Chester County Stormwater BMP Tour Guide

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BMP: **Stormceptor®**

Site Name: Phoenixville Plaza, K-Mart Site

Location: Boro of Phoenixville, ADC Map Coordinates: 15-B5
Directions: Northwest quadrant of the Route 23 and Route 113 intersection.

Watershed: French Creek (Stream Designation: HQ-TSF-MF)

Land Use: Commercial Strip Shopping Center

Description: A Stormceptor® is a pre-fabricated concrete structure designed to remove free oil (i.e., hydrocarbons) and suspended solids (i.e., sediment) from stormwater runoff. At this site, nearly 90 percent of the parking lot runoff and all of the stormwater from roof downspouts flow through a single stormceptor®. The stormceptor® at this site is an in-line stormwater treatment structure employed in lieu of a stormwater basin. Stormwater enters the structure through an underground stormwater conveyance pipe and discharges through a conventional outfall pipe into an adjacent wetland. (Space constraints and subsurface contamination from the previous land use influenced the decision to install a stormceptor® at this site in lieu of a stormwater basin.)

The stormceptor is a mechanical device that uses physical structural components to remove pollutants present in stormwater runoff. Stormwater enters the stormceptor® through its upper compartment. During typical storm events, a weir directs the flow from the upper chamber down through an opening (orifice) into the lower chamber, or the treatment chamber, where pollutants present in stormwater runoff are filtered. Pollutants, including sediment and other heavy particles, are acted upon by gravity causing them to settle to the chamber bottom where they are trapped. Pollutants lighter than water, including oils, grease, and other floatables, accumulate at the top of the treatment chamber. Filtered stormwater flows up and out of the treatment chamber through a second orifice and is discharged from the stormceptor®.

A stormceptor® is sized to fit each site with consideration to local hydrology and anticipated pollutant particle type and distribution. By design, a stormceptor® treats stormwater runoff from typical storm events removing pollutants from the “first flush” when the majority of pollutants are believed present in stormwater. During low flow conditions, stormwater flowing into the structure enters the treatment chamber where pollutants are removed. During high flow periods (i.e, large storm events), the stormceptor® treatment chamber is by-passed by design to prevent the re-suspension of accumulated pollutants.

A stormceptor® can be used on highly developed sites and in urban areas where land is limited. They can replace or supplement other more space-consuming BMPs (i.e., basins). For example, a stormceptor® may be designed to take the place of a forebay performing the function of removing first flush pollutants to minimize the migration of pollutants into downstream structures (i.e., basins) and areas (i.e., wetlands).

SITE 15

Functions: A stormceptor® is a treatment BMP. A stormceptor® is designed to remove common parking lot runoff pollutants for the average size storm event (i.e., often called first flush pollutants), but does not remove pollutants present in runoff from large storm events.

- Removes sediment and heavy particles in stormwater runoff
- Removes oil and other liquids lighter than water from stormwater runoff
- Removes stormwater runoff pollutants in places where these pollutants are prevalent (i.e., parking lots, loading bays)
- Can supplement or replace other more space-consuming stormwater management structures
- Avoids the problem typical in older traditional oil-water and oil-grit separation structures by providing by-pass opportunity in periods of high flows

Functioning as designed, the manufacturer claims this structure has the following pollutant removal efficiencies:

- Total Suspended Solids (TSS): 80%
- Oil (and other floatables): 90% - 95%
- Total Phosphorus: 10% - 30%
- Total Nitrogen: 40% - 60%
- BOD* lowering capacity: 15% - 25%
  (* BOD is Biological Oxygen Demand)

Operation and Maintenance: The Chester County Conservation District considers a stormceptor® to have moderate to high maintenance requirements. Operation and maintenance requirements include the following:

- Requires routine inspection and maintenance
- Manufacturer recommends at least an annual cleaning and after spills
- Accumulated sediment and oil can be removed from the stormceptor® by accessing the system via the manhole at the surface. A standard vacuum truck can vacuum out floatables and solids from the street level. Pollutant removal maintenance must be performed at a frequency that coincides with the rate at which pollutants accumulate in the structure. At this site, a manhole to the subsurface stormceptor® is located on a walking path which provides easy truck access for clean out.

Cost Factors: A stormceptor® can range in cost from $ 4,500 to $ 65,000, depending upon unit size. In terms of value, a stormceptor® offers quality control with minimum land area requirements. A cost comparison, therefore, should consider the minimal land requirements of this compact structure compared to alternative structures (i.e. stormwater pond) that would have greater land requirements. Another cost consideration in light of the requirement that an impervious asphalt cover was needed at this site to control migration of subsurface pollutants from prior land uses; is that, this device allowed the development of the site in this way.

Other Site BMPs

Oil-Grit Separator. A conventional oil-grit separator is employed on site to clean stormwater runoff from a small loading bay behind K-Mart. An oil-grit separator is an underground chamber specially designed to remove oil and grease as well as some sediment from stormwater runoff. Oil-grit separators require frequent maintenance to remove accumulated pollutants, since during periods of high flow, accumulated pollutants have the potential to be flushed out of the chamber and discharged.

For More Information

Designer:	Carroll Engineering (610) 489-5100 (Tom Yuhas)
Manufacturer/ Supplier:	Evans Associates (724) 327-3400 (Andrew Virostek) Camtek Construction Products Corporation, Rinker Manufacturing
Site Contact:	Robin McGill (610) 902-3042

References

Center for Watershed Protection, *Approaches to Stormwater Treatment*, Copyright 2001.

Pennsylvania Handbook of Best Management Practices for Developing Areas, Prepared by CH2MHILL, Spring 1998.

Website: http://stormceptor.com

Site 15 - Phoenixville Plaza - Stormceptor ®

Manhole access to stormceptor® chamber below ground.

Stormceptors filter pollutants common in runoff from commercial parkng lots (designed to capture “first flush”).

Wetland area behind site manages stormwater and provides riparian buffer for French Creek and wildlife habitat