



Catch Basin Inspection Alternatives for Phase I and II Municipal Stormwater Permittees

Introduction

Washington’s Phase I and Phase II Municipal Stormwater Permits (permits) require inspection and regular maintenance of catch basins and inlets¹ owned or operated by permittees. This focus sheet explains the catch basin inspection options in the permits and provides examples. This focus sheet will help permittees:

- Understand their catch basin inspection permit requirements.
- Review the four options each permittee has for implementing catch basin inspections.
- Select a catch basin inspection implementation approach (or approaches).



Vector truck crew cleaning out a catch basin.

Benefits of catch basin inspection and maintenance

Catch basins have been in use nearly as long as modern storm drainage systems to prevent conveyance pipes from becoming clogged with debris and sediment. Catch basins act as the “first line of defense” by trapping and removing leafy debris, trash, and sediments from stormwater, thus preventing them from entering surface and ground water.

Several studies from around the country² have demonstrated the water quality benefits of regular catch basin maintenance. Kitsap County, a Western

Washington Phase II permittee, reported removing 1,200 tons of material from catch basin sumps, vaults, stormwater ponds and streets in 2010. The majority, 962 tons, came from the catch basins and

¹ The term “catch basin” in this document also includes inlets.

² USEPA Catch Basin Fact Sheet:

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=77&minmeasure=5

vaults. Sediment sampling indicates that this equates to removing roughly 800 pounds of toxic metals (copper, lead, and zinc), nine pounds of polycyclic aromatic hydrocarbons (PAHs), and 290 gallons of oil³. This is just one year of maintenance from one of over 100 Washington State permittees.

To maintain proper catch basin functions, permittees need to regularly inspect catch basins and remove the buildup of materials when needed. Inspections also allow permittees to identify and address potential structural and functional issues early. This proactive effort helps prevent small problems from developing into costly, time-consuming repairs.

Catch basin inspection timelines

Washington State municipal stormwater permits establish timelines for catch basin inspection requirements. The default requirements are:

- *Phase I Permit* (S5.C.9.d): Inspect all catch basins annually.
- *Western Washington Phase II Permit* (S5.C.5.d): Inspect all catch basins once no later than August 1, 2017 (except City of Aberdeen by June 30, 2018) and every two years thereafter.
- *Eastern Washington Phase II Permit* (S5.B.6.a.ii (b)): Inspect all catch basins at least once by December 31, 2018, and every two years thereafter.

These inspection timelines (referred to as the standard approach in this document) may be adjusted using the alternatives discussed below.

Options for implementing catch basin inspection requirements

Given the wide variability in municipal separate storm sewer system (MS4) configurations and pollutant loading potential, each permit contains four options for inspecting catch basins and inlets:

1. A *standard approach* of inspecting all catch basins and inlets within the MS4 (frequency is set by permit—either annually or every two years).
2. Establishing a specific, *less frequent schedule* based on documented evidence.
3. Identifying *circuits* (see explanation of circuits on page 4) and inspecting 25 percent of the catch basins within each circuit (frequency set by permit—either annually or every two years).
4. Cleaning the *whole system*, including all pipes, ditches, catch basins, and inlets within a circuit once during the five-year permit term, where the circuit drains to a single discharge point.

Permittees may choose to implement one of the four inspection options for the entire MS4, or implement different options for different portions of the MS4. The permit does not require that



Vactor truck crew cleaning out a catch basin.

³ Kitsap County: www.kitsapgov.com/sswm/pdf/7007.pdf

Ecology ‘approve’ a permittee’s switch to a less frequent or different inspection schedule or approach. Still, the permittee must be able to explain why a less frequent or different inspection schedule is appropriate in certain areas, and must document and report the change in the Annual Report.

The following are detailed descriptions of the four catch basin inspection options:

1. *Standard Approach*

With this approach, permittees inspect all catch basins they own or operate according to default permit timelines (described above). Permittees maintain those found out of compliance with applicable maintenance standards.

2. *Documentation of a Less Frequent Schedule*

Under this option, permittees consult maintenance records or documented maintenance experience to determine a specific, less frequent inspection schedule that will reliably track the condition of the catch basin without exceeding the maintenance standards. For example, maintenance records may document that for a portion of the MS4, the rate of sediment accumulation is equivalent to 10% per year. At this rate of sediment accumulation, it would take six years to reach the sediment height of 60% full. If, for this community, the maintenance standard triggers cleaning at 60% full, then less frequent inspections (e.g., every three years) are entirely appropriate.



Catch basin inspection for depth of sediment accumulation.

Permittees choosing this option must have maintenance records for double the length of time of the proposed inspection frequency. Examples of how to use this option include:

- A Phase I permittee, currently required to conduct annual inspections of catch basins, is planning to inspect once every two years. In this case, the permittee will need at least four years of annual inspection records showing that maintenance was not needed to demonstrate that the proposed two-year inspection schedule is appropriate for the area where it will be implemented.
- A Phase II community hoping to reduce the inspection schedule to once every three years will need to conduct three rounds of inspections (every two years covering six years total), with all inspections showing that the catch basins in the area did not exceed maintenance standards.
- A Phase II permittee with detailed maintenance records that go back to before 2007 could use that data to justify a four year inspection schedule prior to 2015 if the records adequately document that maintenance standards were not exceeded.

