

O & M Manual

Project:

COMPASS PARK – INDIANA MASONIC HOME ROAD EXTENSION AND IMPROVEMENT

690 State ST
Franklin, Indiana 46131

Prepared For:

Compass Park – Indiana Masonic Home

690 State Street
Franklin, IN 46131

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC. Indianapolis, Indiana

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CEC Project 180-416

JUNE 2018



Civil & Environmental Consultants, Inc.

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1.0 OWNER CONTACT INFORMATION

Owners Name: IMH Realty Corp
C/O: Mr. Richard J. Elman
Owners Address: 690 State Street
Franklin, IN 46131

Business Phone:

The AS-6 mechanical water quality unit, underground detention detention pond, and associated storm sewer improvements will be maintained and operated by Indiana Masonic Home.

2.0 INTRODUCTION

The City of Franklin Subdivision Control Ordinance provides a variety of options for improving water quality using Best Management Practices (BMPs). In order to maintain water quality within the BMP, light maintenance activities will be needed to manipulate hydrology. This document defines responsibilities for operating, inspecting and maintaining the storm water BMP at 690 State Street in Franklin, Indiana. The AS-6 mechanical BMP along with underground detention are intended to provide water quality improvement.

3.0 STORM SEWER AND DRY DETENTION MAINTENANCE

Storm sewer inlets should be regularly maintained and cleaned of debris. All inlet castings should be inspected monthly and after each rainfall event. Inlets should be inspected more regularly when falling leaves are present. The maximum sediment depth should be no more than ¼ of the pipe diameter and up to a maximum depth of 6”.

The underground detention pond should be inspected quarterly for the first year of use and annually every year after. The maximum sediment depth should be no more than 6”.

Water and sediment from cleaning procedures should NOT be dumped into a sanitary sewer. Disposal of all sediment must be in accordance with all federal, state and local requirements.

Sample inspection logs are included in **Appendix A**.

Indiana Masonic Home will perform annual compliance inspections of all permanent BMPs.

Water Quality System Maintenance

The BMPs require certain items to be inspected on a monthly or annual basis during the existence of the BMP's. This is the responsibility of the owner. The City of Lebanon reserves the right to enter the property at any time to inspect the operation of any Best Management Practices (BMP) on site. More frequent inspections may need to take place during periods of heavy rainfall. Any needed repairs, even minor ones, are the responsibility of the owner and should be made as soon as possible so the BMPs may continue to function properly. Documentation of all repairs should be kept on file by the owner for review by City of Franklin inspectors.

Right of Entry - The City of Franklin may inspect the premises at any time necessary to determine the functionality of any BMPs onsite.

City of Franklin Note

The BMP shall be owned by the developer/property owner; any and all maintenance and repair activities shall be paid for by the owner. The requirements of the O&M manual shall remain in effect regardless of change in ownership of the development. It shall be the responsibility of the BMP owner to provide the O&M manual to future parties who will assume responsibility for the operation and maintenance of the post-construction storm water quality measures.

Indiana Masonic Home will perform annual compliance inspections of the BMP and provide the City records of inspections, maintenance, and repair of the BMP in accordance with this manual. In the event that the City of Franklin finds a BMP in need of maintenance or repair, the City will notify the landowner in writing of the necessary maintenance or repairs and give the landowner a timeframe for completing the maintenance or repairs. If the maintenance or repairs are not completed within the designated timeframe, the City of Franklin shall perform the repairs or maintenance and bill the landowner for the actual costs for the work.

3.1 MECHANICAL WATER QUALITY DEVICE

- Mechanical water quality device should be inspected every 6 months at a minimum.
- Refer to manufactures' recommended maintenance guidelines attached to this report.
- Inspect all drain inlet pipes for clogging or leaks. Remove all debris/ sediment and dispose of in accordance with all applicable federal and state requirements.
- Cleaning shall be done without the use of detergents or surfactants.
- Inspect mechanical water quality device for cracks or damage. Repair as necessary.

