

Portland Harbor Catch Basins

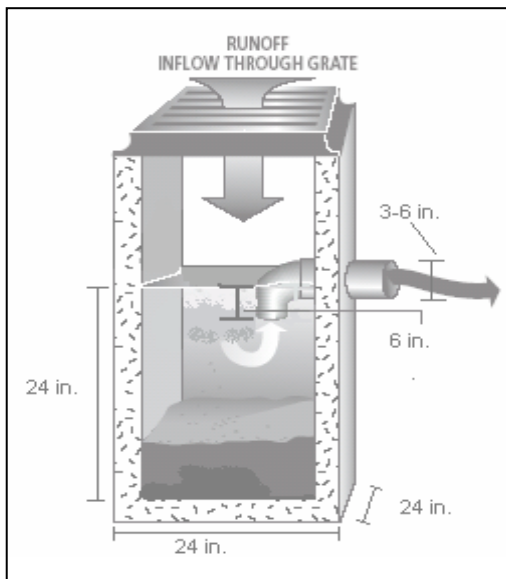
The purpose of this fact sheet is to provide basic information on catch basin design, effectiveness, and sediment sampling.

A catch basin is an inlet to a storm drain system that typically includes a grate where stormwater enters, and a sump to capture sediment, debris, and associated pollutants.

Catch basins are designed specifically for capturing and conveying stormwater. It is important to note, that although catch basins often have sumps for the collection of sediment, the actual design specifications and placement of catch basins are not based on expected sediment load.

Design

Trapped catch basins, commonly referred to as “Lynch-style” catch basins, are constructed of concrete, cast iron, or steel. According to the 1997 City of Portland *Uniform Plumbing Code* §1108.0 - .5, catch basins must adhere to the design specifications in the drawing below:



Standard “Lynch-style” catch basin

Typically, on private commercial/industrial sites, there is no standard for the placement of catch basins. Stormwater drain systems are often installed based on the best professional judgment and experience of the design engineer.

The estimated peak stormwater flow rate dictates the number of catch basins needed on a site. The

percent impervious surface, slope, average rainfall, and rainfall intensity are all factors in calculating the peak flow rate.

Catch basins are designed to hold water below the ¼ bend outlet pipe, or “elbow pipe.” The pipe is also referred to as a 90 degree invert. The standing water allows some larger sediments to settle out. Any oil or grease washed into the basin will float to the top of the water level, above the elbow pipe. The catch basin is only effective for oil and grease separation if the water level is maintained above the elbow pipe intake.

Effectiveness

There are several factors that contribute to the capture efficiency of catch basins. These include catch basin placement, catch basin design (e.g., sump size); maintenance frequency (e.g., sediment removal), flow rate, pollutant loading, and particle size.

The sump in a catch basin captures settleable solids under low flow conditions. According to information obtained from EPA, catch basins are typically best at removing particles greater than 0.04 inches (approx. 1mm in diameter). They are not designed to remove total suspended solids (TSS) or soluble pollutants.

There is limited data on the effectiveness of “Lynch style” standard catch basins to capture TSS. Several studies indicate TSS may be reduced by about 20% in some catch basins.

Resuspension and discharge of sediments previously collected in a catch basin is a potential problem during large storm events or “first flush” scenarios.

Catch basin efficiency can be improved by frequent maintenance, implementation of best management practices (BMPs) or with the use of catch basin inserts, as discussed below.

Maintenance: Maintaining catch basins is critical to their effectiveness. Catch basins should be cleaned when the amount of sediment is greater than 1/3 the distance between the bottom of the basin and the water line. It is recommended that catch basins draining industrial areas be cleaned once per month or more frequently if sediment accumulates above



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the 1/3 threshold. A study of 60 catch basins draining industrial land in Alameda County, California showed that monthly cleaning of industrially used catch basins increased the total pounds of collected sediment from 30 lbs. when cleaned annually to 180 lbs. when cleaned monthly. For more information on catch basin maintenance, see the City of Portland's fact sheet titled, "Maintaining Catch Basins" at: <http://www.portlandonline.com/shared/cfm/image.cfm?id=71693>

Best Management Practices: Implementation of BMPs, such as frequent sweeping, covered material storage areas, etc. will help reduce potential sediment and pollutant loading. BMPs recommended by DEQ are available on our website at: www.deq.state.or.us/nwr/Industrial%20BMPs.pdf

Catch Basin Inserts: Sediment and pollutant loading can be reduced using catch basin inserts. Many different styles of catch basin inserts are available. Some provide oil absorbent strips while others just provide sediment capture (e.g., filtering). Generally, the capacity of inserts is much less than that of the actual basin, which means more frequent maintenance. The advantage to using inserts is that a greater amount of sediment (settleable solids and TSS) is expected to be captured. In addition, the maintenance is much simpler since most inserts can be removed and disposed of by hand. It is recommended that inserts without overflow slots be used to provide for maximum efficiency. The method of sediment disposal depends on whether the captured sediment is contaminated. See DEQ's fact sheet "How to Determine if Your Waste is Hazardous" <http://www.deq.state.or.us/wmc/hw/factsheets/HowDetermineHazWaste.pdf> for more information.



Catch Basin Insert

Stormwater Management Manual

All projects within the City of Portland, including industrial sites, developing or redeveloping over 500 square feet of impervious surface, or existing properties proposing new stormwater discharges off site are subject to the requirements of the Bureau of Environmental Services (BES) Stormwater Management Manual (SWMM). The SWMM requires 70 percent removal of TSS for 90 percent of the average annual runoff.

A site may achieve 70 percent removal of TSS by many different means. Please refer to the 2004 BES SWMM for more details.

<http://www.portlandonline.com/bes/index.cfm?c=35122>

Catch basin sediment sampling

Catch basin sediment sampling is typically required at Portland Harbor upland sites to help characterize and evaluate the stormwater pathway and to determine if source control measures are required to prevent contaminants from impacting the river and its sediments. Catch basin sampling is required to provide a time-integrated sample of contaminants that may be or may have been transported to the river. Catch basin sample analyses should be based on a comprehensive review of potential contaminant sources, available in-water sediment data, and other available data. Sampling should be conducted in accordance with a DEQ approved work plan and BES sampling guidelines.

Considerations when assessing catch basins:

- The presence and size of the sump;
- The outlet location and type;
- The pollutant loading potential of the area drained;
- The use of catch basin inserts and frequency of replacement;
- The schedule of catch basin maintenance;
- Other BMPs the facility has implemented; and
- Available stormwater monitoring data and catch basin sediment data.

Alternative formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at (503) 229-5317, or toll-free in Oregon at 1-800-452-4011.

