

**APPENDIX A
GLOSSARY**

GLOSSARY

API	AMERICAN PETROLEUM INSTITUTE
BMP	BEST MANAGEMENT PRACTICE
CFS	CUBIC FEET PER SECOND
CPI	COALESCING PLATE INTERCEPTOR
CSO	COMBINED SEWER OVERFLOW
DCIA	DIRECTLY CONNECTED IMPERVIOUS AREA
DPE-ED	DETENTION POND EVALUATION-EXTENDED DETENTION
DPE-W	DETENTION POND EVALUATION-WET DETENTION
DPR-ED	DETENTION POND RETROFIT-EXTENDED DETENTION
DPR-OPD	DETENTION POND RETROFIT-OUTLET POLISHING DEVICE
DPW	DEPARTMENT OR DIVISION OF PUBLIC WORKS
DSS	DECISION SUPPORT SYSTEM
EMC	EVENT MEAN CONCENTRATION
EPA	ENVIRONMENTAL PROTECTION AGENCY
EXTRAN	EXTENDED TRANSPORT MODEL
FFSP	FIRST FLUSH SEDIMENTATION POND
FOTR	FRIENDS OF THE ROUGE
GIS	GEOGRAPHICAL INFORMATION SYSTEM
MCTT	MULTI CHAMBER TREATMENT TRAIN
MDNR	MICHIGAN DEPARTMENT OF NATURAL RESOURCES
MDOT	MICHIGAN DEPARTMENT OF TRANSPORTATION
MEP	MAXIMUM EXTENT PRACTICABLE
MIRIS	MICHIGAN RESOURCE INFORMATION SYSTEM
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
NPS	NONPOINT SOURCE
NURP	NATIONWIDE URBAN RUNOFF PROGRAM
OLMF	ON-LINE MEDIA FILTER
OLQD	ON-LINE QUALITY DEVICE EVALUATION
O&M	OPERATION AND MAINTENANCE
OSE	OIL SEPARATOR EVALUATION
PCB	POLYCHLORINATED BIPHENYLS
RAP	REMEDIAL ACTION PLAN
RPO	WAYNE COUNTY ROUGE PROGRAM OFFICE
RRNWWDP	ROUGE RIVER NATIONAL WET WEATHER DEMONSTRATION PROJECT
SE	SWALE EVALUATION
SEMCOG	SOUTHEASTERN MICHIGAN COUNCIL OF GOVERNMENTS
SFE	SAND FILTER EVALUATION
SIC	STANDARD INDUSTRIAL CLASSIFICATION
STORM	STORAGE TREATMENT OVERFLOW RUNOFF MODEL
SWMM	STORM WATER MANAGEMENT MODEL
TAG	TECHNICAL ADVISORY GROUP

TPRC
WASP
WCEHD
WMM
WWTP
WMI

TECHNICAL PEER REVIEW CONFERENCE
WATER QUALITY ANALYSIS SIMULATION PROGRAM
WAYNE COUNTY ENVIRONMENTAL HEALTH DIVISION
WATERSHED MANAGEMENT MODEL
WASTEWATER TREATMENT PLANT
WASTE MANAGEMENT OF MICHIGAN, INC.

APPENDIX B BMP FACT SHEETS

AN EXAMPLE ROUGE RIVER DEMO INFO SHEET IS INCLUDED IN THIS REPORT IN ORDER TO GIVE THE READER AN IDEA OF WHAT THE FINAL BMP FACT SHEETS WILL LOOK LIKE. COMPLETE FACT SHEETS FOR ALL BMPs EVALUATED IN THIS STUDY WILL BE PROVIDED IN A FUTURE VERSION OF THIS REPORT.



Wetlands

Wetlands are areas of land that are covered with water at least part of the year and contain plants and animals that are adapted to these conditions. Wetlands are one of the most biologically diverse systems in the world and can be compared to tropical rain forests and coral reefs in the diversity of species they support.

Wetlands Are Important

Wetlands, also called bogs, swamps and marshes, are vital to the Rouge River Watershed. Wetlands provide many benefits including: water quality improvements; food and habitat for fish and wildlife; flood control and shoreline erosion control; and recreation.

Water Quality Improvements

Wetlands improve water quality by filtering out pollutants before they reach the river. These pollutants include nutrients and sediments.

Nutrients such as nitrogen and phosphorus from fertilizers, contribute a large amount of pollution to the Rouge River. Excess nutrients contribute to increased algae growth, which reduces the amount of oxygen in the water. Wetlands can filter as much as 91% of the phosphorus and 86% of the nitrogen.

Sediments that are suspended in running water can also be removed by wetlands. As the running water enters a wetland, the water slows and the sediments settle out. Some wetlands can retain as much as 94% of the sediment (dirt). Clean sediments are important because they contain air pockets that aquatic life depend upon to exist. These spaces provide habitat for aquatic organisms to lay their eggs and contributes oxygen that is essential for their survival.



This wetland, located in West Bloomfield Township, is also a Great Blue Heron Rookery.

Flood and Shoreline Erosion Control

Wetlands function like big sponges, slowing down and absorbing excess water during storms. This combined action of slowing and storing water reduces flooding downstream and shoreline erosion.

Food and Habitat for Fish and Wildlife

Fish. Wetlands serve three major functions for fish communities. They provide breeding grounds, act as sources of food and provide cover from predators. Most species of freshwater fish are dependent on wetlands for one or more of these functions.

Wildlife. Many varieties of waterfowl and non-game birds depend on wetlands for feeding and resting areas during their spring and fall migration. Resident birds rely on them for nesting and as primary feeding areas. Other wildlife, such as the mink, muskrat and beavers, rely on wetlands.

In addition, wetlands are a productive habitat for insects. Waterfowl, non-game birds and a variety of reptiles and amphibians depend on insect-based food webs. Many species of turtles, snakes, frogs and toads live in and rely upon wetlands.

THE ROUGE RIVER PROJECT
A WORLD CLASS EFFORT



BRINGING OUR RIVER BACK TO LIFE



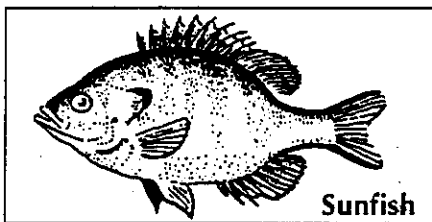
Cattail



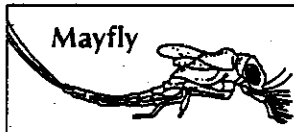
Hibiscus



Blue Heron

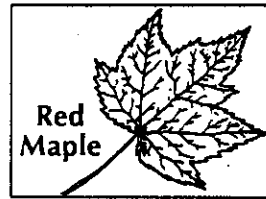


Sunfish

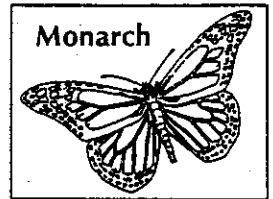


Mayfly

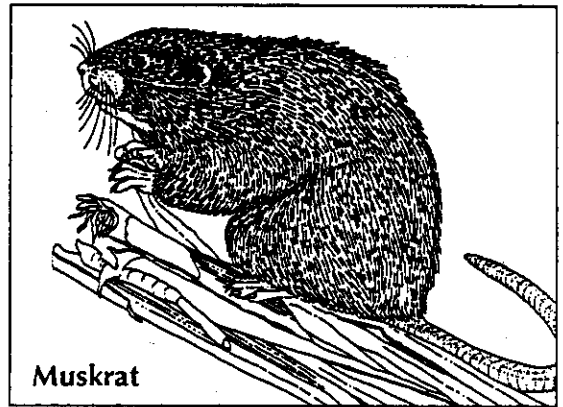
Typical Wetland Species



Red Maple



Monarch



Muskrat

Endangered Species. Wetlands are vital to the survival of various plants and animals, including threatened and endangered species. Approximately 30% of Michigan's threatened and endangered plants and 60% of the threatened and endangered animals are wetland species.

Recreation

There are many recreational activities that involve wetlands. Hunting and fishing for wetland dependent species is a major recreational activity in Michigan. In addition, people enjoy wetlands for hiking, birdwatching and photography.

Types of Wetlands

Natural wetlands include swamps, bogs and marshes. These wetlands occur naturally within the Rouge River Watershed.

Enhanced. Some land areas have historically been wetlands, but were changed due to some outside influence, such as draining the area for farming and development. These wetlands can be restored by leaving them undrained. This can be accomplished by plugging the ditches or breaking the tiles that lead to the drain.