3.2 BMP CHECKLIST – STORMCEPTOR AS-11

- A. The maximum sediment depth should be 6”.
- B. Inspect the diversion structure including the orifices and hood devices.
- C. Measure depth of sediment at water quality structure utilizing tape measure or Sludge Judge. When sediment exceeds 6” above invert elevation of outlet, remove sediment.
- D. Ensure that oil or other contaminants do not enter storm sewer system during routine cleaning. If oil is encountered, remove sediment with a vacuum truck.
- E. Entry into the water quality unit should be considered an OSHA confined space and OSHA guidelines should be followed.
- F. Water and sediment from water quality structure should NOT be dumped into a sanitary sewer.
- G. The minimum inspection frequency should be 6 months. The unit must be cleaned out a minimum of once every 12 months.
- H. The inspection and maintenance of the diversion manhole and weir must be cleaned and similar to the water quality requirements.
- I. See the detail for the AS-6 unit included in **Appendix B**.
- J. Clean the AS-6 Unit immediately if there is a hydrocarbon spill. Adsorbent pads for oil removal must be immediately applied to prevent hydrocarbons from migrating downstream.

4.0 SUMMARY

The objective of the operation and maintenance manual is to allow the owner of the storm management system to manage the system to the City of Franklin specifications. The City requires minimal information for their records:

- 1. Maintenance agreement. The agreement requires the owner to comply with the maintenance set forth in the manual.
- 2. Monthly and annual data sheets and repair documentation must be kept on site for the City Inspectors to review during their annual inspection of the site.

Data sheets are included to ensure that all the required maintenance is conducted to maintain the integrity and design features of the mechanical unit.

APPENDIX A
DETENTION INSPECTION CHECKLIST

Underground Detention and Outlet Structure Operation, Maintenance, and Management Inspection Checklist

Project: _____

Location: _____

Date: _____ Time: _____

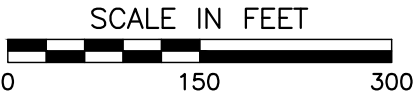
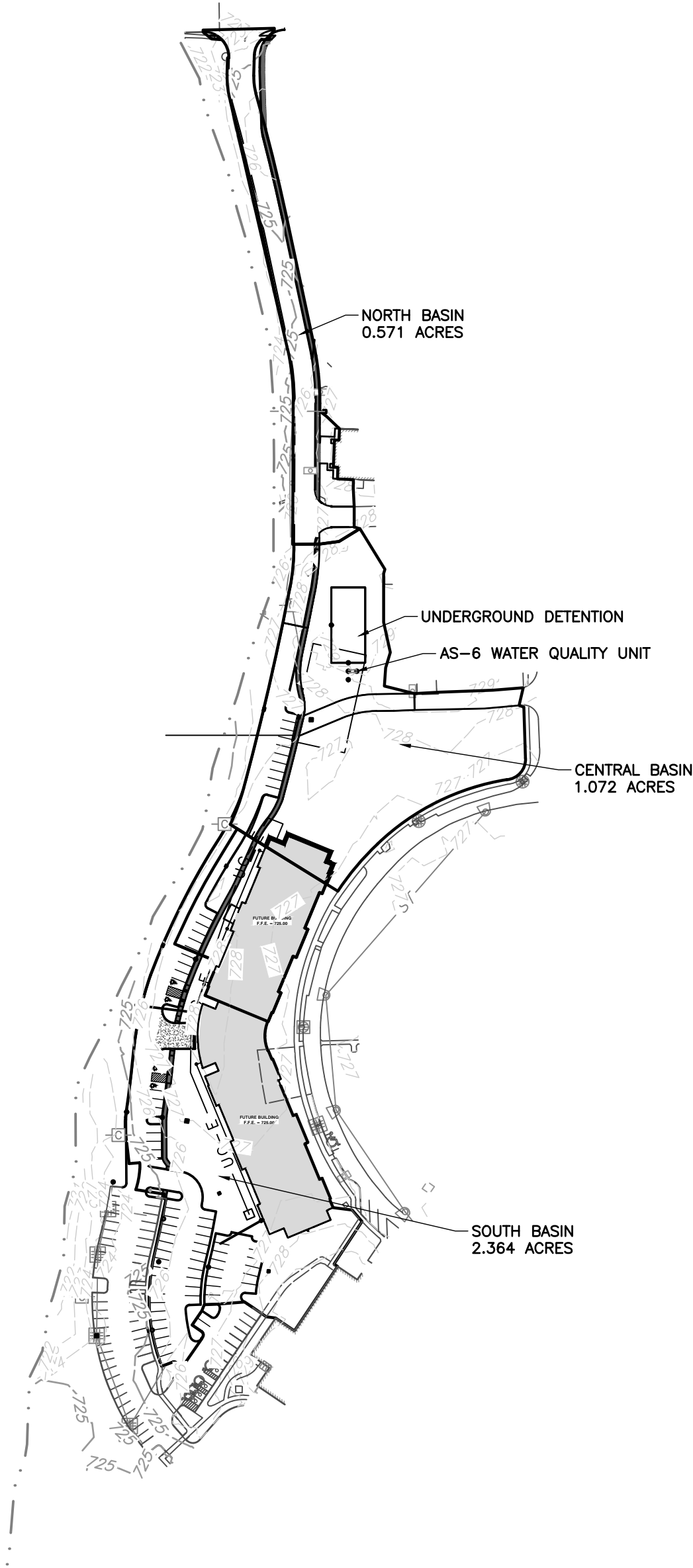
Inspector: _____ Title: _____


