DESIGN GUIDELINE 334443
VORTEX-TYPE HYDRODYNAMIC SEPARATORS

Scope

This Design Guideline pertains to designing and specifying vortex-type hydrodynamic separators for storm water treatment. This guidance does not include conventional gravity separators or coalescing plate separators for storm water or wastewater, often referred to as oil/water or oil/grit separators.

Related Sections

U-M Design Guidelines
DG 3.1 Sustainable Design and LEED Requirements
DG 8.5 Site/Civil Preferred Manufacturers List

Related Documents
Storm Water Management – Post Construction Requirements (EP3-001)
AEC Design Deliverables
Storm Water Management Procedures For Use By Project Team
Southeast Michigan Council of Governments Low Impact Development Manual

Summary

Selection of appropriate storm water best management practices (BMPs) to manage storm water runoff from a site drainage area should follow the required "Storm Water Management Procedures For Use By Project Team". Storm water management planning begins during the pre-design phase with storm water goals and requirements set by the "Storm Water Management Team" consisting of the Project Team and U-M representatives from Environment, Health & Safety (EHS) and Architecture, Engineering & Construction (AEC).

Vortex-type hydrodynamic separators are most suitable for use as a treatment device in constrained storm water retrofit or ultra-urban settings and in areas with a high potential for spills, provided the specified unit is capable of capturing and containing floatable materials, such as oils and fuel. Note that these units are not intended for regulatory secondary containment, but rather, capturing contaminants in runoff from incidental small spills and drips. Storm water BMPs able to provide higher levels of water quality treatment, such as infiltrating or filtering practices, are preferred where feasible.

Design Considerations

If a vortex-type hydrodynamic separator is selected as a component of the storm water management plan, preferably three different manufactured devices and models are to be specified for the project.

Follow manufacturer's recommendations for design including maximum contributing drainage area and peak flow rate to a device.

Assess the drainage area for potential pollutants and typical concentrations when selecting an appropriate storm water treatment device.

An off-line device configuration is preferred to minimize re-suspension of sediment during high flows. If not feasible, the design must include a high flow bypass intrinsic to the device.

If this unit is the only means of treatment from a contributing area for projects required to meet NPDES requirements (ie.>1ac of earth disturbance), it should be capable of meeting UM NPDES treatment goals of at least 80% removal efficiency. Refer to Storm Water Management – Post Construction Requirements (EP3-001).

Consider impact of lead times on project schedule and availability of the device in Michigan.

Maintenance Considerations

The device must be easily accessible for maintenance. During design, seek input from U-M Utilities on maintenance access and the limitations of available maintenance equipment. Document maintenance requirements in the Storm Water Management Plan per the EHS Storm Water Management – Post Construction Requirements (EP3-001).

- Ensure accessibility by U-M Utilities vacuum truck. Consider overhead clearance, width, loading rate, and turn around of access route.
- Avoid positioning the access port(s) beneath parking spots.
- Depth of the bottom of the sump from the vacuum truck pump shall not exceed maximum vertical suction lift (approximately 25 feet).

Submittals

- During the size/model selection process, provide to the Storm Water Management Team in-situ performance testing data. The data should reflect results for drainage areas of a comparable size and land use showing that the device will meet the sediment removal requirements for the target water quality flow rate. Provide a performance curve over the full operating range of that model.
- During installation, verify the location, manufacturer, and model of the installed device, document information on the as-built drawings, and provide drawing to EHS and Utilities for

documentation. EHS will coordinate with U-M Facilities & Operations Information Services (FOIS) to incorporate the device location and attributes into U-M GIS.