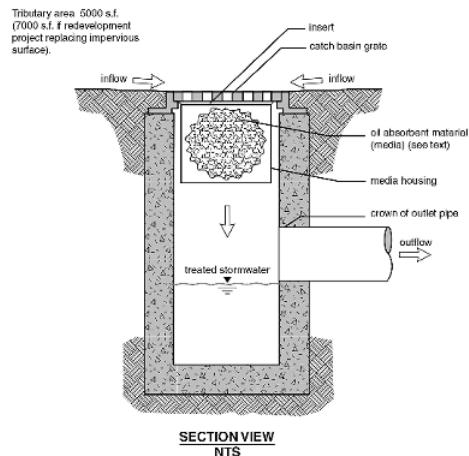


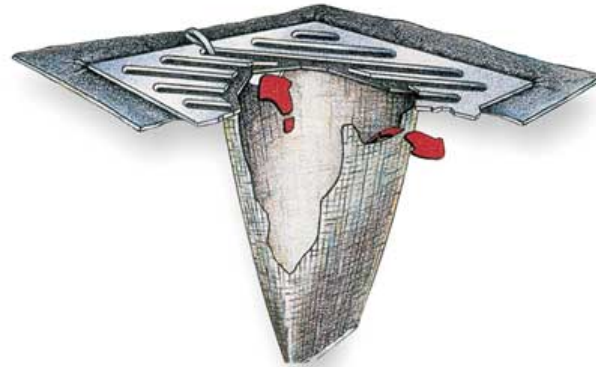
Catch Basin Inserts

Minimum Measure: Post Construction Stormwater Management in New Development and Redevelopment

Subcategory: Filtration



The typical design of a catch basin insert is a set of filters that are specifically chosen to address the pollutants expected at that site (Source: King County, Washington, 2000)



Description

Catch basins, also known as storm drain inlets and curb inlets, capture and convey surface runoff to the storm drain system. They typically include a grate or curb opening to intercept the runoff, an outlet pipe, and a sump to capture sediment, debris, and pollutants. The effectiveness of a catch basin to remove sediments and other pollutants, depends on its design (e.g., the size of the sump) and on maintenance procedures to regularly remove the accumulated sediments.

Inserts designed to remove oil and grease, trash, debris, and sediment can improve the efficiency of catch basins. Some inserts are designed to drop directly into existing catch basins, while others may require retrofit construction.

Applicability

Though they are used in drainage systems throughout the United States, many catch basins are not ideally designed for sediment and pollutant capture. Catch basins are best used as pretreatment to another stormwater management practice. Retrofitting existing catch basins may substantially improve their performance. A simple retrofit option is to ensure that all catch basins have a hooded outlet to prevent floatable materials, such as trash and debris, from entering the storm drain system. Catch basin inserts for new structures and retrofits on existing units may be preferred when available land is limited, as in urbanized areas.

Limitations

Catch basins have three major limitations:

- Even ideally designed catch basins cannot remove pollutants as well as structural stormwater management practices, such as wet ponds, sand filters, and stormwater wetlands.

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- Unless frequently maintained, catch basins can become a source of pollutants through re-suspension.
- Catch basins cannot effectively remove soluble pollutants or fine particles.

Design Considerations

The performance of catch basins is related to the volume in the sump (i.e., the storage in the catch basin below the outlet). The following is an "optimal" sizing criterion, which relates all catch basin dimensions to the diameter of the outlet pipe (D):

- The diameter of the catch basin should be equal to 4D.
- The sump depth should be at least 4D. This depth should be increased if cleaning is infrequent or if the area draining to the catch basin has high sediment loads.
- The top of the outlet pipe should be 1.5 D from the bottom of the inlet to the catch basin.

Several varieties of catch basin inserts exist for filtering runoff. One insert option consists of a series of trays, with the top tray serving as an initial sediment trap, and the underlying trays composed of media filters. Another uses filter fabric to remove pollutants from stormwater runoff. Yet another option is a plastic box that fits directly into the catch basin. The box construction is the filtering medium. Hydrocarbons are removed as the stormwater passes through the box while trash, rubbish, and sediment remain in the box itself as stormwater exits. These devices have a very small volume, compared to the volume of the catch basin sump, and would typically require very frequent sediment removal. Bench test studies found that a variety of options showed little removal of total suspended solids, partially due to scouring from relatively small (6-month) storm events.

Maintenance Considerations

Typical maintenance of catch basins includes trash removal if a screen or other debris capturing device is used, and removal of sediment using a vactor truck. Operators need to be properly trained in catch basin maintenance. Maintenance should include keeping a log of the amount of sediment collected and the date of removal. At a minimum, catch basins should be cleaned once or twice per year.

In some regions, it may be difficult to find environmentally acceptable disposal methods for collected sediments. The sediments may not always be land-filled, land-applied, or introduced into the sanitary sewer system due to hazardous waste, pretreatment, or ground water regulations. This is particularly true when catch basins drain runoff from hot spot areas.

Cost Considerations

The true pollutant removal cost associated with catch basins, however, is the long-term maintenance cost. Typical vactor trucks can store between 10 and 15 cubic yards of material, which is enough storage for three to five catch basins with the "optimal" design and an 18-inch inflow pipe. Assuming semi-annual cleaning, and that the vactor truck could be filled and material disposed of twice in one day, one truck would be sufficient to clean between 750 and 1,000 catch basins.

Retrofit catch basin inserts range from as little as \$400 for a "drop-in" type to as much as \$10,000 or more for more elaborate designs.