Signature: _____

Maintenance Item	<u>S</u> atisfactory/ <u>U</u> nsatisfactory	Comments
<u>Inlet Structures</u>		
Drainage clear and functioning		
Concrete/ Masonry condition		
Excessive sediment buildup- sump not more than 50% full of sediment		
Inlet area clear of debris		
<u>Detention System-Outlet Control Structure</u>		
Outlet control structure free of debris		
No evidence of erosion		
Outlet pipe in good condition		
Orifices free from obstruction		
Detention System Free of Sediment		

Actions to be taken: _____

APPENDIX B
BMP MAP



<div> Civil & Environmental Consultants, Inc. 530 E. Ohio Street, Suite G - Indianapolis, IN 46204 317-655-7777 · 877-746-0749 www.cecinc.com</div>	DRAWN BY: EAJ	CHECKED BY: DRAFT	COMPASS PARK INDIANA MASONIC HOME 690 STATE STREET FRANKLIN, INDIANA 46131	
			BMP MAP	
DATE: JUNE 5, 2018	DWG SCALE: 1"=150'	APPROVED BY: DRAFT	FIGURE NO.: B-1	
		PROJECT NO: 180-416		

APPENDIX C
AS-6 MANUFACTURER RECOMMENDED INPECTION AND
MAINTENANCE MANUAL



Aqua-Swirl[®]

Stormwater Treatment System

Inspection and Maintenance Manual



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AquaShield™, Inc

Stormwater Treatment Solutions

The highest priority of AquaShield™, Inc. (AquaShield™) is to protect waterways by providing stormwater treatment solutions to businesses across the world. These solutions have a reliable foundation based on over 20 years of water treatment experience.

Local regulators, engineers, and contractors have praised the AquaShield™ systems for their simple design and ease of installation. All the systems are fabricated from high performance, durable and lightweight materials. Contractors prefer the quick and simple installation of our structures that saves them money.

The patented line of AquaShield™ stormwater treatment products that provide high levels of stormwater treatment include the following:

- **Aqua-Swirl® Stormwater Treatment System:** hydrodynamic separator, which provides a highly effective means for the removal of sediment, floating debris and free-oil.
- **Aqua-Filter™ Stormwater Filtration System:** treatment train stormwater filtration system capable of removing gross contaminants, fine sediments, waterborne hydrocarbons, heavy metals and total phosphorous.