Constructed wetlands create a wetland where one previously did not exist. Wetland design, site selec-

tion and a maintenance plan must be developed in order for the constructed wetlands to function properly.

Rouge Project Activities

The Rouge Project has initiated projects that utilize existing, enhanced and constructed wetlands to demonstrate the effectiveness of wetlands in treating stormwater runoff. This evaluation will identify the pollutants eliminated and the removal rate by the wetlands. In addition, the water quality and quantity will be measured to determine the effect of the wetland on the River.

What is the Rouge River National Wet Weather Demonstration Project?

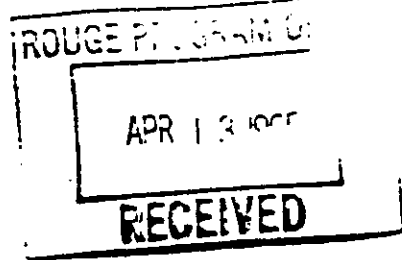
It is a comprehensive analysis, development and implementation of pollution control methods for the entire Rouge River Watershed and the pollution sources which impact the river's water quality. The Rouge watershed is a highly urbanized and heavily populated watershed located within Wayne, Oakland and Washtenaw counties. The Rouge Project looks beyond political boundaries and is intended to determine a method of selecting the most cost-effective controls for wet weather pollution sources while assuring maximum use of the water resource.

If you have any questions about Wetlands or the Project in general, please call the Rouge Hotline at (313)961-0730.

**APPENDIX C
ON-LINE QUALITY DEVICES**



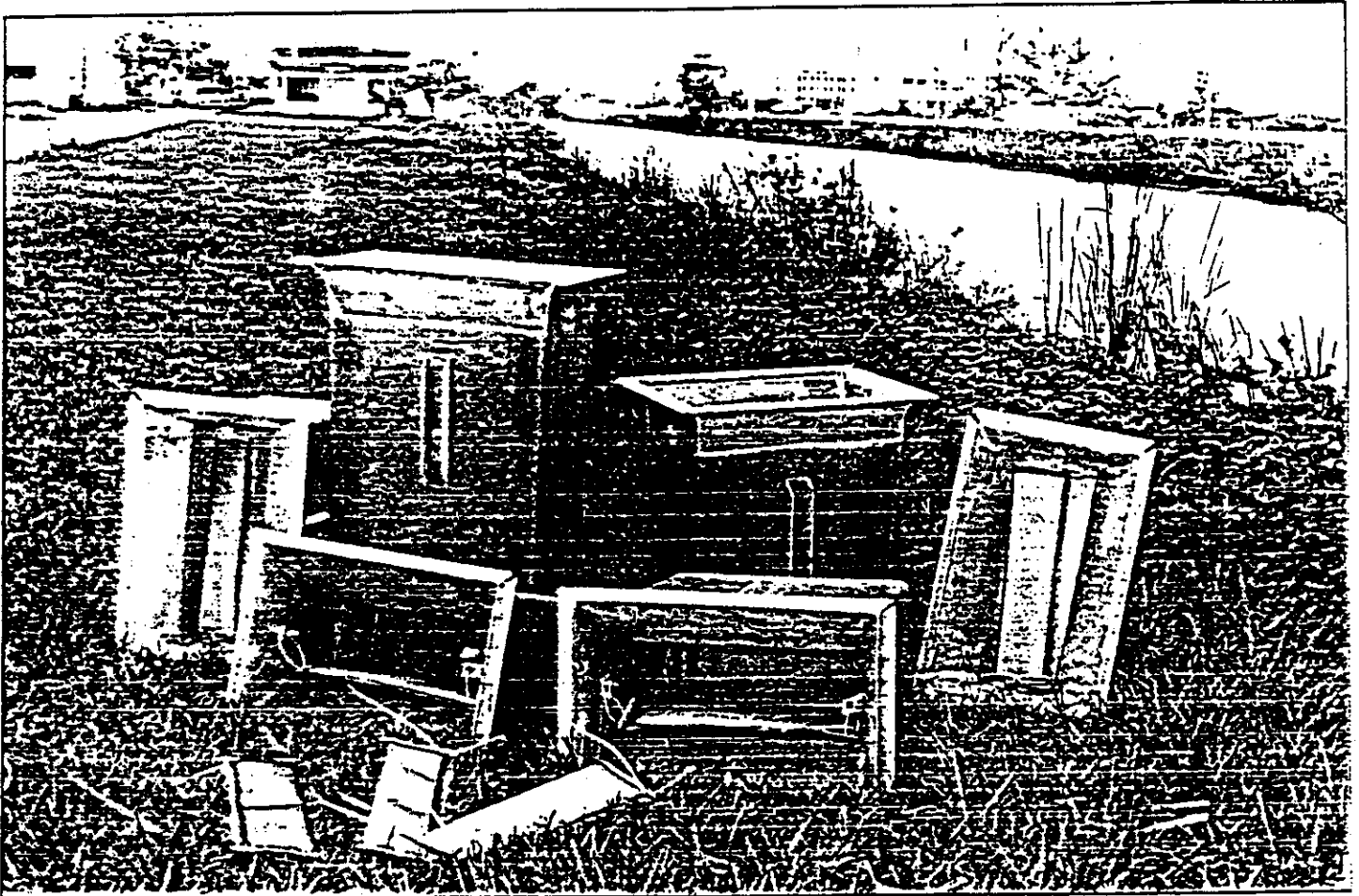
GEOTECHNICAL MARINE CORP.



HYDRO-CARTRIDGES®

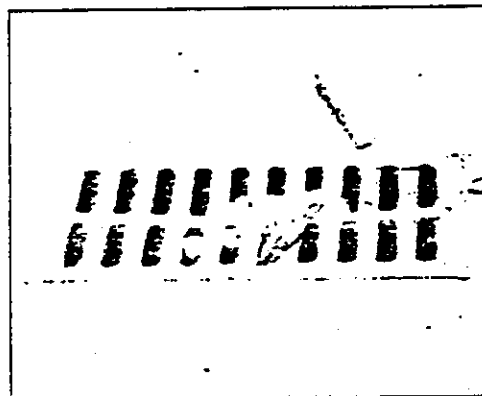
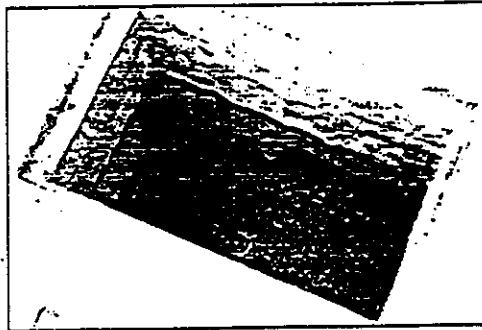
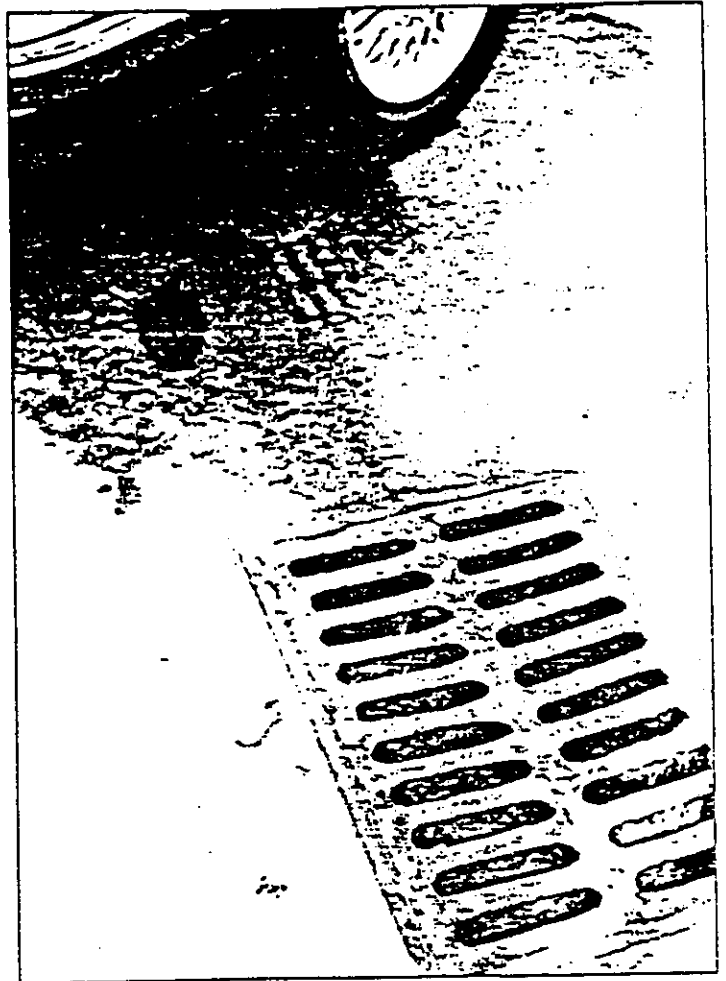
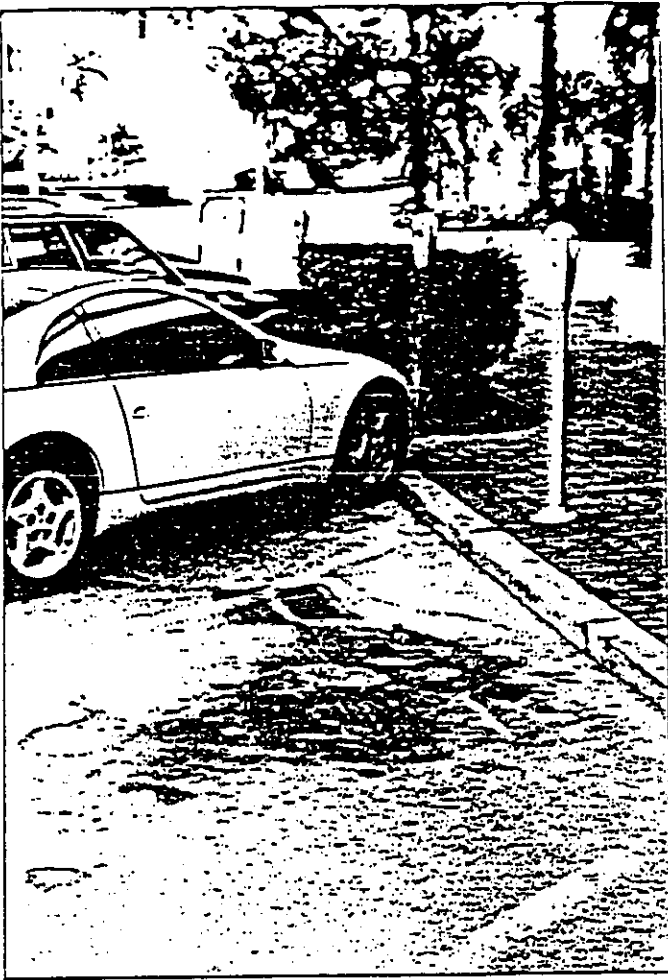
STORM DRAIN FILTRATION SYSTEM