The *Less Frequent Schedule* option can only be applied to catch basins with maintenance records of physical inspections or as described in the paragraph below. Documented evidence from the subset of catch basins inspected on the circuit basis cannot be used to justify a less frequent inspection schedule for all the catch basins in the circuit.



Vactor truck crew dislodging accumulated catch basin solids during cleaning.

In the absence of maintenance records, permittees may submit a written statement to Ecology to document a specific, less frequent schedule. Permittees must base the written statement on actual inspection and maintenance experience. Permittees must certify the statement in accordance with G19 Certification and Signature of the permit, which requires a duly authorized representative to certify that the information is “true, accurate, and complete” under penalty of law.

3. Circuit Inspection Approach

Some permittees have found that sediment accumulation and the need for maintenance varies within the MS4 based on traffic volumes, land use, topography,

street maintenance practices, or the configuration of the MS4. For example, catch basins in an established residential area with low traffic volumes and gentle slopes may accumulate sediment more slowly than catch basins in a high traffic volume commercial or industrial area. Similarly, catch basins along primary arterials and maintained snow routes are likely to experience increased rates of sediment accumulation. For certain areas, especially those with lower sediment accumulation rates, the ‘circuit inspection approach’ may be a useful alternative to the standard approach.

The ‘circuit inspection approach allows permittees to target inspection of certain catch basins within areas that either drain to a single point or that have similar rates of accumulation and similar maintenance needs.

According to the Definitions and Acronyms section of each permit, “A circuit means a portion of a MS4 discharging to a single point or serving a discrete area determined by traffic volumes, land use, topography, or the configuration of the MS4.” Circuits may vary in size and maintenance needs. The simplest type of circuit is a set of connected facilities that drain to a single point.

Permittees using the ‘circuit inspection approach’ must inspect a minimum of 25 percent of catch basins within a circuit, including the catch basin immediately upstream of any system outfall (within their jurisdiction). Defining a circuit with similar maintenance patterns is critical to allow a “sampling” of a limited number of catch basins to determine conclusions about all catch basins in the circuit. If the circuit is truly similar, then any 25 percent of catch basins should produce a sample that determines whether widespread maintenance within the circuit is needed.

Ecology reminds permittees using the ‘circuit inspection approach’ that they are responsible for ensuring that the catch basins they do not sample meet the program objective of reducing pollutants. During the first few circuit inspections, Ecology encourages permittees to conduct quality control by inspecting additional catch basins outside of the 25 percent sample to ensure the sample is actually representative of the circuit. Establishing the circuit and conducting quality control assures the jurisdiction that its ‘circuit inspection approach’ will work. If there are significant changes to the traffic, land use activities, or other factors, Ecology encourages the permittee to revisit the circuit delineation and adjust it accordingly.

Permittees employing the ‘circuit inspection approach’ can expect to encounter a variety of situations, and should rely on knowledge of their MS4 and best professional judgment to evaluate the next steps. The following are examples of some of the results and preferred responses to sampling results:

- If none of the inspected sampling of catch basins indicates that maintenance is needed, there is no need to inspect additional catch basins within the circuit.
- If all of the inspected catch basins within the circuit indicate that maintenance is needed, inspect all remaining uninspected catch basins within the circuit and perform all necessary maintenance.
- If the circuit inspection yields highly variable results (i.e., some catch basins exceed the maintenance standard while others do not), re-evaluate the ‘circuit inspection approach’ as applied to this area. For example, the circuit may need to be redrawn or the ‘circuit inspection approach’ is not appropriate for this area of the MS4.

The following examples illustrate the types of situations that may require further actions or evaluation:

- When an inspected catch basin in a circuit that drains to a single point exceeds the maintenance standard, inspect (and where needed, maintain) catch basins up-gradient of the initial inspected catch basin, beginning with the nearest catch basin. Continue inspecting up-gradient, following each branch within the circuit until reaching catch basins that represent the remaining up-gradient circuit which do not need maintenance.

How Does the Circuit Inspection Approach Work with Asset Management?

Asset management of the MS4 combines regular monitoring, adaptive management, financial considerations, sound engineering practices and other policies and procedures to provide the best and most cost-effective level of service to physical assets such as catch basins. It involves inspecting the structural defects of the catch basin to manage repairs or replacement. Maintenance standards for structural defects include checking the catch basin cover, frame, walls, bottom, or inlet/outlet pipes for cracks, fractures, settlement, or vegetation growth. Stormwater managers using the circuit sampling approach will develop other approaches to evaluate the structural function of catch basins that are not inspected as part of the sample. One cost-efficient option is to coordinate the structural evaluation with illicit discharge inspections. Structural inspections may need to be more frequent in areas of older infrastructure than in areas of new infrastructure.

