BREWSTER VILLAGE
STORM SEWER SYSTEM MAINTENANCE AGREEMENT

THIS STORM SEWER SYSTEM MAINTENANCE AGREEMENT is made this 10th day of June, 2020 by and between the City of Rochester Hills, a Michigan municipal corporation (the "City"), whose address is 1000 Rochester Hills Drive, Rochester Hills, Michigan 49309-3033, and Robertson Brewster Village, LLC, a Michigan limited liability company ("Developer"), whose address is 6905 Telegraph Road, Suite 200, Bloomfield Hills, MI 48301.

RECITALS:

A. Developer is the owner of certain real property located in the City of Rochester Hills, Oakland County, Michigan, which real property is more particularly described in Exhibit A attached hereto and incorporated herein (the "Property").

B. Developer intends to develop the Property as a residential community to be known as Brewster Village, a detached condominium development (hereinafter known as the "Development") and has established the Brewster Village Association ("Association") to manage and administer the affairs of the Development.

C. The Development will alter the natural flow of surface and storm water drainage.

D. Developer desires to extend to the future condominium unit owners within the Development the right to utilize and benefit from the storm water facilities and to provide a permanent method for the support and upkeep of said facilities.

E. Developer has proposed and the City has approved a storm water drainage system (the "Storm Sewer System") as shown in Exhibit B attached hereto and incorporated herein (the "Storm System Plan") and both the Developer and the City will benefit from the proper operation, use and maintenance of the Storm Sewer System and desire to enter into this binding contract relative to the use and governance of the areas described and fully delineated in the condominium Development site plan (the "Condominium Subdivision Plan").

F. Developer also intends to bind the condominium unit owners in the Development to this Agreement so this Agreement is intended to run with the land.

NOW, THEREFORE, in consideration of the approval by the City of the Condominium Subdivision Plan and of the mutual promises contained herein, the parties hereto agree as follows:

1. **Storm Sewer System.** Pursuant to the Condominium Subdivision Plan, Developer hereby makes available and will grant to each of the condominium unit owners in the Development the right to utilize, maintain, replace and repair the Storm Sewer System, including but not limited to the storm sewer lines existing within the Development and delineated in the Condominium Subdivision Plan. Components of the Storm Water System, including any and all water conveyance, storm sewer pipe, catch basins, manholes, end-sections, ditches, swales, open water courses and rip-rap, shall be used solely for the purpose of conveying and detaining storm and surface drainage in the Development until such time as: (i) the City determines and notifies the Developer or Developer's successors and assigns, including the Association, in writing that it is no longer necessary to convey, or detain the storm and surface drainage; and (ii) an adequate alternative for conveying and detaining storm and surface drainage has been provided which is acceptable to the City and which includes the granting of any easements to the City or third parties as may be required or necessary for the alternative drainage system.

2. **Condominium Association for Brewster Village.** Control and jurisdiction over the Storm Sewer System shall be vested in the Association. The Association is organized as a nonprofit corporation for a perpetual term under the laws of the State of Michigan. The Association was incorporated on May 21, 2019. Membership in the Association shall be mandatory for all of the condominium unit owners in the Development. The Association shall be responsible at its sole expense for the proper maintenance of the Storm Sewer System and for compliance with the terms of this Agreement. The Bylaws of the Association shall provide for a Board of Directors of no less than three (3) members.

The Association members shall each bear their prorata share of the total costs of maintaining the Storm Sewer System (including without limitation, the real and personal property taxes assessed against it, if any, and insurance policies maintained with respect to it), which shall constitute a lien against each member's condominium unit. The prorated share of the cost shall be based on each condominium unit owner's percentage of value as set forth in the Master Deed for Brewster Village. Each Association member shall be entitled to vote in accordance with the Master Deed for Brewster Village. The Association members shall also bear their prorate share of the total costs of maintaining the off-site shared storm water system, shared with the Shadow Woods Subdivision Association.

The Association shall have the authority to make and enforce regulations pertaining to the use and maintenance of the Storm Sewer System, which regulations shall be binding upon all members of the Association.

3. **Maintenance of Storm Sewer System.** The Association shall be responsible for the proper. maintenance, repair and replacement of the Storm Water System and all parts thereof as required in the Master Deed for the Development and detailed in the maintenance plan attached hereto as Exhibit C. Proper maintenance of the Storm Water System shall include, but is not limited to, (i) maintaining the Storm Water System structures, end-sections and safety features; and (ii) any other maintenance that is reasonable and necessary to facilitate and continue the proper operation of the Storm Water System.

4. **Failure to Maintain Storm Sewer System.** In the event the Association fails at any time to maintain the Storm Sewer System in reasonable order and condition, the City may serve written notice upon the Association or upon its members setting forth the manner in which the Association has failed to maintain the Storm Sewer System in a reasonable condition and such notice shall include a demand that deficiencies of maintenance be cured within thirty

(30) days thereof. The notice shall further state the date and place of a hearing thereon before the City Council or other such board, body or official to whom the City shall delegate such responsibility, which shall be held at least fourteen (14) days after the date of the notice. At such hearing, the City Council or other designated board, body or official may affirm or modify the list and description of maintenance deficiencies and, for good cause shown, may give an extension of the time within they shall be cured.

