

Appendix D: Vendors' Comments on Final Report

Aqua-Net, Inc.

1110 N.W. 50th
Seattle, Washington 98107

September 22, 1995

Mr. John Koon
King County Surface Water Management Division
Department of Public Works
700 Fifth Avenue Suite 2200
Seattle, Washington 98104

Dear John:

I would like to thank you and the catch basin insert committee for all of your hard work and perseverance over the last year in completing the catch basin insert study. Your efforts provided valuable information as to the performance of filter media and lent support to a new industry in which I believe.

I am pleased with the final report, find it very objective, and within it's scope. Aqua-Net will both benefit from and use what we have learned from the study.

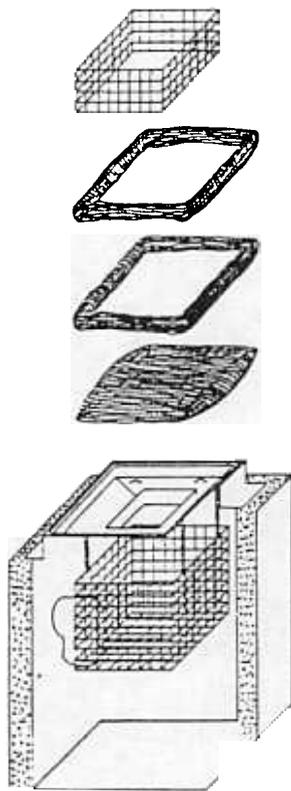
Also, I am pleased to present you with our new types of inserts. Again, thank you for your help. It was a pleasure working with all of you.

Sincerely,

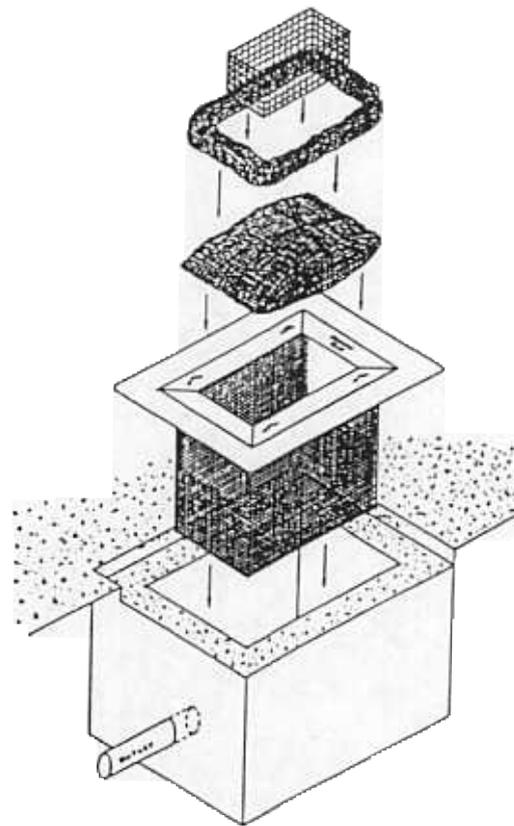
Aqua-Net, Inc.

A handwritten signature in black ink, appearing to read "Paul Geisert", written in a cursive style.

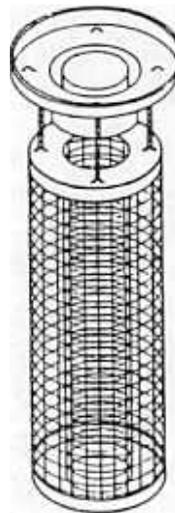
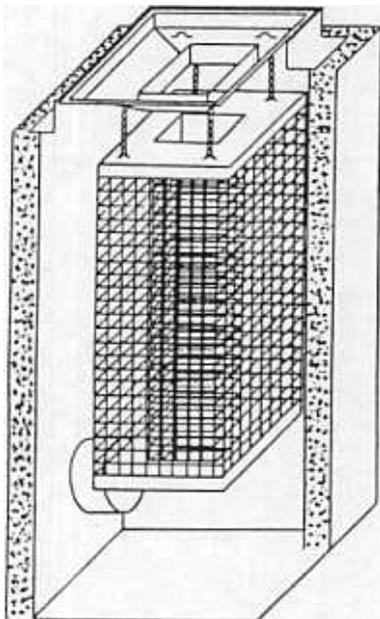
Paul Geisert
President



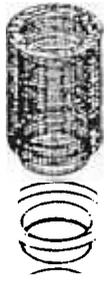
Aqua-Net catch basin insert used with 90 degree elbow and placed below the waterline allows for both direct filtration and absorption of retained oil.



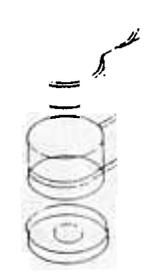
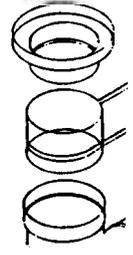
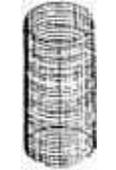
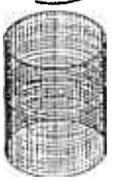
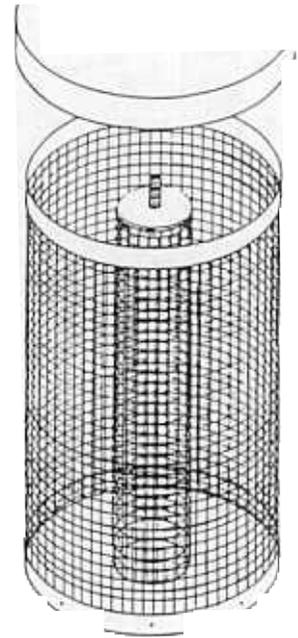
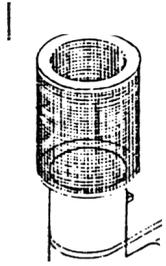
Standard 1/2" mesh basket with fixed top and bypass cut-outs. Use with absorbent to help reduce oil or without absorbent as a simple debris basket.