A SAINZ DESIGN



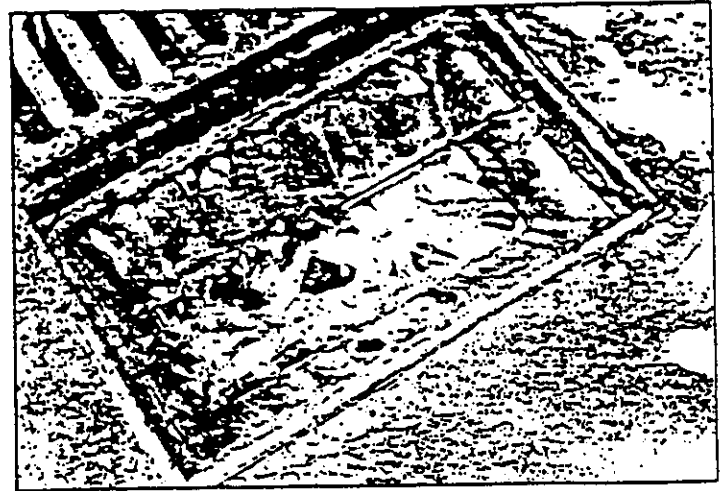
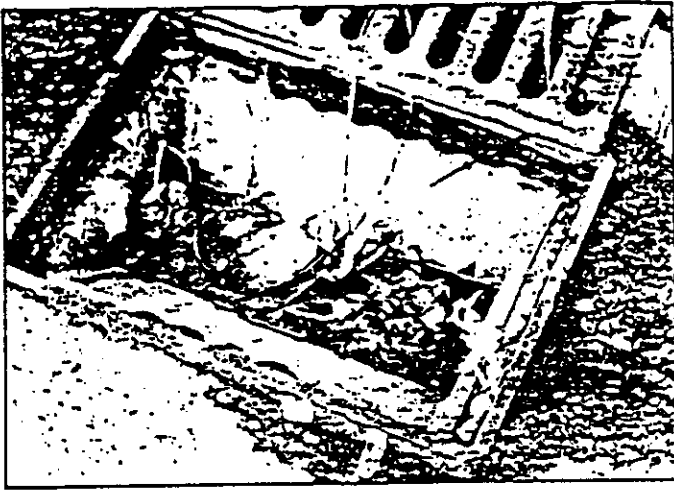
Hydro-Cartridges is the latest environmental fiberplastic product developed by our company, directed to help our communities in the task of improving storm drainage systems and the protection of the delicate aquifer. Its design allows its use in new or already existing storm drainage, giving it retrofitting characteristics, saving expensive improvements in critical areas, as well as

elasticity in accordance with each situation. Hydro-Cartridges is a very simple and flexible concept with a rugged construction aimed to last and perform its duties any time. Hydro-Cartridges also can be used by environmental enforcing agencies as a valuable tool to monitor and control dangerous situations in private industries.



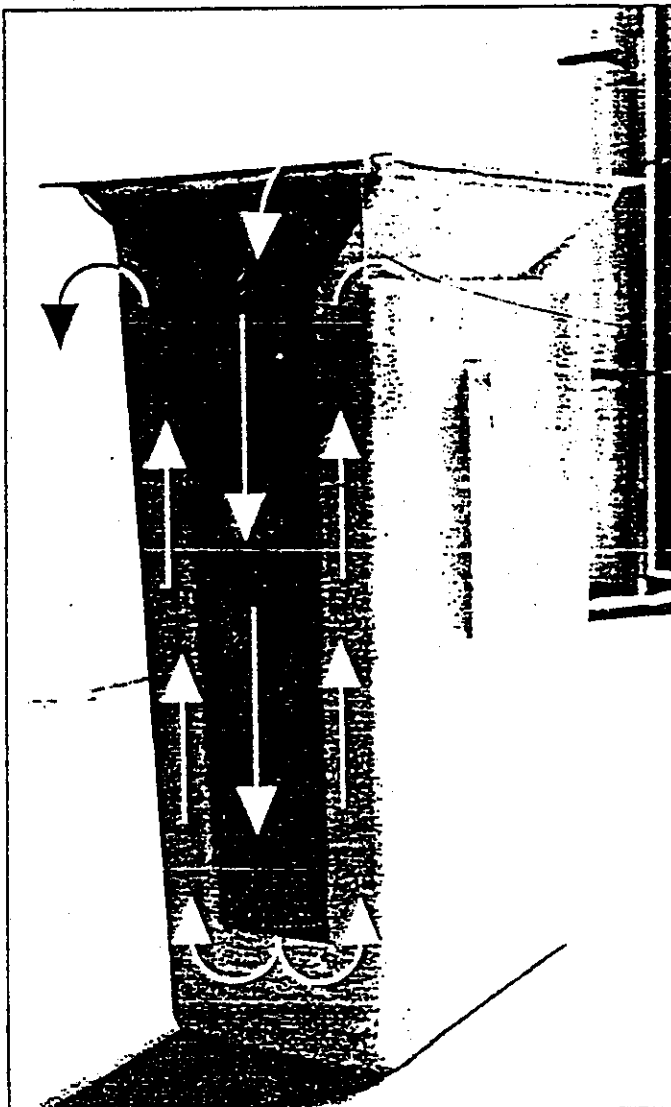
FEATURES

1. Prevents contamination of the aquifer by trapping all kinds of hydrocarbons (oils, grease, gasoline, etc.)
2. Traps debris, silt, heavy metals and solids from going into the drainage system, extending the system's life.
3. Spills containment capacity minimizing expensive cleanups.
4. Easy installation in new or old inlets.
5. Inexpensive, simple maintenance and monitoring.
6. Available for different inlet types or structure sizes.



1. How Do Hydro-Cartridges Prevent Hydrocarbon Contamination?

As shown in picture, the cartridge works full of water, with a water repellent hydrocarbon absorbent material floating at entrance.