**Aqua-Swirl® Stormwater
Treatment System**



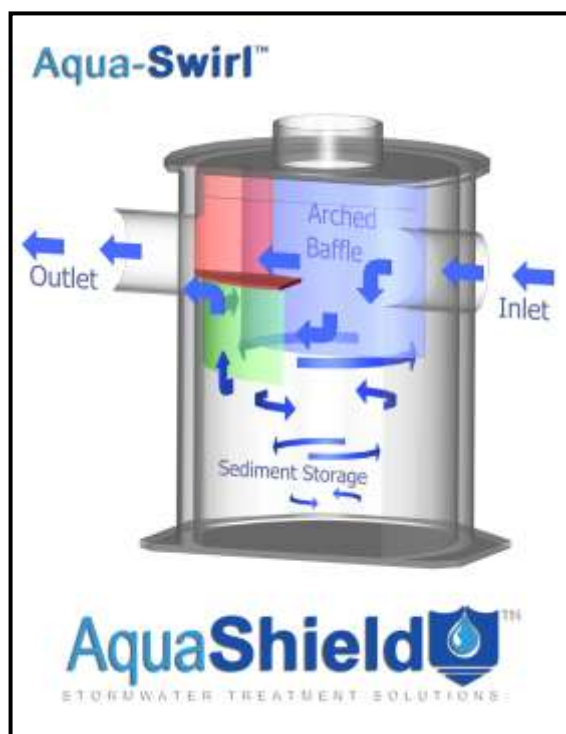
**Aqua-Filter™ Stormwater
Filtration System**



Aqua-Swirl® Stormwater Treatment System

The patented Aqua-Swirl® Stormwater Treatment System is a single chamber hydrodynamic separator which provides a highly effective means for the removal of sediment, free oil, and floating debris. Both treatment and storage are accomplished in the swirl chamber without the use of multiple or “blind” chambers. Independent laboratory and field performance verifications have shown that the Aqua-Swirl® achieves over 80% suspended solids removal efficiency on a net annual basis.

The Aqua-Swirl® is most commonly installed in an “off-line” configuration. Or, depending on local regulations, an “in-line” (on-line) conveyance flow diversion (CFD) system can be used. The CFD model allows simple installation by connecting directly to the existing storm conveyance pipe thereby providing full treatment of the “first flush,” while the peak design storm is diverted and channeled through the main conveyance pipe.



The patented Aqua-Swirl® Stormwater Treatment System provides a highly effective means for the removal of sediment, floating debris, and free oil. Swirl technology, or vortex separation, is a proven form of treatment utilized in the stormwater industry to accelerate gravitational separation.



Floatable debris in the Aqua-Swirl®

Each Aqua-Swirl® is constructed of high performance, lightweight and durable materials including polymer coated steel (PCS), high density polyethylene (HDPE), or fiberglass reinforced polymer (FRP). These materials eliminate the need for heavy lifting equipment during installation.



System Operation

The treatment operation begins when stormwater enters the Aqua-Swirl® through a tangential inlet pipe that produces a circular (or vortex) flow pattern that causes contaminants to settle to the base of the unit. Since stormwater flow is intermittent by nature, the Aqua-Swirl® retains water between storm events providing both dynamic and quiescent settling of solids. The dynamic settling occurs during each storm event while the quiescent settling takes place between successive storms. A combination of gravitational and hydrodynamic drag forces encourages the solids to drop out of the flow and migrate to the center of the chamber where velocities are the lowest.

The treated flow then exits the Aqua-Swirl® behind the arched outer baffle. The top of the baffle is sealed across the treatment channel, thereby eliminating floatable pollutants from escaping the system. A vent pipe is extended up the riser to expose the backside of the baffle to atmospheric conditions, preventing a siphon from forming at the bottom of the baffle.



Custom Applications

The Aqua-Swirl® system can be modified to fit a variety of purposes in the field, and the angles for inlet and outlet lines can be modified to fit most applications. The photo below demonstrates the flexibility of Aqua-Swirl® installations using a “twin” configuration in order to double the

water quality treatment capacity. Two Aqua-Swirl[®] units were placed side by side in order to treat a high volume of water while occupying a small amount of space.



Custom designed AS-9 Twin Aqua-Swirl[®]



Retrofit Applications

The Aqua-Swirl[®] system is designed so that it can easily be used for retrofit applications. With the invert of the inlet and outlet pipe at the same elevation, the Aqua-Swirl[®] can easily be connected directly to the existing storm conveyance drainage system. Furthermore, because of the lightweight nature and small footprint of the Aqua-Swirl[®], existing infrastructure utilities (i.e., wires, poles, trees) would be unaffected by installation.