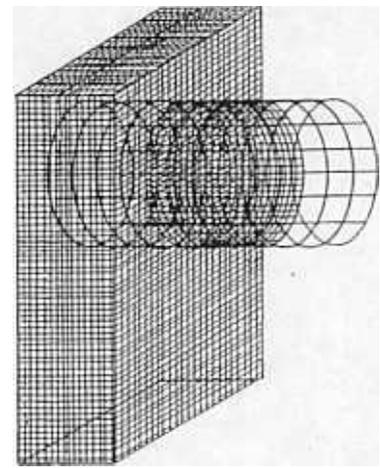
Aqua-Net filter cells for manholes, dry wells, and catch basins with sufficient rim to invert depths. Filter cells can be used with a variety of media including cellulose fiber absorbents, shredded polyurethane or polypropylene, and certified CSF[®] compost.



1/2" X
A



Tee sections can be fitted with filter cells (top and left) of various sizes to absorb floating oil, retain debris, and to help remove dissolved pollutants in manholes and catch basins. Media charges include cellulose fiber absorbents, shredded polyurethane or polypropylene, and certified CSF[®] compost. **Warning: always consult a licensed professional engineer prior to installing tee sections and filter cells. Never enter a catch basin, manhole, or dry well without proper training and equipment.**



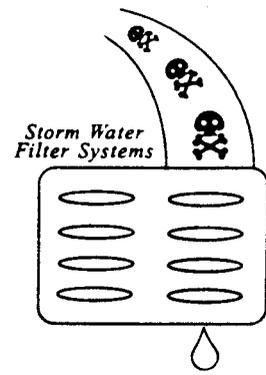
• Reduces Pollution Runoff at the Source •

ENVIRO-DRAIN®, INC.

Patent Pending

13226 - 97th Ave. N.E., #C208 • Kirkland, WA 98034
(206) 820-1953 • Fax (206) 820-8364

SEP 11 1995



September 8, 1995

King County Surface Water Management Division
Attention: John Koon, Water Quality Engineer
700 Fifth Avenue, Suite 2200
Seattle, WA 98104

Dear John:

I appreciate all the work you and the members of the Catch Basin Insert Committee (GBIC) have done the past few years. Your report is very impressive. It's readable, understandable and fair for everyone involved.

After going through the report, I have some comments that may answer some questions in the report:

Table 3, "Accumulation of Sediment at Field Sites", Footnote #3: It is possible that the absorbent came in contact with soap or windshield wiper fluid. Detergent and/or soap have a tendency to breakdown the waterproofing of the absorbent material. The absorbent material does remove detergents and soaps, but also limits the filters effectiveness.

In a controlled environment such as pressure washing that uses detergents/soaps for buildings, cars, driveways, etc. that uses between two-to-three gallons per minute, we are able to calculate a given time frame to change the filter material before leaching or displacement of contaminates. In situations similar to this, we use 110 mesh on the bottom tray to increase the retention time.

I am aware that this type of practice is illegal unless waste water goes to a sanitary sewer, and I explain to contractors the consequences if approached by local officials. This is something I feel strongly about getting resolved in the county and state. Granted, I cannot prevent people from doing this type of activity from pressure washing, but doing something is better than nothing.

In Chapter 4, "Maintenance": Maintenance is the most important aspect for the effectiveness of catch basin filters. No two catch basins are alike. Safety is an issue that cannot be overlooked. It's important to understand and emphasize that maintenance personnel will be working with contaminates that may or may not be hazardous, flammable or explosive. Insulated neoprene gloves and safety

King County Surface Water Management Division
Attention: John Koon, Water Quality Engineer
September 8, 1995
Page 2

goggles should be worn at all times when working with any catch basin inserts to prevent injury or exposure to bacteria or chemicals from feces, roadkill, pesticides, PCBs and heavy metals that could accumulate in the inserts.

Smoking is something that should not be permitted while maintaining catch basin inserts. The chance for methane gases accumulating in catch basin sumps can occur with the decomposition of organic matter or the possibility of chemical instability in the drainage system from the mixing of landscape chemicals, household cleaning agents, etc.

NEVER leave a catch basin unattended during maintenance. Catch basins along roads, in parking lots, sidewalks and golf courses should be clearly marked during maintenance with orange cones and/or place the grate back on the frame to avoid people from walking or driving into them.

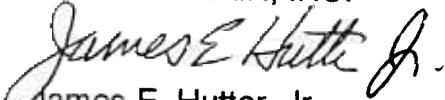
Lastly, I have included an expanded version of a heavy metals list that you might want to include in the study. For the same amount of money, we can see the full spectrum of heavy metals that are contained in the sediment or filter media. This is useful from a standpoint that you can proactively set limits for disposal options depending on the types of industries using catch basin inserts.

In Chapter 5, Section 5.1A, "If the Objective is to Remove Fine Particulate Pollutants": "The CBIC does not recommend the use of inserts if the user's objective is to remove fine particulate pollutants." This first sentence should be based on whether or not they have maintenance personnel on site. If the objective is to remove fine pollutants, it can be done depending on the Good Housekeeping BMP or Source Control BMPs

In closing, I think everyone involved did an excellent job evaluating and preparing this report on catch basin inserts. Thank you for allowing us to participate and comment on your catch basin insert study. I believe this report will prove to be an asset to protecting our water quality in King County and across the country.

Sincerely,

ENVIRO-DRAIN, INC.



James E. Hutter, Jr.
President/CEO

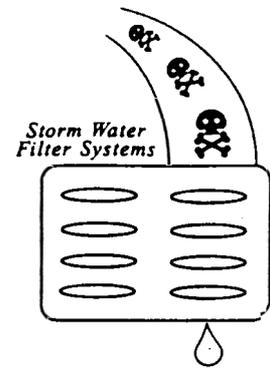
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Attachment

• Reduces Pollution Runoff at the Source •

ENVIRO-DRAIN®, INC.

Patent Pending

13226 - 97th Ave. N.E., #C208 • Kirkland, WA 98034
(206) 820-1953 • Fax (206) 820-8364



June 20, 1995

King County Surface Water Management
Attention: John Koon, Water Quality Engineer
1000 Fifth Avenue, Suite 2200
Seattle, WA 98104

Subject: Catch Basin Insert Report

You are welcome for our participation, and thank you for your pro-activeness in evaluating innovative catch basin insert technology.

Overall, the draft version of the "Catch Basin Insert Study" is fair and equitable for all the parties involved. After reading the study, we now have the technical data to make changes to our filtration system to accommodate King County's Design Manual criteria for treating flows from a six-month storm event.