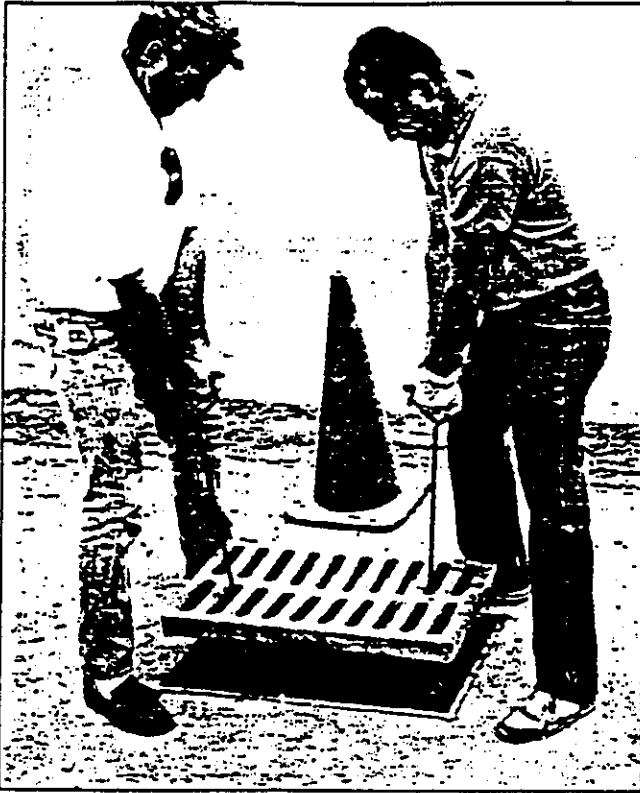
2. Trapping Procedure of Debris, Solids, Heavy Metals, etc.

As water starts flowing into the system, it flows downward through the central funnel at certain speed. When reaching the bottom, speed decreases, precipitating suspended contents to the bottom of cartridge. Clean water then rises in both sides of funnel to the two side openings where it spills out into the structure.

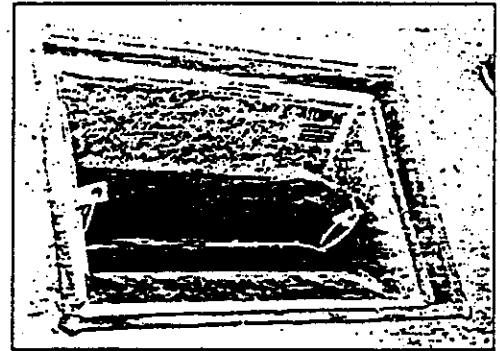
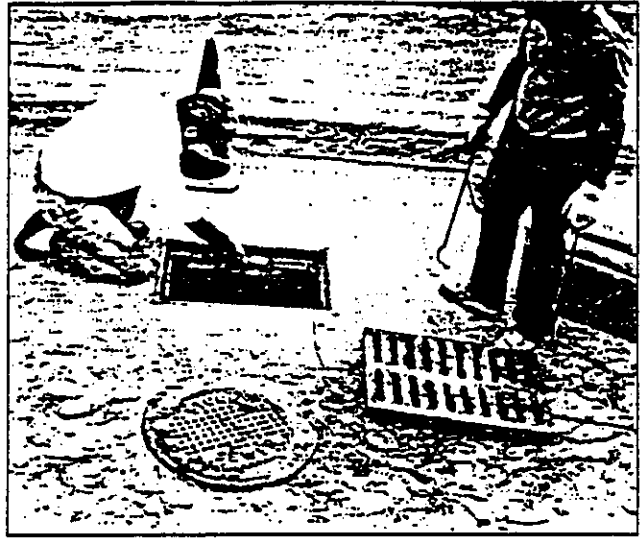
3. Spills Containment Capacity

If any hydrocarbon spill reaches the inlet accidentally, it remains inside of the funnel portion making its removal easy and economical, before further contamination occurs.

4. Installing Hydro-Cartridges is as easy as A-B-C



▲
◀ A. Remove grate and clean frame.

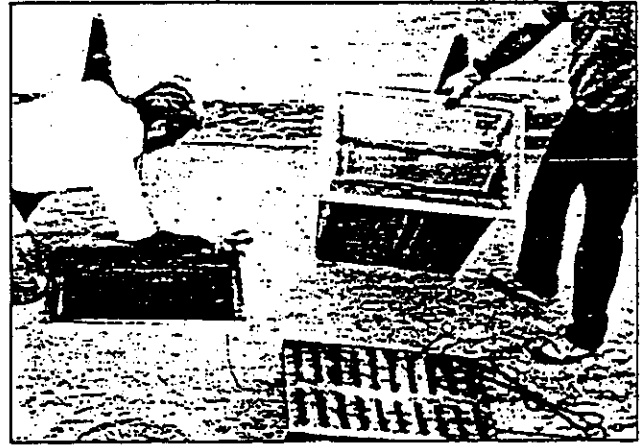
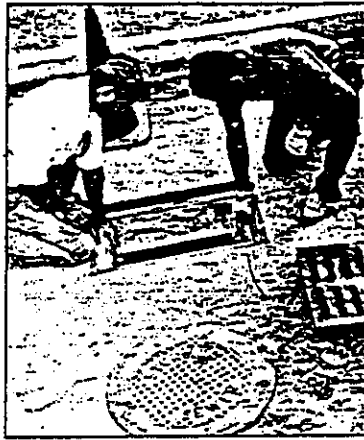
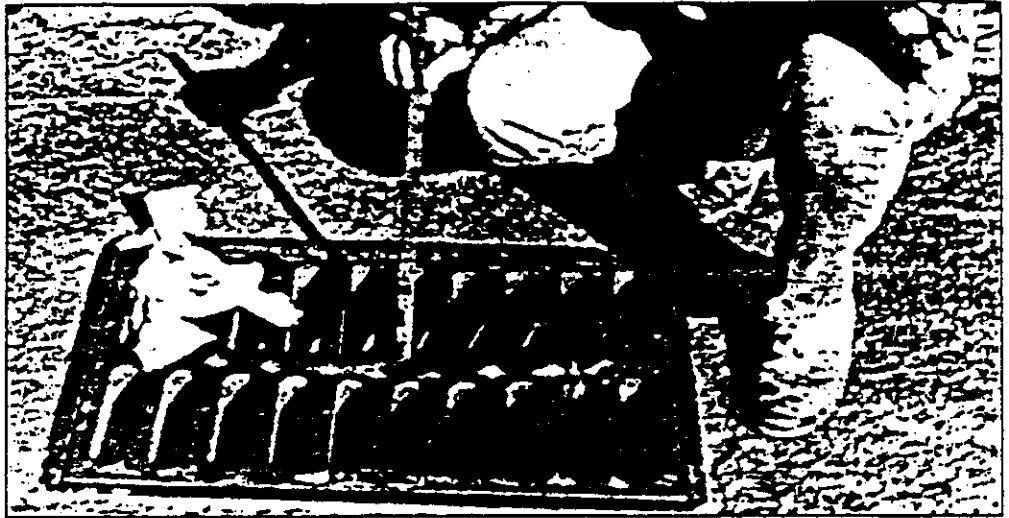


▲
◀ C. Reset grate.



▲
B. Install cartridge.