AquaShield[™] Product System Maintenance

The long term performance of any stormwater treatment structure, including manufactured or land based systems, depends on a consistent maintenance plan. Inspection and maintenance functions are simple and easy for the AquaShield[™] Stormwater Treatment Systems allowing all inspections to be performed from the surface.

It is important that a routine inspection and maintenance program be established for each unit based on: (a) the volume or load of the contaminants of concern, (b) the frequency of releases of contaminants at the facility or location, and (c) the nature of the area being drained.

In order to ensure that our systems are being maintained properly, AquaShield[™] offers a maintenance solution to all of our customers. We will arrange to have maintenance performed.



Inspection

All AquaShield™ products can be inspected from the surface, eliminating the need to enter the systems to determine when cleanout should be performed. In most cases, AquaShield™ recommends a quarterly inspection for the first year of operation to develop an appropriate schedule of maintenance. Based on experience of the system's first year in operation, we recommend that the inspection schedule be revised to reflect the site-specific conditions encountered. Typically, the inspection schedule for subsequent years is reduced to semi-annual inspection.

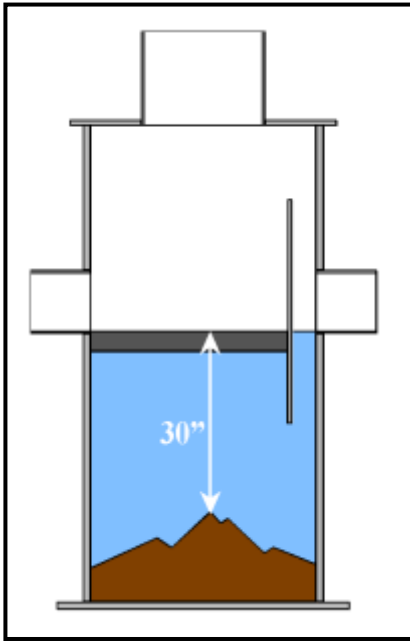


Aqua-Swirl® Maintenance

The Aqua-Swirl® has been designed to minimize and simplify the inspection and maintenance process. The single chamber system can be inspected and maintained entirely from the surface thereby eliminating the need for confined space entry. Furthermore, the entire structure (specifically, the floor) is accessible for visual inspection from the surface. There are no areas of the structure that are blocked from visual inspection or periodic cleaning. Inspection of any free-floating oil and floatable debris can be directly observed and maintained through the manhole access provided directly over the swirl chamber.

Aqua-Swirl® Inspection Procedure

To inspect the Aqua-Swirl®, a hook is needed to remove the manhole cover. AquaShield™ provides a customized manhole cover with our distinctive logo to make it easy for maintenance crews to locate the system in the field. We also provide a permanent metal information plate affixed inside the access riser which provides our contact information, the Aqua-Swirl® model size, and serial number.



Maintain system when sediment is 42-48 inches below water surface. Maximum sediment storage capacity reached when sediment is 30 inches below water surface.



**Sediment inspection
using a stadia rod in a
single chamber**

The only tools needed to inspect the Aqua-Swirl[®] system are a flashlight and a measuring device such as a stadia rod or pole. Given the easy and direct accessibility provided, floating oil and debris can be observed directly from the surface. Sediment depths can easily be determined by lowering a measuring device to the top of the sediment pile and to the surface of the water. When the sediment pile is within 42 to 48 inches of the water surface (or sediment pile thickness is 18 to 24 inches as measured from the base), the system should be maintained. The maximum sediment storage capacity of the Aqua-Swirl[®] is reached when the sediment pile is within 30 inches of the water surface (or sediment accumulation is 36 inches thick as measured from the base).

It should be noted that in order to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the *top* of the sediment pile. Keep in mind that the finer sediment at the top of the pile may offer less resistance to the measuring device than the larger particles which typically occur deeper within the sediment pile.

The Aqua-Swirl[®] design allows for the sediment to accumulate in a semi-conical fashion as illustrated above. That is, the depth to sediment as measured below the water surface may be less in the center of the swirl chamber; and likewise, may be greater at the edges of the swirl chamber.