With the Enviro-Drain storm water filters, we have experienced the same instability and inconsistency with Absorbent W in the particulate form. Some of the changes we have made have been to use less Absorbent W, and this allows the screens to drain properly, or use the Absorbent W pads. Whatever the case, we encourage frequent inspection and maintenance because of its ease in maintenance and inexpensive filter replacement and disposal costs in most cases.

In the draft copy, Chapter 3.3D, "Clogging of overflow areas", I would like to defend Enviro-Drain's reputation. The case with the Washington State Department of Transportation near Chinook Highway was not the overflow of the Enviro-Drain that was plugged. It was the damming effect from fallen leaves entering the catch basin grate. Once the leaves were removed from the front of the grate, the water was able to pass the installed Enviro-Drain filter without interference. In the future, the Washington State Department of Transportation will be incorporating Housekeeping BMPs. In this case, it would be street sweeping more frequently in fall and winter.

I would appreciate the opportunity to be included in the additional research of catch basin inserts. In the future, I would like the CBIC to take advantage of Enviro-Drain's sampling model in the removal of dissolved pollutants from raw storm water.

I want to thank everyone who has worked on the Catch Basin Insert Committee (CBIC) and especially John Koon for his patience.

Sincerely,

James E. Hutter, Jr.
President/CEO

JH:vb

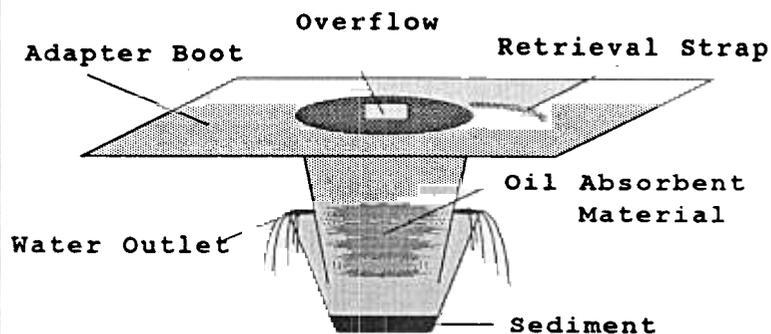
The StreamGuard™ Catchbasin Insert

The *StreamGuard™ Catchbasin Insert* is an innovative technology designed to remove contaminants such as oil and grease, sediment, floatables, and debris from storm water. They are inexpensive, disposable, and universally fit nearly all catchbasins. The StreamGuard™ Insert is easily installed in the catchbasin and works passively (no chemicals or power required) to remove contaminants from storm water or industrial washwater.

Three types of inserts are available: for oil and sediment, for sediment only, and for floatables and debris. The type you use depends on your specific application.

Applications

- Construction Sites
- Industrial Facilities
- Car & Truck Washing
- Steamcleaning Pads
- Parking Lots
- Marinas/Shipyards
- Service Stations
- Sandblasting Operations
- Waterfront Parks
- Parking Lot Cleaning



The StreamGuard Type II Insert for Oil and Sediment

HOW IT WORKS

The StreamGuard™ Insert is made entirely of 8 ounce nonwoven polypropylene geotextile fabric, sewn with heavy-duty marine grade monofilament thread. It is universally fitting because of its unique fabric adapter "boot" (see above drawing). To install, just remove the catchbasin grating, lay the insert "boot" over the opening, then replace the grating. The weight and snug fit of the grating locks the insert in place. Next, simply cut away the excess fabric of the boot from around the grating and the procedure is complete.

When storm water enters the catchbasin, it will flow over the insert. The fabric will act as a filter at first, allowing water to pass but retaining sediment and absorbing oil and grease. When the fabric can no longer filter due to accumulated contaminants, it begins to operate in its designed long-term mode. In this mode the body of the oil and sediment unit fills with water which provides detention for the gravity settling of sediment. The sediment is captured in the bottom of the insert. Oil entering the unit will conversely prefer to remain floating at the surface of the water where it is absorbed into the oil absorbent material as depicted in the above drawing.

King County Transportation &
Natural Resources Library
821 Second Avenue, M.S. 90
Seattle, WA 98104-1598

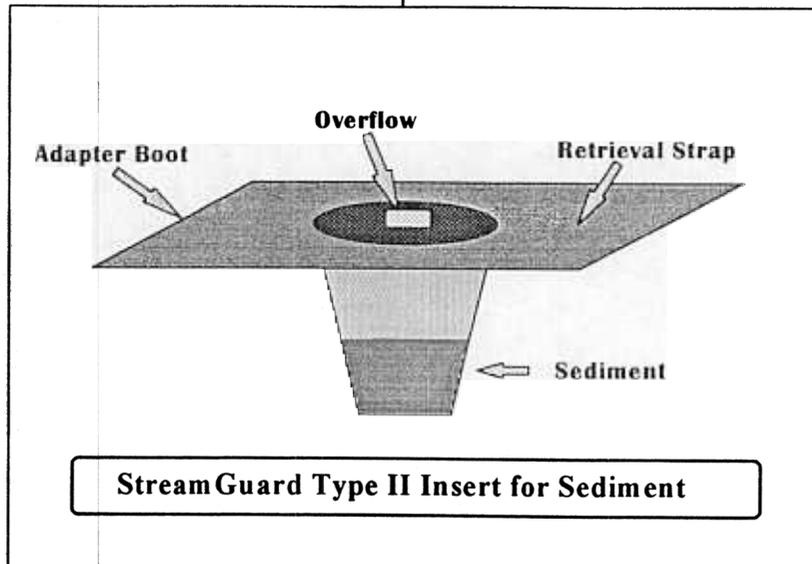
2 The StreamGuard™ Catchbasin Insert

Insert Maintenance

Insert maintenance is quick and inexpensive with replacement frequency dependent on contaminant loading and storm water volume. In many storm drain applications with drainage areas less than 10,000 square feet, the inserts will last up to 5 inches of rain or longer. In heavy-loading applications or poorly controlled sites, however, the inserts will need to be replaced on an "as needed" basis.

To remove the insert, simply pull the retrieval strap from under the grating, secure it by sliding a bar through the strap loop, then slide the grating half-way off the catchbasin and reach in to remove the insert.

For most applications the primary contaminants removed by the inserts will be sediment and oil. In these cases, the spent inserts can usually be disposed of as a standard solid waste. Drip dry to comply with the "no free liquids" rule for solid wastes. In applications where hazardous materials may be present in the storm water, disposal of the inserts should follow local environmental regulations.

