts or underdrains.

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	Above ground (open sand filter)	Erosion Damage to Slopes	Erosion over 2 inches deep where cause of damage is prevalent or potential for continued erosion is evident.	Slopes stabilized using proper erosion control measures.
	Above ground (open sand filter)	Rock Pad Missing or Out of Place	Soil beneath the rock is visible.	Rock pad replaced or rebuilt to design specifications.
	Above ground (open sand filter)	Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter. Rills and gullies on the surface of the filter can indicate improper function of the inlet flow spreader.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
	Above ground (open sand filter)	Damaged Pipes	Any part of the piping that is crushed or deformed more than 20 percent or any other failure to the piping.	Pipe repaired or replaced.
	Below Ground Vault	Sediment and Silt Accumulation on Top Layer	Sediment and silt depth exceeds one- half inch.	No sediment deposits on grass layer of sand filter that would impede permeability of the filter section. Silt scraped off during dry periods using steel rakes or other devices. Surface layer of the media striated.
	Below Ground Vault	Sediment Accumulation in Presettling Portion of Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	No sediment deposits in first chamber of vault.
	Below Ground Vault	Trash/Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatable and non- floatable.	No trash or debris present. Any trash and debris removed from vault and inlet/outlet piping.
	Below Ground Vault	Sediment in Drain Pipes/Cleanouts	When drainpipes, cleanouts become full of sediment and/or debris.	No sediment or debris present. Any sediment and debris removed from cleanouts and/or drainpipes.

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√	Drainage System Feature	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	Below Ground Vault	Clogged Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, and/or flow through the overflow pipes occurs frequently, and/or hydraulic conductivity is less than 1 inch per hour.	Sand filter infiltrates as designed. Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging and influent suspended solids loads (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). <i>Other options include removal of thatch, aerating the filter surface, tilling the filter surface, replacing the top 4 inches of filter media, and inspecting geotextiles for clogging.</i>
	Below Ground Vault	Short Circuiting	Drawdown greater than 12 inches per hour. When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area. (Consider 4-8 hour drawdown tests.)	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Erosion protection added to dissipate force of incoming flow and curtail erosion. No leaks in the cleanouts or underdrains.
	Below Ground Vault	Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
	Below Ground Vault	Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
	Below Ground Vault	Ventilation	Ventilation area blocked or plugged.	Blocking material removed or cleared from ventilation area. A specified percentage of the vault surface area must provide ventilation to the vault interior (see design specifications).
	Below Ground Vault	Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover. Maintenance person cannot remove cover using normal lifting pressure.	Cover repaired to proper working specifications or replaced.

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	Below Ground Vault	Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
	Below Ground Vault	Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of the inlet/outlet pipe.
	Below Ground Vault	Baffles/Internal Walls	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
	Below Ground Vault	Access Ladder	Damaged ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.