Aqua-Swirl[®] Cleanout Procedure

Cleaning the Aqua-Swirl[®] is simple and quick. Free-floating oil and floatable debris can be observed and removed directly through the 30-inch service access riser provided. A vacuum truck is typically used to remove the accumulated sediment and debris. An advantage of the

Aqua-Swirl[®] design is that the entire sediment storage area can be reached with a vacuum hose from the surface (reaching all the sides). Since there are no multiple or limited (hidden or “blind”) chambers in the Aqua-Swirl[®], there are no restrictions to impede on-site maintenance tasks.

Disposal of Recovered Materials

Disposal of recovered material is typically handled in the same fashion as catch basin cleanouts. AquaShield[™] recommends that all maintenance activities be performed in accordance with appropriate health and safety practices for the tasks and equipment being used.

AquaShield[™] also recommends that all materials removed from the Aqua-Swirl[®] and any external structures (e.g, bypass features) be handled and disposed in full accordance with any applicable local and state requirements.



**Vacuum truck quickly cleans the Aqua-Swirl[®]
from a single chamber**

***Aqua-Swirl[®] Inspection and Maintenance Work Sheets
on following pages***

Aqua-Swirl® Inspection and Maintenance Manual

Work Sheets

SITE and OWNER INFORMATION

Site Name: _____

Site Location: _____

Date: _____ Time: _____

Inspector Name: _____

Inspector Company: _____ Phone #: _____

Owner Name: _____

Owner Address: _____

Owner Phone #: _____ Emergency Phone #: _____

INSPECTIONS

I. Floatable Debris and Oil

1. Remove manhole lid to expose liquid surface of the Aqua-Swirl®.
2. Remove floatable debris with basket or net if any present.
3. If oil is present, measure its depth. Clean liquids from system if one half (1/2) inch or more oil is present.

Note: Water in Aqua-Swirl® can appear black and similar to oil due to the dark body of the surrounding structure. Oil may appear darker than water in the system and is usually accompanied by oil stained debris (e.g. Styrofoam, etc.). The depth of oil can be measured with an oil/water interface probe, a stadia rod with water finding paste, a coliwasa, or collect a representative sample with a jar attached to a rod.

II. Sediment Accumulation

1. Lower measuring device (e.g. stadia rod) into swirl chamber through service access provided (Figure 1). From a reference point at the top of the service access:
2. Record distance to top of sediment pile (Figure 2): _____ inches
3. Record distance to top of water surface: _____ inches
4. Calculate distance to sediment minus distance to water: _____ inches
5. Schedule cleaning if value in Step #4 is 48 to 42 inches or less. The sediment storage capacity is exceeded when the depth to sediment is within 30 inches of the water surface and maintenance should be performed immediately.



Figure 1. Measuring sediment in swirl chamber using stadia rod. Inspections are performed from the surface through the manhole access cover.

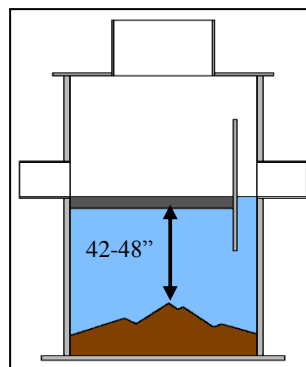


Figure 2. Maintain system when sediment is 42 to 48 inches below water surface to ensure proper system operation and performance. Maximum sediment storage capacity is reached when sediment is 30 inches below water surface.

III. Diversion Structures (External Bypass Features)

If a diversion (external bypass) configuration is present, it should be inspected as follows:

1. Inspect weir or other bypass feature for structural decay or damage. Weirs are more susceptible to damage than off-set piping and should be checked to confirm that they are not crumbling (concrete or brick) or decaying (steel).
2. Inspect diversion structure and bypass piping for signs of structural damage or blockage from debris or sediment accumulation.
3. When feasible, measure elevations on diversion weir or piping to ensure it is consistent with site plan designs.
4. Inspect downstream (convergence) structure(s) for sign of blockage or structural failure as noted above.