Thereafter, if the deficiencies set forth in the original notice, or in the modification thereof, shall not be cured within the time allowed, the City may maintain the same for a period of one (1) year. Such maintenance by the City shall not be construed as a trespass, constitute a taking of the Storm Sewer System, nor vest in the public any rights to use or enter the Storm Water System. Thereafter, if the Association does not properly maintain the Storm Water System, the City may, after providing similar written notice, schedule and hold another hearing to determine whether the City should maintain the Storm Water System for another year, and subject to a similar notice, hearing and determination in subsequent years.

In the event the City determines an emergency condition caused by or relating to the Storm Water System threatens the public health, safety or general welfare, the City shall have the right to immediately and without notice enter the Storm Water System and undertake appropriate corrective action.

5. **Charges.** The cost of any maintenance by the City, plus a ten percent (10%) administrative fee, shall be assessed against the Association and, if not timely paid, added to the tax rolls, which charges shall be a lien on the Storm Water System and shall be collectable and enforceable in the same manner general property taxes are collected and enforced. The City shall be, at its option, subrogated to the right of the Association against its members to the extent of that cost and administrative charge, if the City shall, by an official resolution, give thirty (30) days written notice to each member of the Association of the City's election to be subrogated. The Association members shall bear their prorata share of the total costs of maintaining the Storm Sewer System, which prorata share of the cost shalt constitute a lien against each member's condominium unit and if not paid, the City shall have the right to add it to the tax rolls and collect it in the same manner as provided above. The prorated share of the cost shall be based on each condominium unit owner's percentage of value as set forth in the Master Deed for Brewster Village. The cost of maintenance by the City shall be assessed against the Association or the Association members at the City's discretion.

In the event the City declares the existence of an emergency upon, caused by or relating to the Storm Sewer System, and the City takes appropriate corrective action, the City shall have the right to charge and collect the costs for such corrective action, as provided herein.

6. **Notice.** Any notices required under this Agreement shall be sent by certified mail to the address for each party set forth below, or to such other addresses as such party may notify the other parties in writing:

To the Developer: Robertson Brewster Village, LLC
6905 Telegraph Road, Suite 200
Bloomfield Hills, Michigan 48301-3159

To the City:

City Clerk
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, Michigan 48309

To the Association:

Brewster Village Association
6905 Telegraph Road, Suite 200
Bloomfield Hills, Michigan 48301-3159

7. **Successors and Assigns, etc.** This Agreement shall constitute restrictions and covenants running with the Property. The parties hereto make this Agreement on behalf of themselves and their respective successors and assigns, and hereby warrant that they have the authority and capacity to make this contract.

8. **Recording.** This Agreement shall be recorded at the Oakland County Register of Deeds.

[Signatures and Acknowledgements on Following Page]

IN WITNESS WHEREOF, the parties have executed this agreement on the date first written above.

ROBERTSON BREWSTER VILLAGE, LLC,
a Michigan limited liability company

BY: ROBERTSON BROTHERS CO.,
a Michigan corporation, Manager

By: _____
James V. Clarke
Its: President

STATE OF MICHIGAN)
) SS.
COUNTY OF OAKLAND)

The foregoing instrument was acknowledged before me this 10th day of June, 2020, by James V. Clarke, President of Robertson Brothers Co., a Michigan corporation, a Manager of Robertson Brewster Village, LLC, a Michigan limited liability company, on behalf of the corporation and company.

JENIFER PETTITT
Notary Public - State of Michigan
County of Oakland
My Commission Expires Dec 7, 2024
Acting in the County of Oakland

_____, Notary Public
Oakland County, Michigan
Acting in Oakland County, Michigan
My Commission Expires: 12-07-2024

BREWSTER VILLAGE ASSOCIATION,
a Michigan non-profit corporation

By: _____
James V. Clarke
Its: President

STATE OF MICHIGAN)
) SS.
COUNTY OF OAKLAND)

The foregoing instrument was acknowledged before me this 10th day of June, 2020, by James V. Clarke, President of Brewster Village Association, a Michigan non-profit corporation, on behalf of the corporation.

JENIFER PETTITT
Notary Public - State of Michigan
County of Oakland
My Commission Expires Dec 7, 2024
Acting in the County of Oakland

_____, Notary Public
Oakland County, Michigan
Acting in Oakland County, Michigan
My Commission Expires: 12-07-2024

CITY OF ROCHESTER HILLS

BY: _____
Bryan K. Barnett, Mayor

By: _____
Tina Barton, City Clerk

STATE OF MICHIGAN)
) SS.
COUNTY OF OAKLAND)

The foregoing instrument was acknowledged before me this ____ day of _____, 2020, by Bryan K. Barnett, Mayor, and Tina Barton, City Clerk, of the City of Rochester Hills, on behalf of the City.

