



5.3.12 Manufactured Devices (Proprietary Devices)

Description

Manufactured devices are pre-fabricated devices that implement technologies ranging from filtration and adsorption to vortex separation and settling to treat stormwater prior to discharge from a site.

There are many manufactured devices marketed by proprietary vendors to treat stormwater runoff. Common types of manufactured devices include hydrodynamic devices, catch basin inserts, cartridge filters, and biotreatment devices. Manufactured devices provide stormwater treatment with varying degrees of effectiveness.

Manufactured devices are effective as a water quality treatment component of a stormwater treatment system, or treatment train, which includes volume-reducing BMPs.

BMP Functions Table

BMP	Applicability	Volume Reduction	Water Quality	Peak Rate Reduction	Recharge	Runoff Temperature Mitigation	Heat Island	Habitat Creation	Maintenance Burden	Cost
Manufactured Devices*	U/S/R	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H

KEY: U = Urban; S = Suburban; R = Rural; H = High; M = Medium; L = Low

*Ratings vary between manufactured products and their application in design.

Key Design Features

- Hydraulic flow capacity of each manufactured device must match that of design storm event flows to achieve desired performance.
- Incorporate into a stormwater system or treatment train for optimal performance.
- Manufacturer installation, operation, and maintenance instructions must be followed to ensure performance.

Applications

- Roadways, walkways, and parking stalls
- Parking lots





- Playgrounds, plazas, and basketball and tennis courts
- As part of multifamily housing and commercial office areas
- Institutional: schools and university campuses

Advantages

- Can be used in areas with restricted space.
- Can be used in areas with limited infiltration capacity.
- May be engineered to target specific pollutants.

Disadvantages

- Performance is highly dependent on matching hydraulic flow capacity to that of design storm event flow rates.
- Devices are not typically visible and may be “forgotten.”
- More frequent maintenance may be required as compared to traditional technologies.
- Review time may be longer for evaluation of projected performance (third-party verified pollutant removal rates).

Applications

Manufactured devices may be used in urban and suburban environments, on residential, institutional, and commercial properties, and within the public right-of-way. Potential applications include roadways, alleys, sidewalks and paths, plazas, playgrounds, and athletic fields and courts. Manufactured devices may be implemented on virtually any project site if they are designed and constructed to meet the manufacturer’s specifications.

Applicable Protocols and Specifications

The following must be submitted to the City at the time of application: manufacturer specifications; engineering drawings of the assembled device; manufacturer’s installation, operation, repair, and maintenance instructions and recommended schedule; and any other information relevant to the application of the specific manufactured device from the manufacturer. Third-party verification of device performance must also be submitted to the City for review and consideration prior to approval.





Design Considerations for Manufactured Devices

Vendors are continually expanding and updating manufactured devices; design guidance from each applicable vendor should be consulted prior to design. At a minimum, manufactured devices must meet the following criteria:

- Selected manufactured devices must have 80 percent minimum treatment effectiveness for the removal of total suspended solids.
- Selected manufactured devices must not pond water for more than 72 hours following a storm event.
- Selected manufactured devices must not degrade water quality by resuspending floatable debris, or total suspended solids, or by leaching pollutants during subsequent storm events.
- Selected manufactured devices must not be constructed at a depth that is inaccessible by a vacuum truck/hose for cleaning and maintenance.
- Selected manufactured devices must provide a mechanism to bypass flows during storm events that exceed the water quality design peak flow rate for the device.
- Selected manufactured devices must provide a mechanism by which flows may be diverted for isolation of the device during maintenance and repair.

1. Location and Capture Area

Designed properly, manufactured devices may be incorporated on a variety of sites. With regard to hydrodynamic devices, it is important to control inflow rates. To do this, it is crucial to understand the hydraulic capacity of the device and the flow rates from contributing drainage areas.

2. Entrance/Flow Conditions

The primary design consideration for most manufactured devices is the peak rate of runoff entering the device. Devices that rely on vortex separation and/or filtration must be designed with careful consideration of peak rates of inflow into the device.

All manufactured hydrodynamic devices must be located such that inflow velocities do not exceed the maximum treatment flow rate specified by the vendor.

Upstream conveyance structures (pipes, swales, etc.) should be designed to discharge into manufactured devices at velocities no greater than the vendor-recommended maximum flow rate.





3. Freeboard

All manufactured devices must meet vendor construction specifications, including sump and freeboard requirements.

4. Management of Sediment, Trash, and Debris

Manufactured devices must not degrade water quality by resuspending floatable debris or total suspended solids or by leaching pollutants during subsequent storm events. Careful hydraulic design and diligent maintenance are required for ensured performance of manufactured devices.

5. Storage and Stay-on-Volume

Manufactured devices designed to treat runoff through filtration and/or settlement must carefully consider storage capacity and discharge velocity to ensure water is retained in the device for an appropriate length of time to allow for pollutant removal.

6. Overflow

All manufactured devices must be capable of conveying larger storms without resuspending floatable debris and/or accumulated sediment.

7. Water Quality/Total Suspended Solids

Manufactured devices must have an 80 percent minimum treatment effectiveness for total suspended solids (at the flow rate specified, when applicable), and be certified by an independent, third-party testing laboratory prior to consideration by the City. All manufactured devices should be field tested (laboratory testing of field-collected samples) and monitored after installation to ensure achievement of 80 percent total suspended solids removal.

Construction Considerations

All manufactured devices must be constructed in accordance with vendor-recommended construction specifications.

Operations and Maintenance

Operation and maintenance of manufactured devices must be performed in accordance with vendor-recommended construction specifications.





Specifications

A copy of all relevant vendor specifications must be submitted to the City prior to stormwater management plan approval.