5. How To Maintain The Cartridges



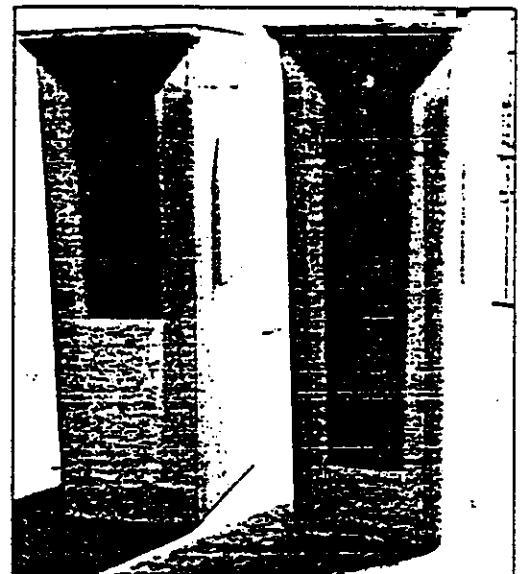
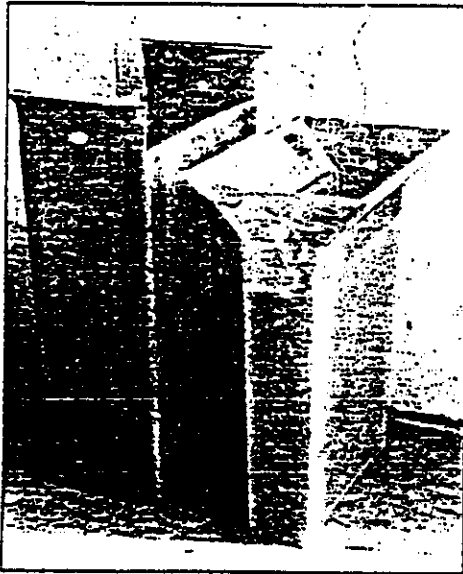
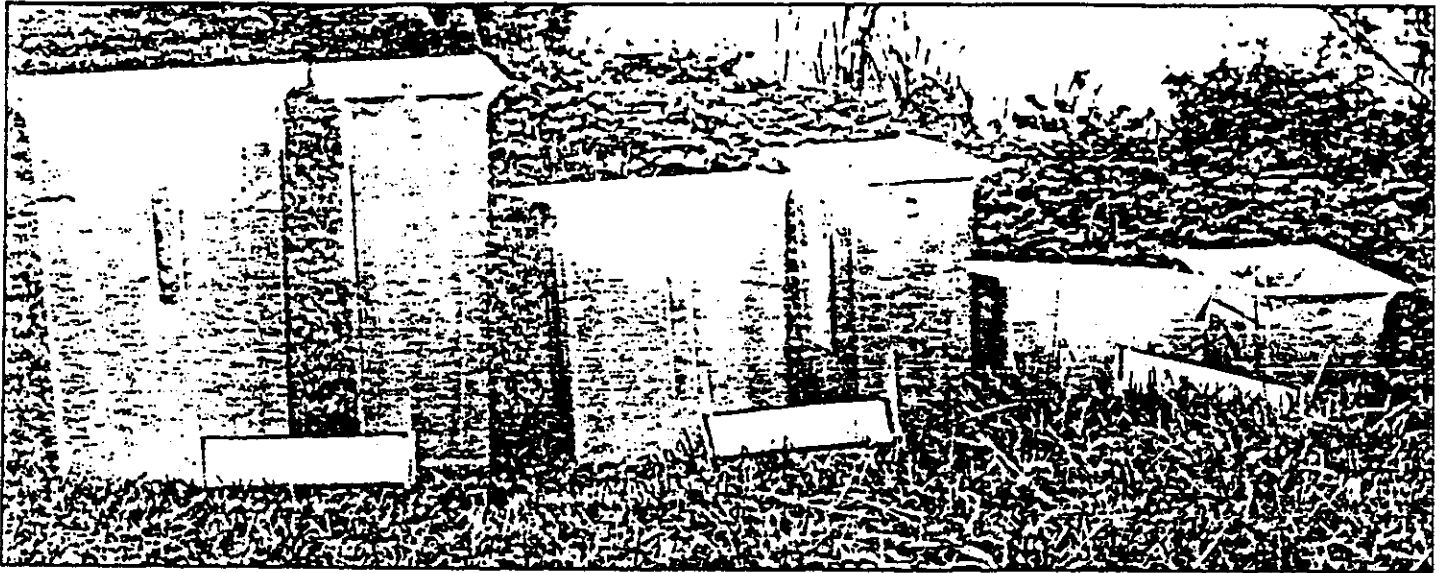
Checking the absorbing material for hydrocarbons requires only lifting grates for access, and replacing it by cutting the tie wraps when saturated. A new filter material kit is set in place quickly.

For solids levels, a measuring bar is introduced through the grate and direct readings are taken. When solids level reaches close to funnel tip, cleaning is due.

Cleaning the cartridge of solids is a simple, fast and inexpensive operation. Extract water from the unit with an electric bilge type pump, pouring it into an empty 55-gallon drum into any pickup truck. Then the cartridge unit is easily removed from the frame. Dump solids into truck, replace cartridge into frame and replace grate.

A record sheet should be kept on each of the inlets, of which we can furnish a sample.

6. Different Inlets and Structures



The company is able to produce cartridges for the most common and numerous inlet types used in the industry over a long period of time, and is willing to work with

Municipalities, Cities, Counties, etc., to approach special situations and needs in an effort to protect our environment.

**GEOTECHNICAL
MARINE CORP.**
10138 N.W. 80th Avenue
Hialeah Gardens, FL 33016
Tel (305) 557-4164

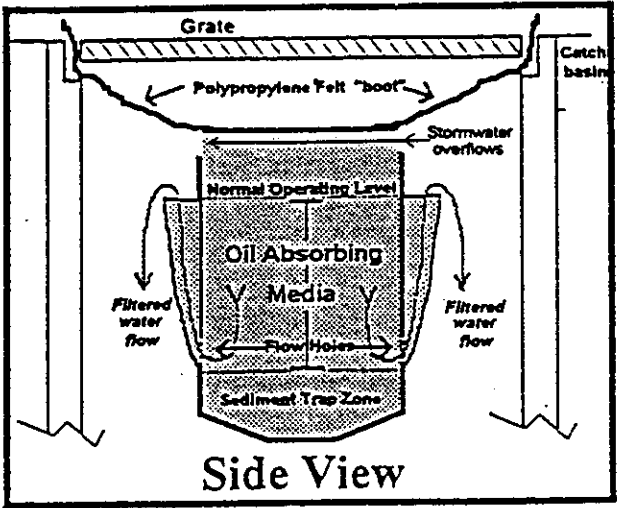
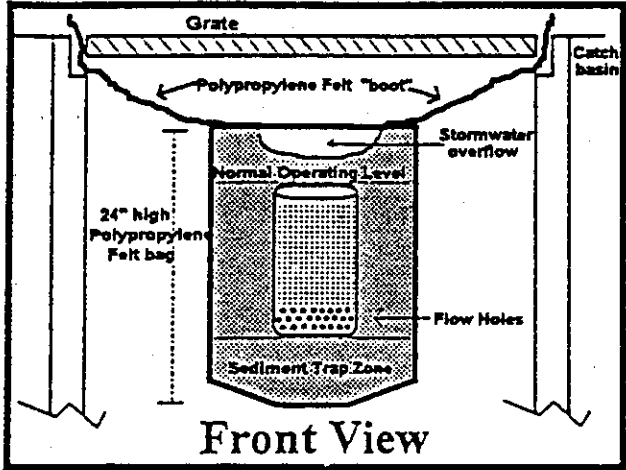
⇒ *New & Improved* ⇐

StreamGuard™ CATCH BASIN FILTERS

THE MOST TALKED ABOUT BEST MANAGEMENT PRACTICE FOR STORMWATER POLLUTION REDUCTION SINCE THE IMPLEMENTATION OF THE NPDES STORMWATER PROGRAM!

BY REMOVING OVER 90% OF OIL AND SEDIMENT FROM STORMWATER RUNOFF AT THE CATCH BASIN INLET, *StreamGuard™ Catch Basin Filters* KEEP THE ENVIRONMENT CLEANER, REDUCE THE NEED FOR CATCH BASIN CLEANING AND . . . *will not cause flooding!*

CBF Type II-OS



Innovative Design

- ☑ 4 Models
- ☑ Inexpensive
- ☑ Universal Fit
- ☑ Durable
- ☑ Effective
- ☑ Easy Installation and Removal
- ☑ Disposable

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

StreamGuard™...THE FUTURE OF INLET PROTECTION

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

MANUFACTURED BY:



"LEADERS IN INLET PROTECTION..."

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StreamGuard™ ... THE FUTURE OF INLET PROTECTION

Description

A *StreamGuard™* Type II Catch Basin Filter (CBF) consists of a specially designed, nonwoven polypropylene felt filter bag which is suspended in the catch basin using a nonwoven polypropylene felt fabric "boot". *StreamGuard™* units can be quickly installed in most catch basins by simply removing the catch basin grating, placing the filter in the basin opening, and replacing the grating. The weight of the grating holds the catch basin filter in place, even when full. There are four (4) *StreamGuard™* models to choose from: oil and sediment (OS), industrial (IND), sediment (S) and trash (T).

Operation

The *StreamGuard™* Type II-OS has been specially designed to remove oil, grease, and sediment from stormwater runoff. The unit differs from the sediment only unit in that it has a measured amount of specially modified hydrophobic and oleophilic polypropylene oil absorbent in the bag. Every major component of the *StreamGuard™* Type II-OS (the felt fabric bag, felt fabric "boot" and special oil-absorbent media) attracts oil like a magnet. As water enters the catch basin inlet, it is directed into the filter bag. Contaminants are initially filtered from the runoff by the boot, and then the bag and absorbent media where oil, grease and sediment are captured. Soon this felt cloth is masked over and then the bag operates in the "normal" mode with the bag $\frac{3}{4}$ full of water. This gives the oil-absorbing media more time to capture the oil and grease, also allowing the sediment to drop directly into the sediment trap zone (see drawings on reverse side). Water flow is down through the oil-absorbing media and then through the flow holes back up to the overflow pockets where it is released to the catch basin. During the peak storm periods, emergency overflow openings allow the unit to be bypassed at a rate of up to 200 gallons per minute (the industrial unit does not have this overflow mechanism).