CLEANING

Schedule cleaning with local vector company or AquaShield™ to remove sediment, oil and other floatable pollutants. The captured material generally does not require special treatment or handling for disposal. Site-specific conditions or the presence of known contaminants may necessitate that appropriate actions be taken to clean and dispose of materials captured and retained by the Aqua-Swirl®. All cleaning activities should be performed in accordance with property health and safety procedures.

AquaShield™ always recommends that all materials removed from the Aqua-Swirl® during the maintenance process be handled and disposed in accordance with local and state environmental or other regulatory requirements.

MAINTENANCE SCHEDULE

I. During Construction

Inspect the Aqua-Swirl[®] every three (3) months and clean the system as needed. The Aqua-Swirl[®] should be inspected and cleaned at the end of construction regardless of whether it has reached its maintenance trigger (42 to 48 inches below water surface), sediment storage capacity (30 inches below water surface).

II. First Year Post-Construction

Inspect the Aqua-Swirl[®] every three (3) months and clean the system as needed.

Inspect and clean the system once annually regardless of whether it has reached its sediment or floatable pollutant storage capacity.

III. Second and Subsequent Years Post-Construction

If the Aqua-Swirl[®] did not reach full sediment or floatable pollutant capacity in the First Year Post-Construction period, the system can be inspected and cleaned once annually.

If the Aqua-Swirl[®] reached full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction period, the system should be inspected once every six (6) months and cleaned as needed. The Aqua-Swirl[®] should be cleaned annually regardless of whether it reaches its sediment or floatable pollutant capacity.

IV. Bypass Structures

Bypass structures should be inspected whenever the Aqua-Swirl[®] is inspected. Maintenance should be performed on bypass structures as needed.

MAINTENANCE COMPANY INFORMATION

Company Name: _____

Street Address: _____

City: _____ State/Prov.: _____ Zip/Postal Code: _____

Contact: _____ Title: _____

Office Phone: _____ Cell Phone: _____

ACTIVITY LOG

Date of Cleaning: _____ (Next inspection should be 3 months from this data for first year).

Time of Cleaning: Start: _____ End: _____

Date of Next Inspection: _____

Floatable debris present: Yes No

Notes: _____

Oil present: Yes No Oil depth (inches): _____

Measurement method and notes: _____

STRUCTURAL CONDITIONS and OBSERVATIONS

Structural damage: Yes No Where: _____

Structural wear: Yes No Where: _____

Odors present: Yes No Describe: _____

Clogging: Yes No Describe: _____

Other Observations: _____

NOTES

Additional Comments and/or Actions To Be Taken	Time Frame

ATTACHMENTS

- Attach site plan showing Aqua-Swirl[®] location.
- Attach detail drawing showing Aqua-Swirl[®] dimensions and model number.
- If a diversion configuration is used, attach details showing basic design and elevations (where feasible).

Aqua-Swirl®

TABULAR MAINTENANCE SCHEDULE

Date Construction Started: _____

Date Construction Ended: _____

During Construction

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as needed			X			X			X			X
Inspect Bypass and maintain as needed			X			X			X			X
Clean System*												X*

* The Aqua-Swirl® should be cleaned **once a year** regardless of whether it has reached full pollutant storage capacity. In addition, the system should be cleaned at the **end of construction** regardless of whether it has reach full pollutant storage capacity.

First Year Post-Construction

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as needed			X			X			X			X
Inspect Bypass and maintain as needed			X			X			X			X
Clean System*												X*

* The Aqua-Swirl® should be cleaned **once a year** regardless of whether it has reached full pollutant storage capacity.

Second and Subsequent Years Post-Construction

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as needed												X*
Inspect Bypass, maintain as needed												X*
Clean System*												X*

* If the Aqua-Swirl® did **not** reach full sediment or floatable pollutant capacity in the First Year Post-Construction period, the system can be inspected and cleaned once annually.

If the Aqua-Swirl® **reached** full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction period, the system should be inspected once every six (6) months or more frequently if past history warrants, and cleaned as needed. The Aqua-Swirl® should be cleaned annually regardless of whether it reaches its full sediment or floatable pollutant capacity.