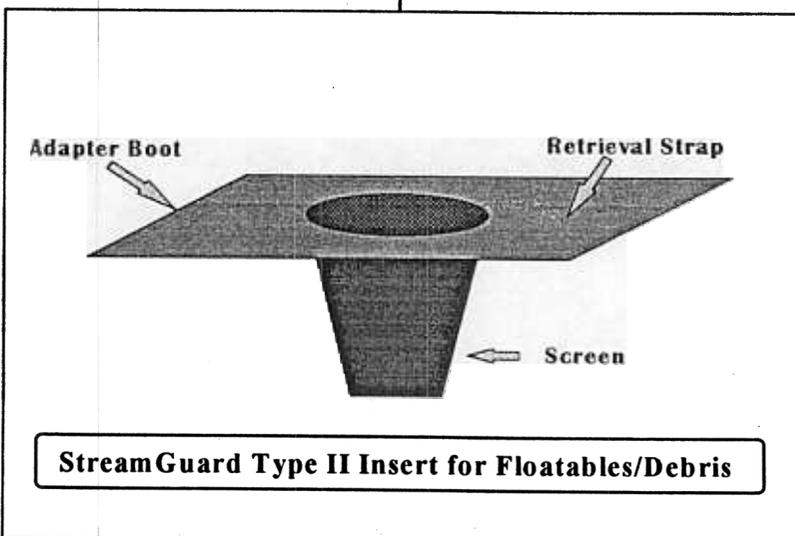


↑ ↑ ↑ Also available is the StreamGuard™ Insert for sediment pictured above. This unit has been approved as an operational BMP by regulatory authorities for construction sites.

* * * * *

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For floatables and debris, the StreamGuard™ Insert pictured below has proven very effective. ↓ ↓ ↓



For more information or to order, call your local StreamGuard™ Dealer: → →

*Foss Environmental Services Co.
7440 W. Marginal Way South
Seattle, Washington USA 98108
(206) 767-0441; Fax: (206) 767-3460*

Appendix E: King County Surface Water Design Manual Excerpts

Inasmuch as insert technology will change over time, it is neither possible nor appropriate for public agencies to develop data for each new product. While the information in this report should provide regulators with a basic understanding of catch basin insert technology, regulation or authorization of catch basin inserts must be developed in accordance with the planning and pollution-control objectives of individual jurisdictions. At one extreme, an agency may choose to allow catch basin inserts in general, specifying only that inserts be configured to meet specific treatment objectives. At the other extreme, a jurisdiction may choose to establish a certification program whereby the effectiveness of each new insert must be established before it can be used to meet regulatory requirements.

The level of performance testing required of the insert manufacturers will likely vary with the intensity of the regulations intended to control pollutants. If inserts are proposed in lieu of other, more commonly accepted and legally mandated BMPs, manufacturers may be required to demonstrate the effectiveness of new products. However, if the improvement of water quality BMPs is being carried out on a voluntary basis and performance standards have not been set or are not being enforced, regulators may be satisfied with any level of improvement and not require manufacturers to provide performance data.

King County is currently providing information on catch basin inserts through two documents. One is the Surface Water Design Manual (King County, 1995 Draft Update) which outlines stormwater management regulations and design criteria for new developments and redevelopment projects. The other is the Stormwater Pollution Control Manual (King County, 1995) which provides existing businesses and organizations more general information on BMPs that can be used to meet discharge limits. Excerpts from these two manuals that address catch basin insert use and regulation are included in this appendix.

The section in the King County Surface Water Design Manual that addresses the use of catch basin inserts for oil control bases acceptance of an insert on the ability of the unit to treat the required design flow without causing flooding. This approach is based on the observation that most of the inserts tested for oil and grease removal were limited not by an inherent inability to capture oil, but rather by poor contact between the stormwater and the absorbant.

to reduce total phosphate by 50 percent, reduce nitrate+nitrite by 40 percent, and maintain alkalinity below 10 mg/L and pH below 6. Although it is not known whether alkalinity or nitrogen can be reduced sufficiently by these measures, there is no other alternative technologically feasible at this time. An experimental facility variance could be pursued as additional technology becomes available.

Bog Protection Option 1 — Large Wetpond or Combined Detention and Wetpond Followed by Sand Filter

This option involves use of the large wetpond (Section 6.3.6) or the large combined detention and wetpond (Section 6.3.7), sized so that the wetpond volume is 4.5 times the volume of runoff from the mean annual storm, rather than 3 times the volume as in the basic water quality menu. A large sand filtration facility (Section 6.3.10 or .11), or infiltration of 90 percent of the annual runoff volume, must follow the pond.

Bog Protection Option 2 Constructed Wetland Followed by Sand Filter (reserved)

Bog Protection Option 3 — Three-Facility Treatment Train

TABLE 6.1.4-A lists the choices of facilities for this option.

Table 6.1.4-A. Facility combinations for bog protection treatment train, option 3.		
First Facility	Second Facility	Third Facility
Biofiltration swale (Section 6.3.1, 2, or 3)	Leaf compost filter (Section 6.3.13) or experimental facility (needs variance)	Basic sand filter (Section 6.3.10 or .11), or infiltration of 90 percent of annual stormwater runoff
Filter strip (Section 6.3.4 or 5)		
Basic wetpond (Section 6.3.6)		
Basic combined detention and wetpond (Section 6.3.7)		
Wet vault (Section 6.3.8)		
Basic sand filter (Section 6.3.10 or 11)		
Constructed wetland (reserved)		

6.1.5 HIGH-USE MENU

Oil Control Option 1 — Catch Basin Insert

Catch basin inserts may be used to meet the oil control requirements for new or redevelopment high-use sites. For new development, all criteria for flow capture must be met. The flow capture criteria apply to the high-use area only, provided that flows not subject to high use are shunted around the insert. For redevelopment sites, up to a maximum of 40 percent additional flow may be routed through the insert, satisfying the high-use requirement if it is not possible for the site to meet the flow capture criteria without installing new catch basins.