Maintenance

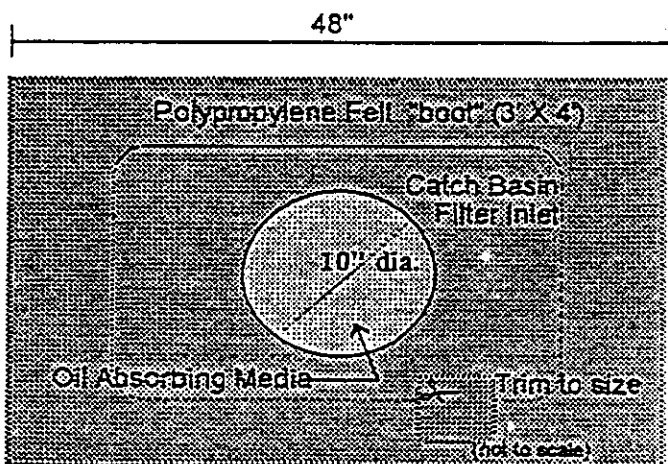
Maintaining *StreamGuard™* CBFs is a quick and inexpensive procedure; replacement frequency depends on sediment/oil loading and runoff volume. The maintenance interval can be as often as weekly at busy construction sites for the sediment (S) only unit. For use in parking lot applications the oil and sediment (OS) unit is an excellent choice. Frequency of replacement is very site dependant; a good rule of thumb is to replace the filter every 3-5 inches of rainfall. For industrial (IND) applications with heavier sediment and oil loads, more frequent maintenance may be required. The *StreamGuard™* is disposable, so maintenance of the units is as simple as removing the used unit (using the handy retrieval strap attached to the boot) and installing a new one. In all cases it is recommended that a monitoring program be put into place after the installation of any catch basin filter.

Disposal

Disposal of the material accumulated in the *StreamGuard™* catch basin filters (CBFs), and the filters themselves is dependent on the nature of the pollutants being collected. At some sites, the Type II-OS CBFs could contain up to 50 percent oil (dry weight basis). In certain industrial applications, the accumulated sediment may contain other contaminants (e.g., heavy metals) and should be managed in accordance with local, state and federal regulations. In all cases, the generator is responsible for the proper characterization and disposal of the waste.

Applications

StreamGuard™ Catch Basin Filters provide a cost-effective BMP for removal of oil, grease, sediment and floatables at: industrial facilities, car and truck washing locations, construction sites, steam cleaning operations, parking lots, ports, marinas, shipyards, airports, intermodal rail yards, service stations, truck stops, shopping malls and many other sites where sediment, oil, trash and floatables can enter storm water drainage systems.



Top View

Specifications

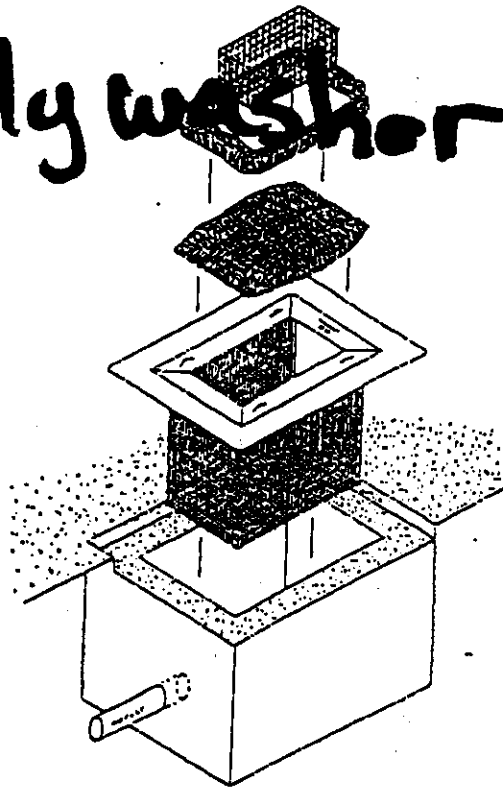
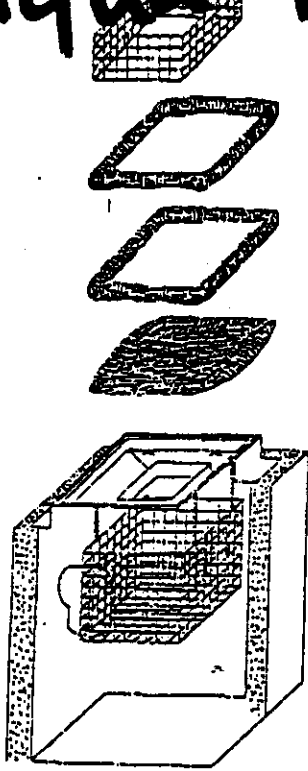
Type II-OS (oil and sediment):

Construction material:	8 oz. polypropylene felt
Maximum overflow rate:	>200 GPM (except IND model)
Absorbent Material:	Polypropylene (oleophilic)
Optimum filtration rate:	>5-10 GPM (Type-OS)
Boot adapter dimensions:	36" x 48"
Nominal depth:	24"

Note: Boot adapter may be trimmed to size for a neat appearance.

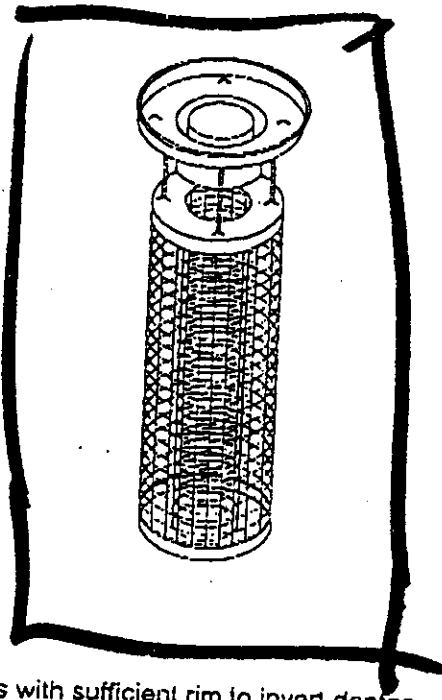
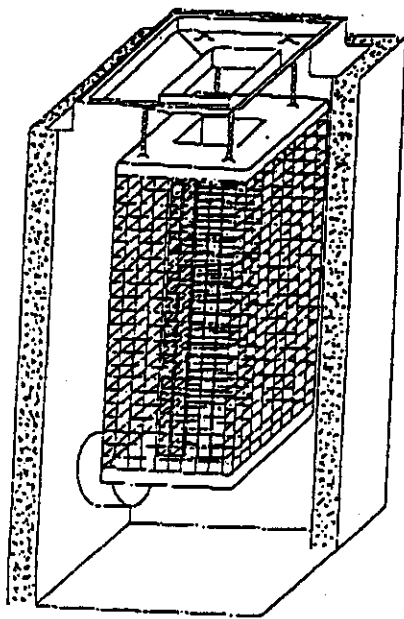
Stormwater Services Corporation (SSC) expressly warrants this product to be free from defects in material and workmanship. Except as specifically provided above, SSC makes no representation or warranty, either expressed or implied, with respect to the Catch Basin Filter, including its performance, merchantability, or fitness for a particular purpose. In no event will SSC be liable for any lost profits or consequential or special damages.