_____
, Notary Public
_____County, Michigan
Acting in _____County, Michigan
My Commission Expires: _____

Drafted by:

John Staran
Approved 6/24/20

C. Kim Shierk, of
Williams, Williams, Rattner & Plunkett, P.C.
380 North Old Woodward Avenue, Suite 300
Birmingham, Michigan 48009

When recorded return to:

Clerk's Department
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, Michigan 48309

EXHIBIT A

PROPERTY DESCRIPTION

LEGAL DESCRIPTION - PROPERTY
(PROPOSED BREWSTER VILLAGE CONDOMINIUM)

PART OF THE SOUTHWEST 1/4 OF SECTION 8, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 8; THENCE SOUTH 89 DEGREES 57 MINUTES 18 SECONDS EAST, 11.55 FEET TO THE PROPERTY CONTROLLING CORNER; THENCE NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST ALONG THE PROPERTY CONTROLLING LINE BETWEEN THE SAID PROPERTY CONTROLLING CORNER AND THE CENTER POST OF SAID SECTION 8, 620.24 FEET; THENCE SOUTH 85 DEGREES 56 MINUTES 50 SECONDS WEST, 60.00 FEET TO THE POINT OF BEGINNING; THENCE SOUTH 85 DEGREES 56 MINUTES 50 SECONDS WEST, 211.51 FEET; THENCE NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST, 110.00 FEET; THENCE SOUTH 85 DEGREES 56 MINUTES 50 SECONDS WEST, 467.95 FEET; THENCE NORTH 03 DEGREES 47 MINUTES 21 SECONDS WEST, 257.86 FEET TO A POINT ON THE SOUTH LINE OF SHADOW WOODS SUBDIVISION No. 1, AS RECORDED IN LIBER 160 OF PLATS, ON PAGES 30 THROUGH 35, OAKLAND COUNTY RECORDS; THENCE THE FOLLOWING THREE (3) COURSES ALONG THE SOUTH AND EAST LINES OF SAID SHADOW WOODS SUBDIVISION No. 1: 1) SOUTH 89 DEGREES 34 MINUTES 48 SECONDS EAST, 240.52 FEET, 2) NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST, 300.91 FEET AND 3) SOUTH 89 DEGREES 34 MINUTES 48 SECONDS EAST, 439.82 FEET TO A POINT ON THE WEST RIGHT OF WAY LINE OF BREWSTER ROAD (103 FEET WIDE); THENCE SOUTH 04 DEGREES 03 MINUTES 10 SECONDS EAST ALONG SAID WEST RIGHT OF WAY LINE, 615.71 FEET TO THE POINT OF BEGINNING.

CONTAINS 312,264 SQ. FT. OR 7.17 ACRES OF LAND.

#15-08-376-015
or #15-08-331-041

NF ENGINEERS
NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
WWW.NOWAKFRAUS.COM

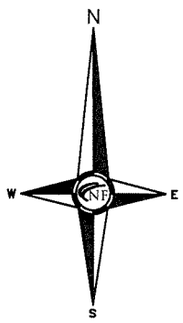
Jonny M.
Approved 6/9/20

REVISED
06-09-2020

DATE	DRAWN	JOB NO.	SHEET
3-12-2020	M.C.	K342	1 of 2

EXHIBIT A

PROPERTY SKETCH



CENTER POST
SECTION 8
T.3N., R.11E.,
L.19009, P.147

S.89°34'48"E. 439.82'

N.04°03'10"W. 300.91'

S.89°34'48"E. 240.52'

PROPOSED
BREWSTER VILLAGE
CONDOMINIUM

60' R.O.W. LINE

S.04°03'10"E. 615.71'

BREWSTER ROAD

N.03°47'21"W. 257.86'

S.85°56'50"W. 467.95'

N.04°03'10"W.
110.00'

P.O.B.
PROPERTY

S.85°56'50"W. 211.51'

S.85°56'50"W. 60.00'

THEORETICAL
NORTH–SOUTH 1/4
LINE OF SECTION 8

N.04°03'10"W.
620.24'

PROPERTY CONTROLLING
NORTH–SOUTH 1/4
LINE OF SECTION 8

SOUTH 1/4 CORNER
SECTION 8
T.3N., R.11E.,
L.34596, P.041

S.89°57'18"E. 11.55'