All catch basin inserts must be fitted with oil sorbent media, to be changed at least monthly in wet weather (October through June) and whenever the surface of the media is covered with sediment. Acceptable oil sorbent media include wood fiber products such as absorbent W or supersorb, whole fibrous moss (need not be sphagnum), or Petrolok (these media have been investigated by the county and found to retain captured oil fairly effectively). Other products which absorb oil without significant release are also acceptable. Cedar Grove compost was tested and found unacceptable for oil retention. CFS patented leaf compost mix was also tested, and although it performed fairly well, it did not retain oil as well as the other products tested. Therefore CFS leaf compost should not be used without enhancements for oil control in catch basin inserts.

Alternative media may be used if they can be demonstrated substantially equivalent to the media listed above. The method that should be used to demonstrate oil retention is given in the decision paper entitled "Oil leachate tests for various adsorbent filter media," May 1994, King County Surface Water Management Division.

Oil Control Option 2 Gravity Oil/Water Separator

Oil Control Option 3 Coalescing Plate Oil/Water Separator

Oil Control Option 4 Linear Sand Filter Trench (See Section 6.3.12)

**Oil Control Option 5 Parking Lot Washing with Proper Washwater Disposal
(reserved)**

Oil Control Option 6 — Compliance with NPDES Permit Requirements

If the site has a National Pollutant Discharge Elimination System (NPDES) permit that specifically addresses oil control for the pollution-generating impervious surface of the site, compliance with NPDES permit conditions is adequate to comply with the oil control requirements of Special Requirement #5.

6.4 OIL CONTROL FACILITY DESIGNS AND REQUIREMENTS

6.4.1 CATCH BASIN INSERT

A catch basin insert is a device installed underneath a catch basin inlet that treats stormwater through filtration, settling, absorption, adsorption, or a combination of these mechanisms. Several systems have been developed by local manufacturers within the last few years; however, information on their performance is limited.

King County, in conjunction with other local agencies, has tested several catch basin inserts and found performance and removal rates to be highly variable, dependent upon system configuration, pollutant particle size and concentration, and maintenance frequency. Because performance varies widely among the different devices, King County has developed a set of performance criteria that the devices must satisfy in order to be considered acceptable. These criteria were developed based upon the results of the testing program. Table 6.4.1-A lists the performance criteria and describes the tests to be used to evaluate whether a device meets the criteria.

At the present time, none of the available catch basin inserts fully meets all criteria. However, based on the results of the previous testing program, it is expected that manufacturers will modify their products so that an insert will be accepted by the time this manual is adopted. King County will subsequently maintain a list of acceptable catch basin inserts.

Water Quality Treatment Objectives

The catch basin inserts manufactured to date typically have been configured to remove sediment, pollutants adsorbed to sediment, and/or oil and grease. The inserts described here are intended to capture oil and grease for use in new or redeveloped high-use sites (see Chapter 1 for definition of high-use sites). Devices meeting the design criteria outlined in Table 6.4.1-A should provide oil and grease removals comparable to those of other high-use treatment options. However, catch basin inserts provide little if any spill protection and do not meet spill-containment requirements.

While the inserts described here are focused on treating oil and grease, catch basin inserts can also be configured with other sorbents to remove specific pollutants. Owners proposing to use catch basin inserts to treat specific pollutants should obtain assistance from King County or another pollution control agency.

Catch basin inserts also may be used for sediment control during construction, as described in Chapter 5. In some instances, particularly for redevelopment projects at high-use sites, existing catch basins may first be equipped with inserts for sediment control during construction and then be reconfigured (e.g., changing treatment media) for treating oil and grease following completion of construction activities.

Applications and Limitations

Catch basin inserts may be used to meet the oil control requirements for new or redevelopment high-use sites. The minimal space requirements, planning and engineering needs, and implementation time make catch basin inserts particularly attractive for redevelopment projects. The initial cost investment may be much lower than that of comparable oil treatment options. However, long-term costs associated with the more frequent maintenance required of catch basin inserts may offset some of the initial cost savings. Owners considering catch basin inserts are encouraged to investigate maintenance costs associated with a particular device. Costs for maintaining catch basin inserts are on the order of \$10 to \$100 per unit per month, assuming monthly media replacement.

The use of a catch basin insert may be limited by drainage area, available space inside the catch basin, the availability of maintenance personnel or services, and access. Each of these limitations is discussed below.

Table 6.4.1-A. Performance criteria and evaluation methods for catch basin inserts.

Performance Criteria		Methods of Evaluation
1	Insert has ability to treat 90 percent of average annual runoff, defined as 2/3 of the peak of the 2-year event conditions; for a minimum of 6 weeks under typical high-traffic conditions; in Seattle, this flow rate is approximately 19 gpm for a drainage area of 5,000 square feet	Subject the system to the maximum flow rate when new, and again after 4 and 6 weeks deployment. All flow must pass through the treatment area without short-circuiting or bypass.
2	Insert has ability to create a positive seal around grate to prevent low-flow bypass	Install and observe unit under low-flow conditions. All flow must pass through the treatment area.
3	Media system functions so that its surface does not become blinded shortly after deployment and cause stormwater to bypass media before full use of media is realized	Inspect media after 4 and 6 weeks deployment. If filtration rate as tested above has been compromised and media still can absorb oil, clogging is a problem.
4	Media resists water saturation and maintains oil-absorbing properties for a minimum of 6 weeks under constantly wet conditions	Examine media after 4 and 6 weeks deployment for signs of water saturation or degradation. Media in acceptable condition should still absorb oil and repel water.
5	Insert has means of preventing floating oil from escaping the unit	Inspect the insert for the presence of an under-over weir at the high-flow relief. If this or some comparable device exists, it is assumed that free oils will be retained.
6	Insert has means of preventing oil-soaked media from escaping the unit	When the insert is new, and again after 4 to 6 weeks deployment, subject it to the peak flow rate (defined under criterion #7) and observe whether media escapes.
7	Insert has ability to pass high flows without causing excessive ponding (the high flow rate is defined in Section 1.2.4.1); no ponding to occur for the 25-year peak flow rate (in Seattle this rate is approximately 43 gpm for a drainage area of 5,000 square feet)	Blind all filtration surfaces with plastic sheeting and subject the insert to the required flow. No ponding around the drain inlet should occur for the 25-year peak rate.
8	Manufacturer provides complete installation and maintenance instructions	Verify that instructions include information on the following: Installation Creating an adequate seal Removal (including safety considerations) Cleaning and replacement Decant and disposal of liquid wastes Media disposal guidance
Desirable Features		Methods of Evaluation
1	Insert has high-flow bypass to prevent resuspension and washout	Subject the insert to the flow rate calculated for criterion #1, then gradually increase the flow. Only the designed flow rate should pass through the treatment surfaces.
2	Service contract is provided	There is no method for evaluating service contracts. Service contracts are listed as a desirable feature because they may offer greater assurance of regular system maintenance and, consequently, treatment reliability.
Note: The evaluation tests assume the use of suitable oil-absorbing/adsorbing media (see material requirements).		