Aqua-net Gully washer

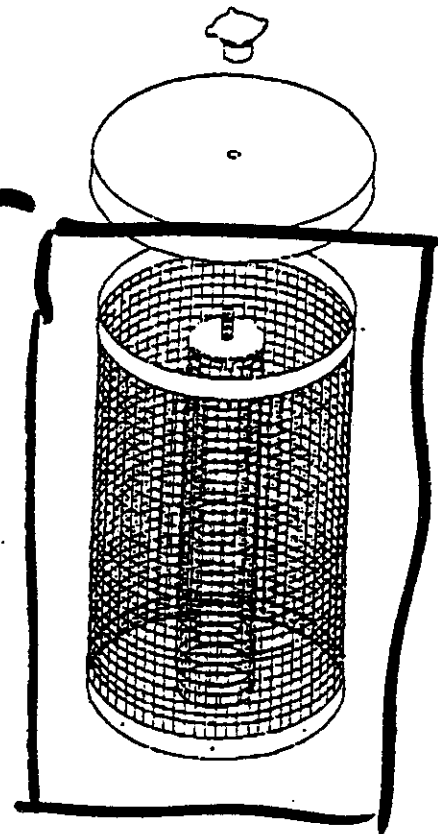
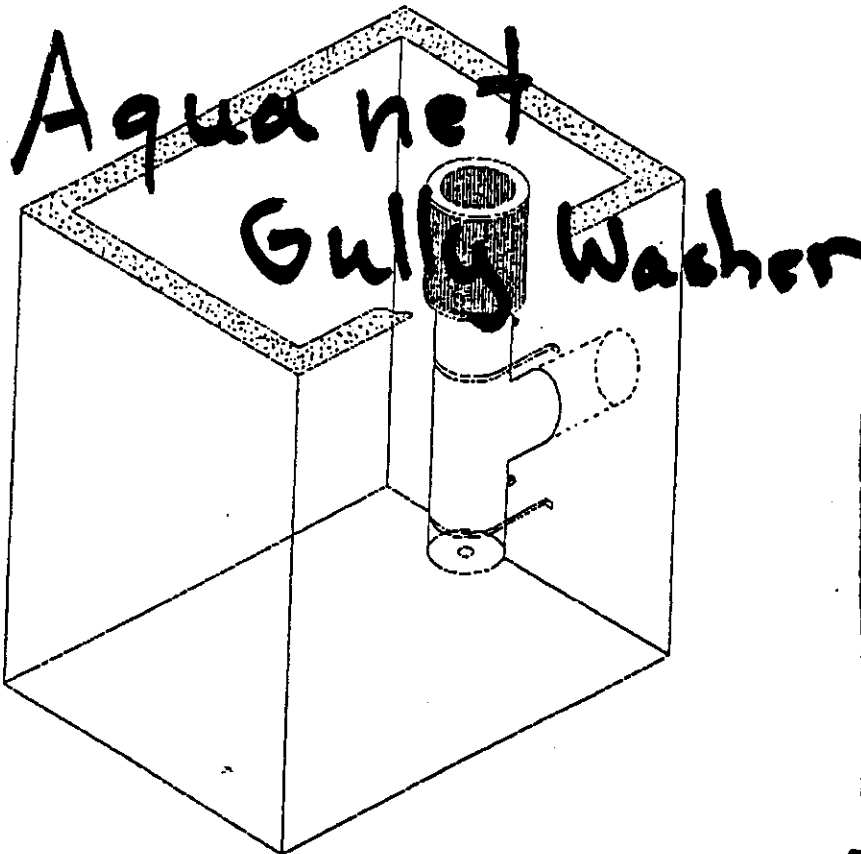


Aqua-Net catch basin insert used with 90 degree elbow and placed below the water line allows for both direct filtration and absorption of retained oil.

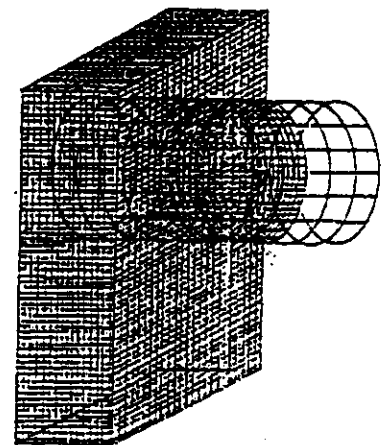
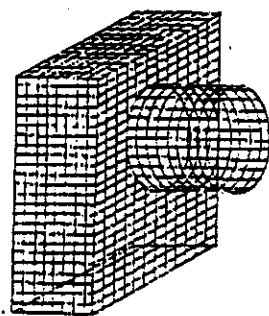
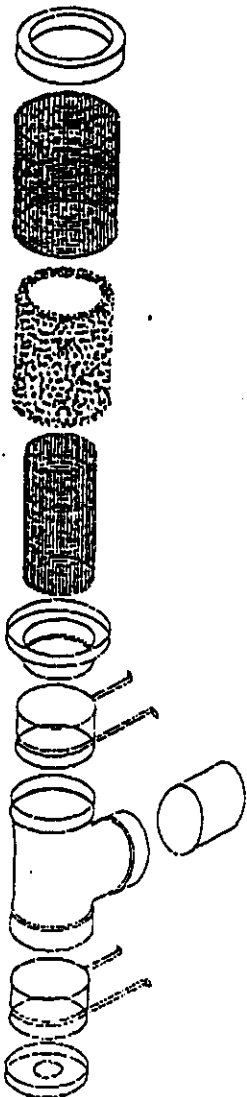
Standard 1/2" mesh basket with fixed top and bypass cut-outs. Use with absorbent to help reduce oil or without absorbent as a simple debris basket.



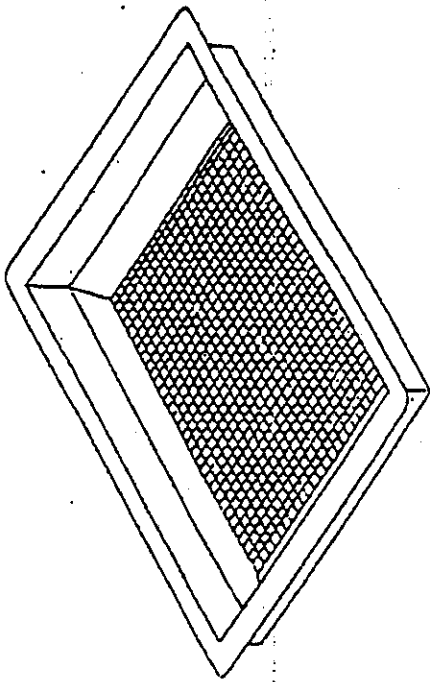
Aqua-Net filter cells for manholes, dry wells, and catch basins with sufficient rim to invert depths. Filter cells can be used with a variety of media including cellulose fiber absorbents, shredded polyurethane or polypropylene, and certified CSF[®] compost.



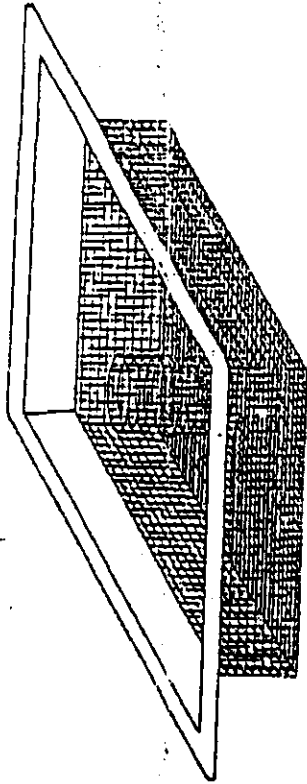
Tee sections can be fitted with filter cells (top and left) of various sizes to absorb floating oil, retain debris, and to help remove dissolved pollutants in manholes and catch basins. Media charges include cellulose fiber absorbents, shredded polyurethane or polypropylene, and certified CSF® compost. **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.



Aqua-Net all wire downturns provide an inexpensive means for retaining floatables and debris in catch basins. Wire systems can be clad with your choice of our fabric, screen, plastic netting or oil absorbent pads, pillows, and socks.

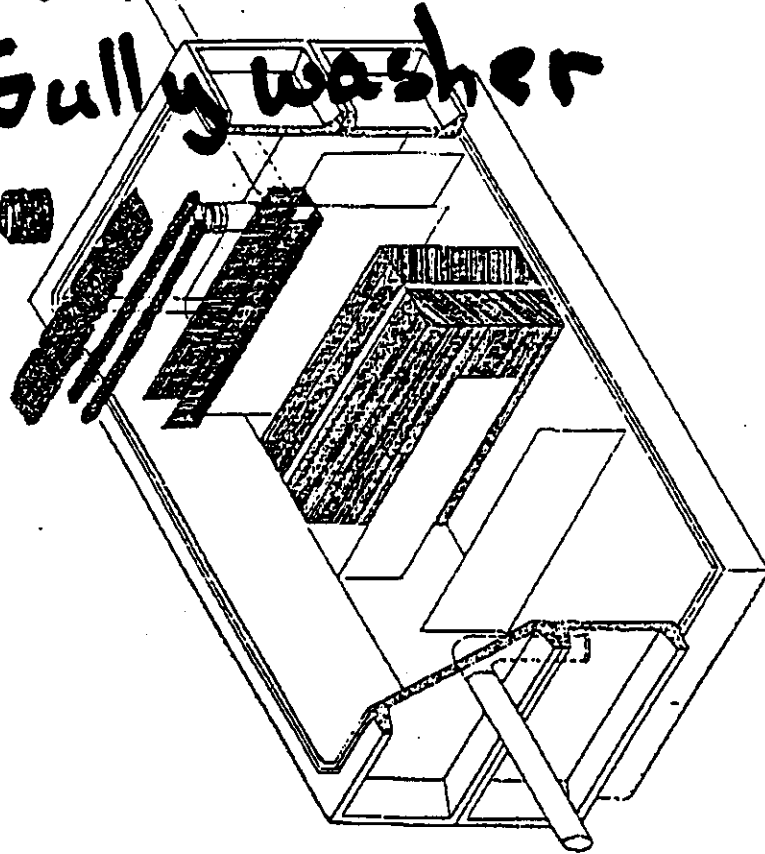


Filter fabric support tray for construction sites. Prevents fabric and collected sediment from falling into catch basin during change out. Reduces change out to one person. Fabric can be layered to peel off and filter ponded water.