PROPERTY CONTROLLING
CORNER L.23720, P.305

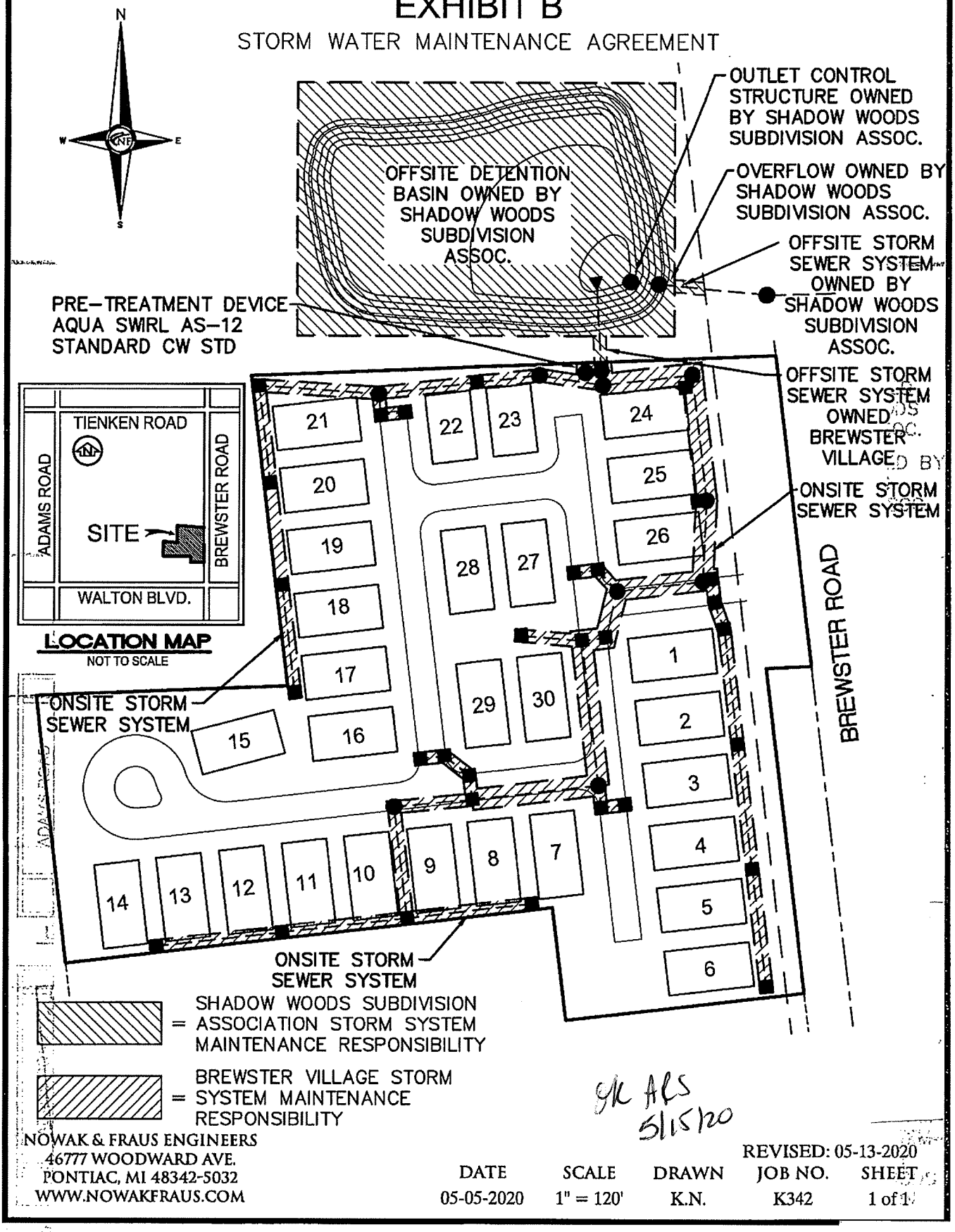
NF
ENGINEERS
NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
WWW.NOWAKFRAUS.COM

REVISED
06-09-2020

DATE	SCALE	DRAWN	JOB NO.	SHEET
3-12-2020	1" = 120'	M.C.	K342	2 of 2

EXHIBIT B

STORM WATER MAINTENANCE AGREEMENT



YK ALS 5/15/20

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
WWW.NOWAKFRAUS.COM

REVISED: 05-13-2020

DATE	SCALE	DRAWN	JOB NO.	SHEET
05-05-2020	1" = 120'	K.N.	K342	1 of 1

EXHIBIT 'C'
OPERATIONS AND MAINTENANCE MANUAL

Brewster Village
STORMWATER MAINTENANCE PLAN
ROCHESTER HILLS, MICHIGAN

PROPERTY OWNER:
Robertson Brewster Village, LLC
6905 Telegraph Road, Suite 200
Bloomfield Hills, MI 48301-3159

Prepared by:
Nowak & Fraus Engineers
46777 Woodward Avenue
Pontiac, MI 48342
Phone: (248) 332-7931
Contact: Brad W. Brickel, PE

AR 5/15/20

OPERATION AND MAINTENANCE MANUAL

INTRODUCTION:

This manual identifies the ownership, operation and maintenance responsibilities for all storm water management systems including the underground storm sewer system, mechanical pre-treatment devices as incorporated into and detailed on the approved Construction Plans as prepared by Nowak & Fraus Engineers. In order to comply with the local best management practices (BMP) and requirements, this manual should serve as a minimum performance standard. This manual should be retained intact and read in its entirety by all parties responsible for the operations and maintenance of the on-site and offsite BMP's.

