

4.4-g HYDRODYNAMIC SEPARATOR

Alternative Names: Vortex Separators, Swirl Concentrators

DESCRIPTION

Hydrodynamic separators remove trash, debris, and some sediment, oil, and grease from stormwater runoff. The units are designed to swirl stormwater in a circular motion, using centrifugal forces to separate and collect heavier pollutants that move to the center of the device where they settle to the bottom. Trash, oil, grease, and other floatable debris are retained in the device with a baffle system.



APPLICABILITY

- Typically applied as a pretreatment device to remove coarse sediment, trash, and other debris from stormwater runoff.
- Certain designs can be installed anywhere that a standard manhole can be installed.
- Connected to an existing or proposed storm drainage system.
- Not considered effective for removal of pollutants of concern for lake clarity.

Advantages

- Useful for retrofit applications to provide additional stormwater treatment.
- When considering the small space requirements of these devices, they are relatively effective for removal of trash, debris, and coarse sediment.
- Most designs do not require confined space entry for cleanout and maintenance.

BMP DESIGN APPROACH

Pollutant Source Control

Hydrologic Source Control

Stormwater Treatment

SCALE OF APPLICATION

All SFR and MFR < 1 acre

MFR 1-5 Acre and CICU < 5 acres

MFR and CICU > 5 acres and all WQIPs

TYPE OF APPLICATION

Temporary

Permanent

- Individual units can be placed in series to provide additional storage capacity for captured material.

Disadvantages

- Typically requires frequent maintenance to remove captured material to avoid re-suspension and transport during subsequent runoff events.
- Cannot remove significant amounts of pollutants of concern for lake clarity (i.e. fine sediment particles and species of nitrogen and phosphorus).
- Units with standing water potentially promote mosquito breeding.

DESIGN CONSIDERATIONS

The following guidelines are water quality design considerations. Refer to applicable drainage design manuals within the responsible jurisdiction for requirements associated with structural integrity, drainage design, public safety, and other factors.

- Size units based on manufacturer's design criteria and guidelines.
- Ensure the unit selected is effective at removal of targeted pollutants.
- Ensure that the peak flow of the design storm event targeted is matched by the treatment flow capacity of the unit, not the hydraulic capacity of the unit.
- Consider hydraulic head loss in the design, which differs by product and model.
- Eliminate access openings to the extent possible for adult mosquitoes.
- Install oil adsorbent materials to capture oil and grease.

INSTALLATION CONSIDERATIONS

Refer to manufacturer's instructions for proper installation guidelines.

INSPECTION AND MAINTENANCE

- Inspect at least twice per year and after significant runoff events.
- Use BMP Rapid Assessment Methodology (RAM) protocols pertaining to treatment vaults to establish benchmark and threshold standard criteria for maintenance and material removal.
- Use a stadia rod to measure the amount of accumulated sediment and material in the device.
- Most units are designed to be cleaned by a vactor truck or functionally equivalent equipment.
- Properly dispose of material and standing water.

EFFECTIVENESS CONSIDERATIONS

Hydrodynamic separators can be effective at removing coarse sediment and debris when properly designed, constructed, and maintained. Hydrodynamic separators are not considered effective for removal of pollutants of concern for lake clarity (fine sediment particles and species of nitrogen and phosphorus). Hydrodynamic separators, when properly maintained, can be successful pretreatment devices that increase the effectiveness of downstream BMPs by reducing loads of coarse sediment and other gross pollutants.