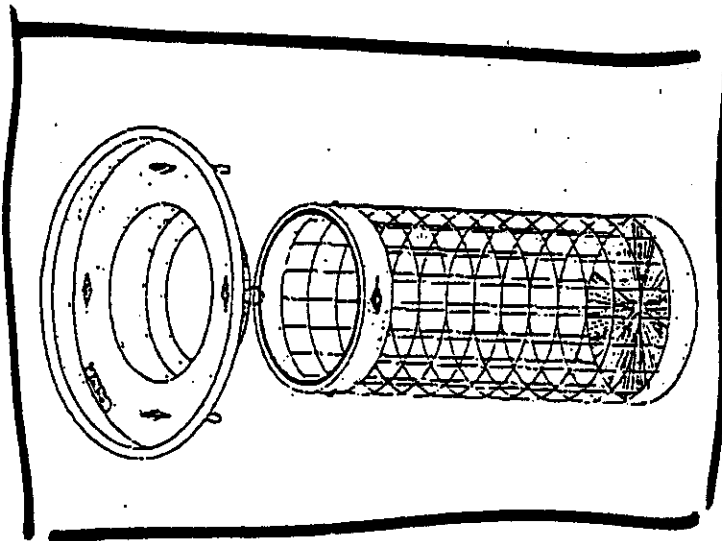


Filter fabric support tray with bypass. Support trays can also be used without fabric as simple debris screens.

Aqua-net Gully washer



Oil-water separator retrofit system. Absorbs floating oil in high flow conditions.

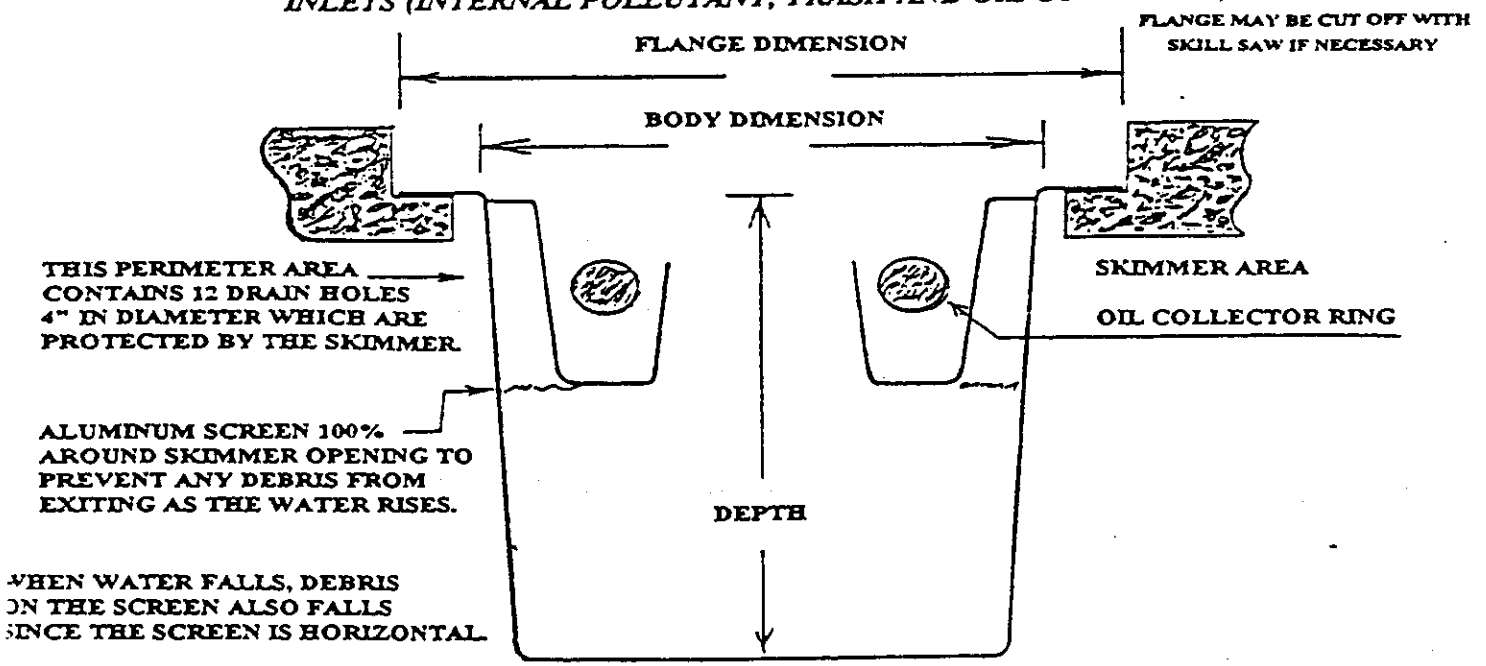


Sump filter baskets for waste water processing and eductor truck decant. Helps keep solids out of recycling and sewer systems. For use with our geotextile liners, screens, and plastic netting.

SUNTREE ISLES, INC., 720 MULLET RD., UNIT "H"
CAPE CANAVERAL, FL 32920
TEL: (407) 799-0001 FAX: (407) 799-1245



GRATE INLET SKIMMER BOX, AN EROSION CONTROL DEVICE FOR GRATED INLETS (INTERNAL POLLUTANT, TRASH AND OIL COLLECTOR)



SPECIAL SIZES AVAILABLE UPON REQUEST

LARGE FLANGE BODY SIZE			HIGH MID FLANGE BODY SIZE			LOW MID FLANGE BODY SIZE			SMALL FLANGE BODY SIZE		
28" X 36" — 22" X 30"			28" X 18" — 22" X 12"			24" X 24" — 18" X 18"			14" X 25" — 10" X 21"		
DEPTH			DEPTH			DEPTH			DEPTH		
36" MOD.	24" MOD.	18" MOD.	36" MOD.	24" MOD.	18" MOD.	36" MOD.	24" MOD.	18" MOD.	36" MOD.	24" MOD.	18" MOD.
283636	283624	283618	281836	281824	281818	242436	242424	242418	142536	142524	142518

TECHNICAL DATA

- WILL FIT ANY SIZE GRATE
- NO TOOLS REQUIRED FOR INSTALLATION
- ALTERATION OF EXISTING INLETS NOT REQUIRED
- CONTAINS OVERFLOW DRAINS SO UNIT NEVER OVERFLOWS EVEN IF IT IS NEVER CLEANED
- COMES COMPLETE WITH A 100% PERIMETER SKIMMER WITH TRASH SCREEN ATTACHED WHICH CAN BE REMOVED OR REPLACED WITH NO TOOLS REQUIRED
- ALSO AVAILABLE WITH UNIT IS AN ABSORBENT OIL COLLECTOR RING WHICH CAN BE ADDED OR REMOVED WITH NO TOOLS REQUIRED
- THE OIL COLLECTOR-RING IS 100% AROUND THE INSIDE PERIMETER OF THE GRATE WHICH ALLOWS 98% OF ALL WATER ENTERING THE UNIT FROM ALL DIRECTIONS TO PASS THROUGH AND AROUND THE OIL COLLECTOR ENSURING THAT MOST OF THE OIL IS COLLECTED IN THE MEMBRANE
- UNIT CONTAINS AN INTERNAL DRAINAGE SYSTEM FITTED WITH A FILTER SILT SCREEN WHICH ALLOWS ALL REMAINING WATER THAT DID NOT GO UP AND THROUGH THE SKIMMER TO BE FILTERED AND DRAINED OUT, PREVENTING MOSQUITO BREEDING
- BECAUSE OF THE WAY THE UNIT IS CONSTRUCTED WITH THE REMOVABLE OIL TRAY AND TRASH SKIMMER, IT IS VERY ADAPTABLE TO NEW ITEMS OR REQUIREMENTS AT THE PRESENT TIME AND IN THE FUTURE