Developer:
Robertson Brewster Village, LLC
6905 Telegraph Road, Suite 200
Bloomfield Hills, MI 48301-3159

PROPERTY INFORMATION:

This Operations and Maintenance Manual covers the storm water systems located at the following subject property:

LEGAL DESCRIPTION: (see Exhibit 'A' of the Storm Sewer System Maintenance Agreement)
PART OF THE SOUTHWEST 1/4 OF SECTION 8, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 8; THENCE SOUTH 89 DEGREES 57 MINUTES 18 SECONDS EAST, 11.55 FEET TO THE PROPERTY CONTROLLING CORNER; THENCE NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST ALONG THE PROPERTY CONTROLLING LINE BETWEEN THE SAID PROPERTY CONTROLLING CORNER AND THE CENTER POST OF SAID SECTION 8, 930.35 FEET TO THE POINT OF BEGINNING; THENCE NORTH 89 DEGREES 34 MINUTES 48 SECONDS WEST, 43.14 FEET TO A POINT ON THE WEST LINE OF BREWSTER ROAD (WIDTH VARIES); THENCE SOUTH 04 DEGREES 03 MINUTES 10 SECONDS EAST ALONG SAID WEST LINE OF BREWSTER ROAD, ALSO BEING 43 FEET WEST OF AND PARALLEL TO SAID PROPERTY CONTROLLING LINE, 313.47 FEET; THENCE SOUTH 85 DEGREES 56 MINUTES 50 SECONDS WEST, 228.50 FEET; THENCE NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST, 110.00 FEET; THENCE SOUTH 85 DEGREES 56 MINUTES 50 SECONDS WEST, 467.95 FEET; THENCE NORTH 03 DEGREES 47 MINUTES 21 SECONDS WEST, 257.86 FEET TO A POINT ON THE SOUTH LINE OF SHADOW WOODS

SUBDIVISION No. 1, AS RECORDED IN LIBER 160 OF PLATS, ON PAGES 30 THROUGH 35, OAKLAND COUNTY RECORDS; THENCE THE FOLLOWING THREE (3) COURSES ALONG THE SOUTH AND EAST LINES OF SAID SHADOW WOODS SUBDIVISION No. 1: 1) SOUTH 89 DEGREES 34 MINUTES 48 SECONDS EAST, 240.52 FEET, 2) NORTH 04 DEGREES 03 MINUTES 10 SECONDS WEST, 300.91 FEET AND 3) SOUTH 89 DEGREES 34 MINUTES 48 SECONDS EAST, 500.00 FEET TO A POINT ON SAID PROPERTY CONTROLLING LINE; THENCE SOUTH 04 DEGREES 03 MINUTES 10 SECONDS EAST ALONG SAID PROPERTY CONTROLLING LINE, 300.91 FEET TO THE POINT OF BEGINNING.

CONTAINS 335,657 SQ. FT. OR 7.71 ACRES OF LAND.

STORMWATER MAINTENANCE EXHIBIT:

Exhibit 'B' of the Storm Sewer Maintenance Agreement is the Storm Water System Plan which provides a clear presentation of all components of the storm water system. This system is subject to the long-term operation and maintenance responsibilities detailed in this manual. The system includes:

- Storm sewer pipes onsite and offsite (See Exhibit B)
- Storm sewer structures onsite and offsite (manhole, inlet, catch basin etc. See Exhibit B)
- Pre-Treatment Devices (AS-12 Standard CW STD)

INSPECTIONS:

The frequency of system inspections outlined in the manual and attached exhibits should be considered the minimum, if no events warrant additional inspections. The frequency of inspections should be fine-tuned over time as system specific conditions are better known and the rate at which certain maintenance operations need to be performed is better understood. Maintenance Inspection Checklists are provided for each of the BMP's in this system. Inspections should be performed by personnel responsible for maintenance and may need to be certified for confined space entry, depending on the component being inspected. Operation of the pre-treatment devices may need to be inspected by a practicing civil engineer familiar with their operation.

Records of all routine inspections and any work performed on the system for maintenance, repair or replacement should be maintained by the owner and kept for a minimum of ten (10) years. A copy of all records should be provided to the City of Rochester Hills Engineering Division. The records should include this manual, all inspection sheets, approved construction plans and as-built documents, a maintenance log of work performed to the system(s) and

contact information for the system inspector, civil engineer, landscape architect, geotechnical engineer and contractor involved with the system.

STORM SEWER SYSTEMS MAINTENANCE:

Regular inspection and maintenance of BMP's are necessary if these facilities are to consistently perform up to expectations. Storm water systems are expected to perform quality and quantity control functions as long as the land use they serve exists. Failure to maintain these systems can create the following adverse impacts:

Increased pollutants to surrounding surface water features
Potential loss of life or property resulting from catastrophic failure of the facility
Aesthetic or nuisance conditions, such as mosquitoes or reduced property values due to a degraded facility appearance.

Most of these impacts can be avoided through proper and timely inspection and maintenance. A major concern associated with these impacts is the general public's expectations related to the quality of life provided, in part, by construction of these systems. Inadequate maintenance means the general public may have a false sense of security. The most common cause of storm water system failure is the lack of adequate and proper operation, inspection, maintenance and management.

Good design and construction can reduce subsequent maintenance needs and costs, but they cannot eliminate the need for maintenance altogether Maintenance requires a long term commitment of time, money, personnel and equipment. Monitoring the overall performance of the storm water management system is a major aspect of any maintenance program.

The maintenance responsibilities for these systems lie with the current property owner and transfer with the property in perpetuity. If maintenance of the system is not performed, the City of Rochester Hills reserves the right to enter the property and perform all necessary work at the property owners' cost. Refer to the Agreement for Storm Sewer System Maintenance for additional details.