- For circuits defined by similar traffic or land use conditions in which catch basins are not connected to each other, when an inspected catch basin exceeds the maintenance standard, inspect (and where needed, maintain) all remaining uninspected catch basins with the circuit. If the remaining, uninspected catch basins do not need maintenance, then evaluate why these differences in maintenance needs exist. Are there are other explanations for excess sediment, such as a nearby construction site that discharged sediment-laden runoff during a recent storm event? Or, does the discrepancy indicate that the circuit is not similar enough to support this approach?

Pierce County has integrated circuit-based inspections into their asset management program. Pierce County Road Operations (PCRO) performs annual inspections of over 4,000 circuits. Catch basins are inspected beginning with the most downstream catch basin in the circuit. Inspections proceed upstream until three up-gradient catch basins in every applicable direction are found that do not trigger maintenance per the standards, or until all catch basins in the circuit are inspected. For compliance with the 2013-2018 Phase I permit, the County will also need to assure that a minimum of 25 percent of the catch basins in each circuit are inspected.

4. Whole System Cleaning of a Circuit

Recent efforts by some Phase I permittees have demonstrated the water quality benefits of cleaning all pipes, ditches, catch basins, and inlets within a circuit that drains to a single point. Particularly in older portions of a MS4, contaminants from historical activities may have accumulated in cracks, crevices, low spots, or other areas within the conveyance system prior to the requirements for stormwater source controls and routine maintenance. For such areas, cleaning the whole system within the circuit one time during the permit cycle may make the most sense. Inspection and maintenance to address structural issues may still be needed.

The City of Tacoma recently conducted a study that showed statistically significant reductions in pollutants discharged from the MS4 following circuit-based whole system cleaning. Pollutants monitored included total suspended sediments (TSS), lead, zinc, and PAHs (including both light and heavy PAH fractions), and bis(2-ethylhexyl)phthalate (DEHP). For more information on this study, see the City of Tacoma's webpage (www.cityoftacoma.org/Page.aspx?hid=8096) for Section S8.E Program Effectiveness reports.

Permittees that implement this option will clean their whole system (within a circuit that drains to a single point) once during the five-year permit term. This may significantly reduce the inspection level of effort, which might otherwise occur annually or every other year. Permittees often combine whole system/circuit cleaning with structural inspections. Doing so may lead to early detection and rehabilitation of failing conveyance systems. Removing legacy pollutants from the MS4 and rehabilitating failing conveyances have the potential to significantly improve water quality.

Selecting the best options for the MS4

Ecology recommends the following steps in selecting which approach to apply to different portions of the MS4:

- *Review* system maps and maintenance records for areas with documentation to support a less frequent schedule, to identify areas of similar maintenance patterns for the circuit inspection approach, or to look for opportunities for whole system cleaning.
- *Delineate* areas for the less frequent inspection, the circuit inspection approach, or whole system cleaning.
- *Document* which catch basin approach is being applied in any portion of the MS4, and why. This information must be reflected in the Annual Report submittal.



Vector truck dumping its load at a decant facility for proper waste handling.

Catch basin maintenance timelines

The permits require permittees to establish catch basin maintenance standards. Compliance with these standards helps keep catch basins functioning as designed, removes pollutants, and prevents re-suspension of pollutants during wet weather events. Permittees must at a minimum base these maintenance standards on the guidance in Chapter 4 of Volume V (Pages 4-37 through 4-38) of Ecology's 2012 *Stormwater Management Manual for Western Washington* (SWMMWW) or Chapters 5, 6 and 8 of the *Stormwater Management Manual for Eastern Washington* (2004) or another technical manual approved by Ecology. The guidance lists conditions when maintenance is needed and the results expected when maintenance is performed.

If an inspection identifies an exceedance of the maintenance standard, the permittee must conduct maintenance. Unless there are circumstances beyond the permittee's control, a permittee must complete required maintenance related to facility function within six months of the date that the maintenance standard exceedance was detected. Maintenance may include simply cleaning the catch basin to remove accumulated debris, or could include correcting structural problems that prevent the facility from functioning as designed. Permittees must dispose of catch basin waste appropriately. When conducting circuit-based whole system cleaning, permittees must be prepared to collect all material removed from the circuit and all water used in cleaning the circuit. These materials are wastes and must be properly handled, stored, tested and disposed of accordingly.

Summary

Ecology encourages permittees to consider the range of available catch basin inspection options and use local knowledge and experience to establish a program that makes the most sense for their MS4.

Over time, permittees may modify their selected approaches to improve effectiveness and efficiency, or to respond to altered land use conditions. Permittees may also change their selected approaches if they change other operational or maintenance practices, such as street sweeping. Although there may be a trial-and-error period to find the right balance of approaches, the objective of selecting an approach is to meet the catch basin maintenance standards with the appropriate level of effort.

For more information

Permittees with questions on catch basin and inlet inspection and maintenance alternatives should contact their regional permit specialist.

www.ecy.wa.gov/programs/wq/stormwater/municipal/municontacts.html

If you need this document in a format for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.