Drainage area

The size of the contributing area affects both system performance and flooding potential during high-intensity rainfall. To ensure adequate treatment performance, the maximum area contributing to a catch basin insert shall be limited to 5,000 square feet for new projects and 7,000 square feet for redevelopment projects. This limit is based on a target of treating 90 percent of the runoff volume. (King County SWM has determined that units designed to handle the water quality design flow capture approximately 90 percent of the total average annual runoff.) For a 5,000-square-foot impervious area in the Seattle region, this flow is approximately 19 gallons per minute (gpm). Testing by King County indicates that few of the devices tested could continue to meet treatment requirements at flow rates in excess of about 20 gpm. In addition, due to the very short contact time and potential for flushing previously trapped materials, treatment may be compromised at higher flow rates.

If a manufacturer develops a catch basin insert that is proven to effectively treat flow rates higher than 20 gpm (0.045 cubic feet per second) without releasing previously trapped material (in accordance with performance criteria #1, #5, and #6 listed in Table 6.4.1-A), King County may allow specific catch basin inserts to drain areas larger than 5,000 square feet. In such a case, King County will determine a maximum drainage area for the particular catch basin insert.

Catch basin interior space

Pipe stub-outs, misaligned inlet frames, and shallow drainage systems limit the use of catch basin inserts for redevelopment. Therefore, an owner considering catch basin inserts for a redevelopment project must ensure that the devices are physically compatible with existing catch basins and will achieve the desired performance. For example, it is generally not advisable to install a catch basin insert if the insert will be partially submerged. Analysis of the drainage system may be needed to determine the available space (freeboard) between the water surface in the catch basin and the inlet grate during wet weather.

Availability of maintenance staff or services

To be effective, a catch basin insert must be maintained at a frequency recommended by the manufacturer, but at least monthly (the cycle may be extended up to 6 weeks depending upon local conditions; see maintenance requirements below). Because of the importance of regular maintenance, owners using catch basin inserts will be required to keep a maintenance log that specifies when the facilities were cleaned or replaced; the log must be available for review by county inspectors. Commercial maintenance services for facilities like catch basin inserts are increasingly available. Owners intending to use catch basin inserts should include maintenance in a routine program such as grounds maintenance or contract with a commercial service.

Owners planning to use a catch basin insert should also consider the weight of candidate devices and whether the insert must be completely lifted out of the catch basin to be maintained. Some of the inserts currently produced are heavy and may require two people or machinery, such as a forklift, to perform routine maintenance.

Access

Catch basin inserts must be accessible for both inspection and maintenance. It may not be practical to use an insert where access is blocked by dumpsters, shipping containers, fixed equipment, or continuous vehicle parking.

6.4.1.1 METHODS OF ANALYSIS

The catch basin insert requires little design or analysis but must meet the design criteria listed in the following section.

6.4.1.2 DESIGN CRITERIA

Figure 6.4.1-A illustrates the general configuration of a catch basin insert.

Required Design Criteria

The catch basin insert must meet the following criteria. Unless otherwise stated below, use of a catch basin with an insert must also meet the requirements of King County Road Standards, Chapter 7 (e.g., catch basin spacing, unpiped runoff distances, etc.).

1. The total maximum tributary area shall be 5,000 square feet (\pm 5 percent) per unit for new development projects. The total maximum tributary area shall be 7,000 square feet per unit for redevelopment projects.
2. A catch basin insert for a new development project shall be designed to fit with a standard grate, contained in the King County Road Standards (e.g., KC Rd Std Nos. 41 and 42). If the insert is installed in an existing catch basin, the insert shall be demonstrated to fit properly so that there is a positive seal around the grate to prevent low-flow bypass. The maximum height of the grate above the top of the frame, with the insert installed, shall not exceed 3/16-inch, and the grate shall be non-rocking.
3. The bottom of the filter media (oil absorbent/adsorbent material) must be above the level of normal low flows. If the media is above the crown of the outlet pipe, it is assumed to be above the normal low flows. An alternative method to demonstrate that the media is above the normal low flow is to show (by the backwater analysis method described in Section 4.3.4) that the bottom of the media is above the water surface elevation corresponding to the water quality design flow.
4. The catch basin insert shall be located to be accessible as needed for maintenance and not limited by continuous vehicle parking. This may require elimination of a parking stall for redevelopment projects.

Recommended Design Features

While no pretreatment is required with a catch basin insert, the use of the source control measures (i.e., best management practices) described in the *King County Stormwater Pollution Control Manual* will decrease maintenance needs. Catch basin inserts may not be used in place of source control best management practices.

Material Requirements

The catch basin insert must be fitted with oil-absorbent/adsorbent filter media, to be changed at least monthly (October to June) and whenever the filter media surface is covered with sediment. Acceptable filter media include absorbent W, whole fibrous moss (not necessarily sphagnum moss), Petrolok, and general purpose absorbent (i.e., wood fiber).

To minimize the generation of solid waste and the consumption of natural resources, systems constructed of or using recycled products are preferred. Reusable filter materials should be refreshed according to the manufacturer's instructions.

6.4.1.3 CONSTRUCTION AND MAINTENANCE REQUIREMENTS

Construction

Installation of a catch basin insert for a new or redevelopment project shall follow the manufacturer's recommended procedures. The catch basin insert should be installed in the catch basin after the site has been paved or stabilized (for new development) or after completion of construction (for a redevelopment site that is already paved).

If the catch basin insert is used for sediment control during construction, it should be reconfigured in accordance with the manufacturer's recommendations. When used for sediment control, the insert should be inspected at least weekly and maintained if needed (see Chapter 5).

Maintenance and Inspection

Catch basin insert systems require more frequent maintenance than other oil treatment systems. While maintenance requirements of individual units may be relatively minor, the need for diligence and the potentially large number of units required in place of other more typical oil treatment systems make sound maintenance planning essential to the successful use of these devices.