General Maintenance Items:

Grass Mowing and Maintenance:
Mowing requirements for a development should be designed to the specific site conditions, grass types and seasonal variations in climate. Grassed areas require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth. Provisions will need to be made to reseed and reestablish grass cover in areas damaged by sediment accumulation, storm water flow, erosion or other causes. Dead turf will need to be replaced after being

discovered. Inspection of the grass areas and other landscaping features should be made annually. Grass mowing and maintenance shall be the responsibility of the individual homeowners.

Trash and Debris Removal:

Removal of trash and debris from all areas of the property should be performed monthly. Removal of these items will prevent damage to vegetated areas and eliminate their potential to inhibit the operation of any of the storm water management systems. Sediment, debris and trash that are removed and collected should be disposed of according to local, State and Federal regulations at suitable disposal and/or recycling centers.

Storm Sewer System Maintenance Items:

The following narratives give an overview of the maintenance requirements of the different components of the storm water system. The inspection checklists attached to this report offer a more complete listing of what should be inspected, when inspection should occur and the likely frequency of maintenance activities.

Storm Sewer and Structures:
Catch basins, inlets, manholes and sewer pipes should be inspected to check for sediment accumulation and clogging, floatable debris, dead vegetation etc. The structures and sewers should also be observed during a wet weather event to ensure their proper operation. Accumulated sediment and debris should be removed on an annual basis or as needed based on observed conditions. Structural repairs or maintenance should occur as needed based on observed conditions such as cracks, spalling, joint failure, leakage, misalignment or settlement of structures. A civil engineer should be retained if problems are thought to exist.

Storm water Pre-Treatment Devices (AS-12 Standard CW STD):
Refer to the attached maintenance manual from the manufacturer for all inspection and maintenance requirements for the SWTD structure.

Off-Site Detention Basin Outlet Control Structure and Overflow Structure:
The off-site detention basin, outlet control structure and overflow structure are owned by Shadow Woods Subdivision Association. There is a tri-party maintenance agreement between Shadow Woods Subdivision Association, Robertson Brewster Village, LLC and the City of Rochester Hills. These items are shown on the Exhibit B.

The following page includes the on-site stormwater systems inspection checklist for the various devices and components listed above as well as the manufacturer's manual for the AS-12 storm water treatment structure.

ON-SITE STORM WATER SYSTEM INSPECTION CHECKLIST

DATE / TIME OF INSPECTION: _____

INSPECTOR: _____

MAINTENANCE TASKS AND SCHEDULE POST-CONSTRUCTION MAINTENANCE ACTIVITIES	SYSTEM COMPONENTS Catch Basins, Inlets, Manholes & SWTD	Storm Sewer Pipes	FREQUENCY	COMMENTS
MONITORING / INSPECTION Inspect for Sediment Accumulation	x	x	Annually	
Inspect for Floatables, dead vegetation and debris	x	x	Annually and after major rainfall	
Inspect for erosion			Annually	
Inspect all components during wet weather and compare to as-built plans	x	x	Annually	
Inspect inside of structures and pipes for cracks spalling, joint failure, settlement, sagging and misalignment.	x	x	Annually	
PREVENTATIVE MAINTENANCE Remove accumulated sediment	x	x	Annually or as needed	
Remove floatables, dead vegetation and debris			Annually or as needed	
REMEDIAL ACTIONS Repair / stabilize areas of erosion			As Needed	
Structural repairs	x	x	As Needed	
Make adjustments / repairs to ensure proper functioning	x	x	As Needed	

SUMMARY:

INSPECTOR'S REMARKS: _____

_____

_____

OVERALL CONDITION OF SYSTEM: _____

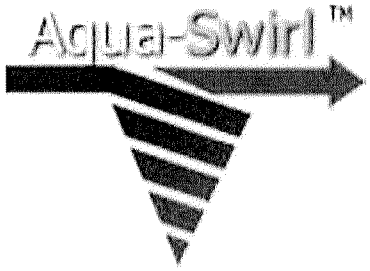
RECOMMENDED ACTIONS NEEDED: _____

DATES ANY MAINTENANCE MUST BE COMPLETED BY: _____

AquaShield
STORMWATER TREATMENT SOLUTIONS

Aqua-Swirl®
Stormwater Treatment System

Inspection and Maintenance Manual



AquaShield™, Inc.
2705 Kanasita Drive
Chattanooga, TN 37343
Toll free (888) 344-9044
Phone: (423) 870-8888
Fax: (423) 826-2112
Email: info@aquashieldinc.com
www.aquashieldinc.com

March 2013

Table of Contents

AquaShield™, Inc.
2705 Kanasita Drive
Chattanooga, Tennessee 37343
Toll free (888) 344-9044
Fax (423) 870-2112
www.aquashieldinc.com

AquaShield™, Inc
Stormwater Treatment Solutions

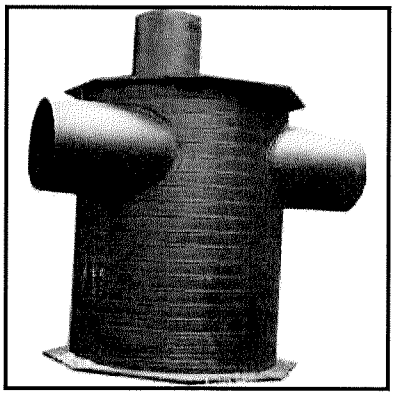
The highest priority of AquaShield™, Inc. (AquaShield™) is to protect waterways by providing stormwater treatment solutions to businesses across the world. These solutions have a reliable foundation based on over 20 years of water treatment experience.

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.

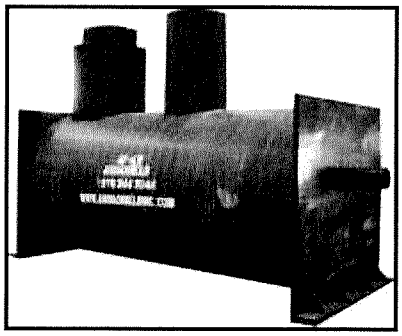
The patented line of AquaShield™ stormwater treatment products that provide high levels of stormwater treatment include the following:

- **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

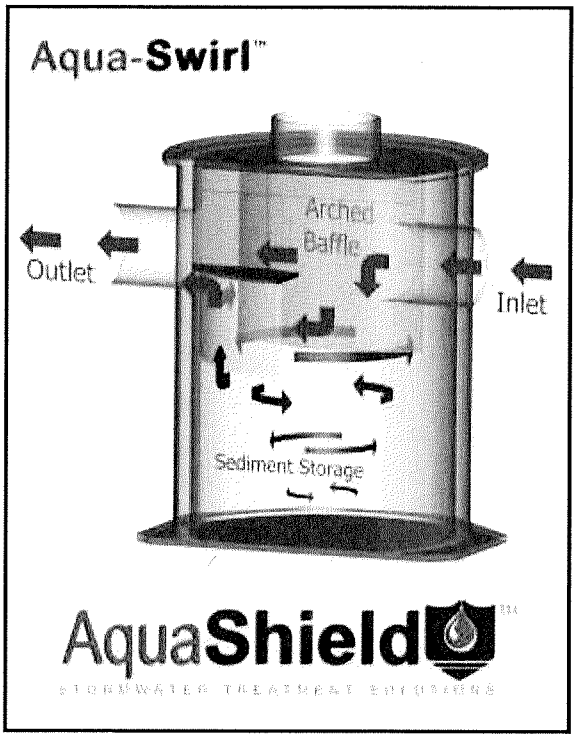


Aqua-Filter™ Stormwater Filtration System

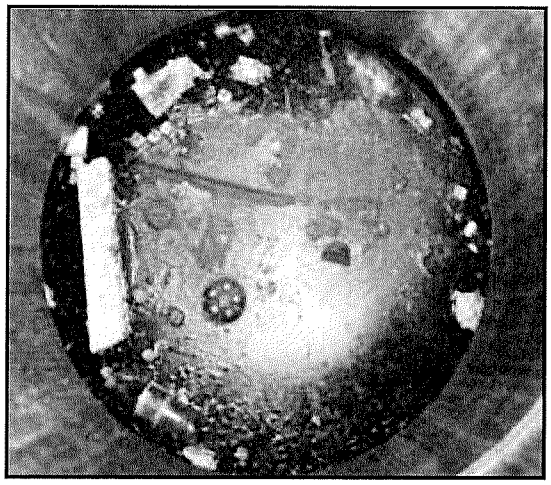
Aqua-Swirl® Stormwater Treatment System

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

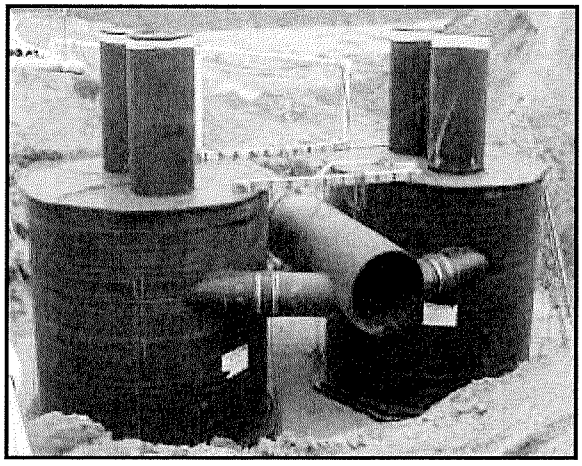
The treatment operation begins when stormwater enters the Aqua-Swirl® through a tangential inlet pipe that produces a circular (or vortex) flow pattern that causes contaminates to settle to the base of the unit. Since stormwater flow is intermittent by nature, the Aqua-Swirl® retains water between storm 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