Maintenance needs vary from site to site based on the type of land use activity, implementation of source controls, and weather conditions. Catch basin inserts shall be maintained at a frequency recommended by the manufacturer, but at least monthly during the wet season (October through March) and once every 2 months during the remainder of the year. Maintenance shall include full replacement or renewal of oil absorbent/adsorbent material. In addition, when maintaining the insert, the catch basin vault should be inspected for sediment accumulation. Such sediment shall be removed if the depth of sediment in the vault is greater than 0.5 feet.

Complete operation and maintenance instructions from the catch basin insert manufacturer shall be kept with the maintenance logbook. Manufacturer's instructions shall include installation, removal (including safety instructions), cleaning and replacement (including a practical means of determining when the unit is in need of service), media disposal guidance (including decanting of liquid wastes), and maintenance log form. At a minimum, the maintenance log shall include the following information: date, type of maintenance performed, names of persons performing the work, and county inspection date and signature.

Maintenance of the catch basin insert shall follow the manufacturer's instructions. Persons conducting maintenance activities should be informed of health and safety requirements (e.g., wear gloves while handling filter media). Media shall be disposed of in accordance with applicable regulations, including the Seattle/King County Department of Public Health solid waste regulations (Title 10) and state dangerous waste regulations (WAC 173-303).

All filter media should be dewatered prior to disposal. In most cases, dewatered filter media may be disposed of as solid waste.

Owners should follow the manufacturer's instructions for dewatering filter media, which vary depending on the type of unit. Generally, catch basin inserts that are able to drain by gravity can be dewatered in place during dry weather. If an owner is unable to perform monthly maintenance because there has not been sufficient dry weather, the maintenance period may be extended, up to an additional 2 weeks. If by the end of the additional 2 weeks there has been insufficient dry weather to allow dewatering, the owner shall make other arrangements for dewatering the filter media. Such arrangements could include use of a commercial service, dewatering the insert in a watertight container, or other methods meeting environmental regulations.

During the first wet season, inspection of the catch basin insert shall be carried out every other week to determine whether a shorter maintenance cycle is needed for the particular site. An inspection and maintenance log shall be kept onsite and made available to county inspectors on an as-needed basis.

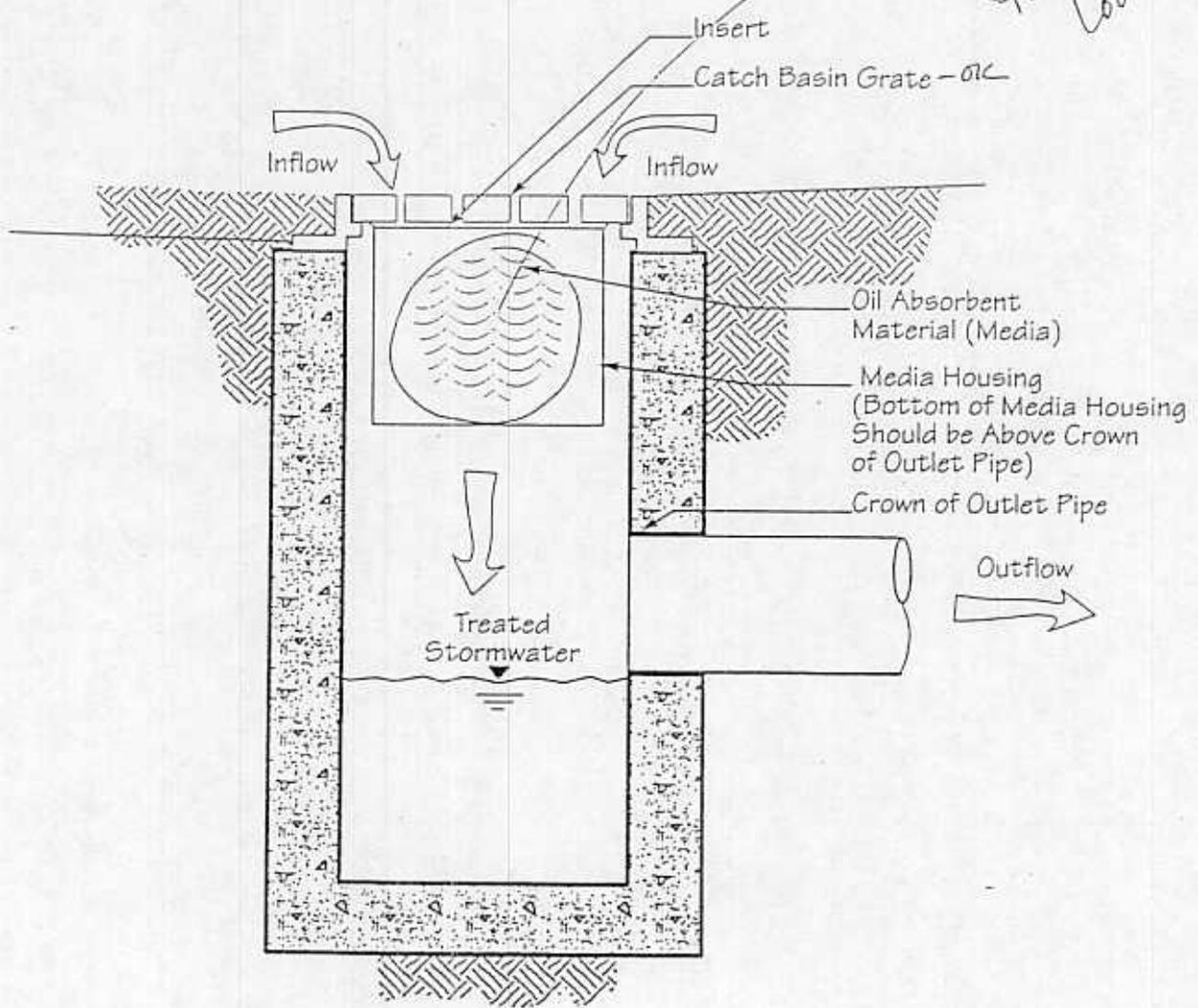
6.4.2 GRAVITY OIL/WATER SEPARATOR

Attempts to remove oil from stormwater runoff have focused on passive mechanisms that take advantage of oil being lighter than water, thus rising to the surface of water. The two types of oil/water separators typically used for stormwater are the gravity or API (American Petroleum Institute) oil water separator and the coalescing plate oil/water separator. The coalescing plate oil/water separator is described in Section 6.4.3.