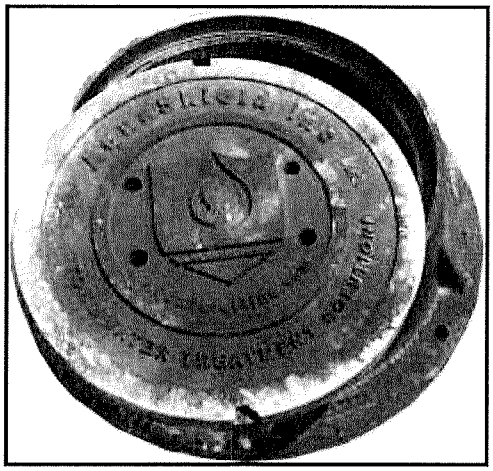
The Aqua-Swirl® system is designed so that it can easily be used for retrofit applications. With the invert of the inlet and outlet pipe at the same elevation, the Aqua-Swirl® can easily be connected directly to the existing storm conveyance drainage system. Furthermore, because of the lightweight nature 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

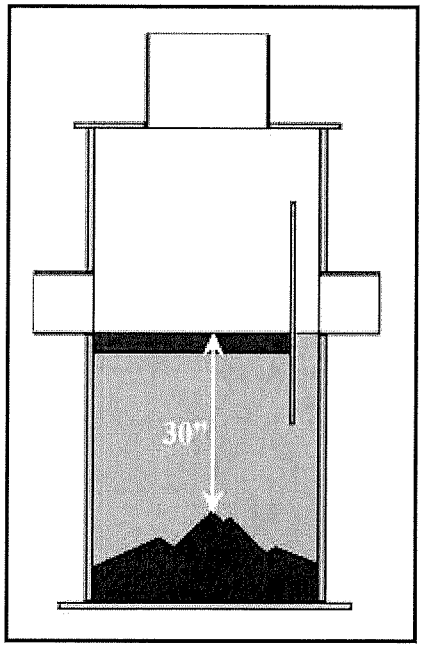
All AquaShield™ products can be inspected from the surface, eliminating the need to enter the systems to determine when cleanout should be performed. In most cases, AquaShield™ recommends a quarterly inspection for the first year of operation to develop an appropriate schedule of maintenance. Based on 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

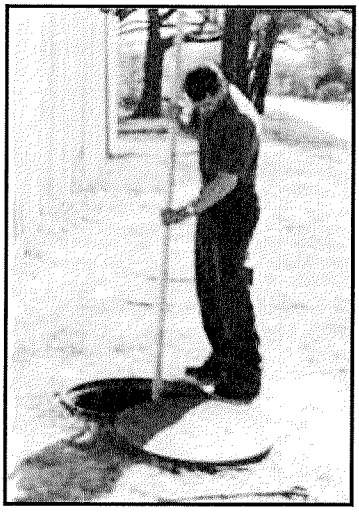
The Aqua-Swirl® has been designed to minimize and simplify the inspection and maintenance process. The single chamber system can be inspected and maintained entirely from the surface thereby eliminating the need for confined space entry. Furthermore, the entire structure (specifically, the floor) is 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

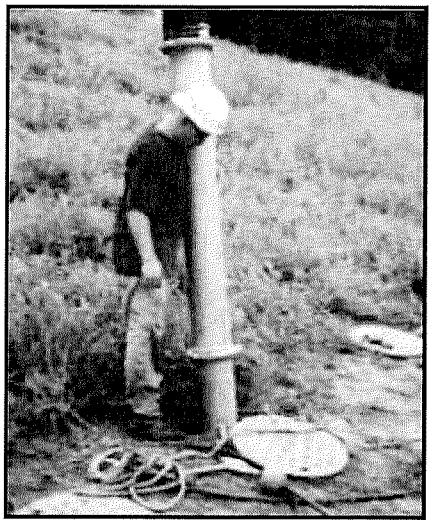
Cleaning the Aqua-Swirl® is simple and quick. Free-floating oil and floatable debris can be observed and removed directly through the 30-inch service access riser provided. A vacuum truck is typically used to remove the accumulated sediment and debris. An advantage of the

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 (½) 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.

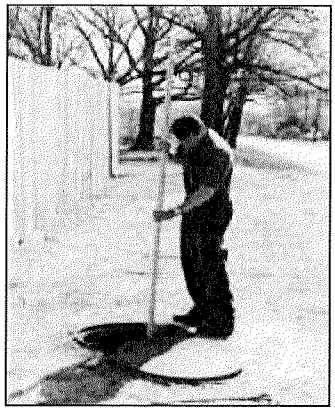


Figure 1. Measuring sediment in swirl chamber using stadia rod. Inspections are performed from the surface through the manhole access cover.

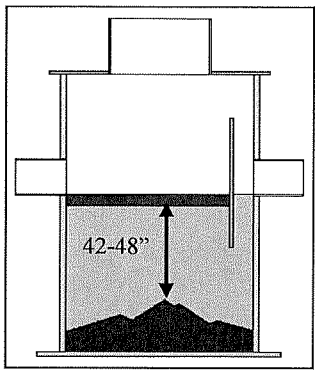


Figure 2. Maintain system when sediment is 42 to 48 inches below water surface to ensure proper system operation and performance. Maximum sediment storage capacity is reached when sediment is 30 inches below water surface.

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 vactor 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

	Month											
Activity	**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

	Month											
Activity	**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

	Month											
Activity	**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.