Gravity oil/water separators have been used over the past 50 years to remove free oil and grease from industry processing fluids, and, more recently, from stormwater runoff. Gravity separators consist of rectangular vaults, typically constructed of steel or concrete. The vaults have multiple chambers separated by baffles extending down from the top of the vault. The baffles block oil flows out of the vault and reduce turbulence in the vault. Baffles are also commonly installed at the bottom of the vault to trap solids and sludge that accumulate over time. In many industrial process plants,

FIGURE 6.5.1 SCHEMATIC OF CATCH BASIN INSERT

*no - this pattern
looks like water
try something else
that's fluffy
looking*



SECTION
(NTS)

Catch Basin Insert

APPLICATION AND DESCRIPTION

A catch basin insert is a device installed under a storm drain grate to provide water quality treatment through filtration, settling, or absorption.

Catch basin inserts are commercially available products which fit into existing catch basins and are generally configured to remove one or more of the following contaminants: coarse sediment, oil and grease, and litter and debris. While it has been suggested that some units may be able to remove dissolved pollutants and pollutants associated with fine sediments, King County is not aware of independent tests which have confirmed this. Catch basin insert technology, however, is rapidly changing and future products may be able to remove dissolved pollutants. When selecting a system, ensure that your specific pollutant-removal needs are met. As with any treatment BMP, catch basin inserts should never be used in place of sound source control practices.

Oil and Grease Removal: Inserts designed for the removal of oil and grease contain, and depend on, oil-absorbing media. These inserts are appropriate for use in any area in which vehicles are used or stored. Because of the small storage capacity of these inserts (about 1 quart of oil under ideal conditions) they are not acceptable as the sole line of defense against actual oil spills in areas where larger amounts of oil could be released. Large amounts of sediment entering the catch basin significantly reduces the effectiveness and longevity of the oil absorbing media. Under these conditions, an oil/water separator with a pre-settling chamber, may be more appropriate.

Sediment Removal: Inserts designed for sediment removal may be used at construction sites, and in situations where stockpiles or unpaved areas are likely to contribute high sediment loads. They may also be appropriate for small (low traffic) businesses in which the per-inlet cost of cleaning would be excessive. Tests indicate that these units do little to remove fine materials and dissolved pollutants and should not be considered a substitute for other pollutant-removal BMPs.

Debris Removal: Inserts can also be used for the removal of litter and debris. Some evidence suggests that the removal of large debris such as cigarette butts, candy wrappers, and beauty bark reduces the amount of harmful bacteria in receiving waters.

DESIGN AND MAINTENANCE

Unlike most other treatment BMPs, which must be designed and constructed specifically for your site, catch basin inserts may be purchased directly from a vendor and installed by the user. While standardized units are available, most vendors are able to customize their systems for your site. This service may dramatically improve the performance of your system while adding relatively little to the cost of the product. Before purchasing a catch basin insert, the following factors must be considered.

Conveyance Capacity: The conveyance capacity refers to the amount of water which the system can pass without causing flooding. This capacity is equal to the amount of water which is able to pass through the insert's treatment area, plus the amount which can pass through the built-in overflow structure. As the unit treats the stormwater, the treatment area begins to clog and the total conveyance capacity is reduced. If maintenance is neglected, or an unusually high amount of sediment or debris enter the system, the treatment capacity may drop to zero, and all of the water will have to exit through the overflow. In order to minimize the chance of flooding, the insert should be able to pass the maximum expected flow from the area draining to the catch basin. In most cases the vendor should be able to tell you what the overflow capacity is.

Treatment Capacity and Bypass: The treatment capacity refers to the amount of water which the unit will pass through its treatment area. The unit should be sized to ensure that most of the water entering the drain-inlet is treated even as the treatment area starts to clog. The ability of the unit to remove pollutants will be reduced if water is able to seep between the storm-drain grate and the edge of the pavement. Ensure that this gap is sealed. The vendor should provide you with information on how to prevent this situation and information on the treatment capacity of the system.

Maximum Weight: The maximum weight of the filter will be equal to the weight of the unit when new, plus the weight of the sediment and water trapped in the unit. Under the most extreme cases, the treatment area of the unit may become completely clogged, and the unit may be full of water when it comes time to service it. It is essential the maximum weight of the unit be less than what can be lifted by the people or equipment to be used during maintenance. Before ordering a system, or having a system customized to your site, be sure the vendor knows how you will be removing the unit for maintenance.

Simplicity and Durability: Since the installation of one or more catch basin inserts represents a long-term commitment to maintenance, it is important that the unit selected be easy to use and maintain, and that it is built to last. Be sure to have the vendor provide a complete demonstration of the product at your site, and if possible, ask to try a unit for a month or so before committing to its purchase and use.

Catch basin inserts will generally require more frequent, but less costly maintenance than other treatment BMPs. Frequent inspection of the units is necessary to ensure that they are not clogged by large debris. Actual maintenance will generally consist of removing the unit from the catch basin, cleaning or replacing the filter media (if applicable), and re-installing the unit. In addition to the weight considerations mentioned above, you must

insure that the drain-inlet will not be obstructed when it is time to clean the filter, that you have the time and personnel to do the job (or can arrange for this service through a private contractor), and that you have a legal means of disposing of the trapped material and spent media. In most cases these materials may be disposed of as regular solid waste, however, media used for oil and grease removal may require special treatment. See BMP Info Sheet 2 in this chapter and resources in Chapter 6 for more information on disposal.

Maintenance frequency will vary depending on the amount and type of pollutant targeted. Tests conducted by King County suggest that initially, all units should be inspected every one to two weeks (except during periods of dry weather), and that complete maintenance will be required approximately monthly. Units configured simply to catch litter and debris may work for several months without maintenance. The simplest way to determine whether the units need maintenance is to inspect them during a rainstorm and see whether water is exiting out the overflow. If this is the case, the unit is probably in need of service. Alternatively, the depth of sediment accumulation or appearance of the filter media, may provide insight as to whether the unit is in need of maintenance. Again, be sure the vendor provides you with this information.