

**AGREEMENT FOR  
STORM WATER SYSTEM MAINTENANCE**

This agreement is made on FEBRUARY 22, 2022, by JBD Grace Rochester, LLC, a Michigan Limited Liability Company, whose address is 300 E. Long Lake Road, Suite 280, Bloomfield Hills, MI 48304, ("Owner") and the CITY OF ROCHESTER HILLS ("the City"), whose address is 1000 Rochester Hills Drive, Rochester Hills, MI 48309.

RECITALS:

WHEREAS, JBD Grace Rochester, LLC owns and occupies the property described in attached **Exhibit A**; and

WHEREAS, JBD Grace Rochester, LLC has proposed, and the City has approved, a storm water drainage and detention system (the system) for the property as described and depicted in the attached **Exhibit B**; and

WHEREAS, the parties will benefit from the proper use and maintenance of the System and desire to enter into this agreement to provide for the same.

THEREFORE, the parties agree:

1. **Use of the System:** Components of the System, including any and all water conveyance, detention and water quality treatment facilities and devices, storm sewer pipe, catch basins, manholes, and swales, shall be used solely for the purpose of detaining storm and surface water on the property until such time as: (i) The City may determine and advise Owner, or Owner's successors, grantees or assigns, in writing that it is no longer necessary to use the detention system to detain storm or surface water; and (ii) An adequate alternative for draining storm and surface water has been provided which is acceptable to the City and which includes the granting of such easements to the City or third parties for the alternative drainage system as may be necessary.

2. **Maintenance:**

A. Owner shall be responsible for the proper maintenance, repair and replacement of the System and any part thereof as detailed in the Maintenance Plan attached as **Exhibit C**.

B. Proper maintenance of the System shall include, but not limited to: (i) Removing accumulated sediment, trash and debris from the detention system and at inlet pipes; (ii) Maintaining storm sewer and structures; (iii) Controlling the effects of erosion; (iv) Inspection and cleaning of the water quality treatment device; (v) Inspection of inlet and outlet pipes for structural integrity; (vi) Inspection and cleaning of the storm sewer and catch basins upstream from the detention system; and (vii) Any other maintenance that is reasonable and necessary to facilitate and continue the proper operation and use of the System.

3. **Action by City:** In the event Owner or Owner's successors, grantees, or assigns, neglects or fails at any time to properly maintain the System or any part thereof, the City may notify Owner or Owner's successors, grantees or assigns, in writing, and the notice shall include a listing and description of maintenance deficiencies and a demand that they must be corrected within thirty (30) days. The notice shall further specify the date and place for a hearing to be held at least fourteen (14) days after the date of the notice before the City Council, or such other board or official to whom the City Council may delegate responsibility. At the hearing, the City Council (or other board or official) may endorse or modify the listing and description of deficiencies to be corrected and, for good cause, may extend the time within which the deficiencies must be corrected.

Thereafter, if the maintenance deficiencies are not corrected within the time allowed, the City may undertake and make the necessary corrections, and may maintain the System for a period not to exceed one (1) year. Such maintenance of the System by the City shall not be deemed a taking of the property, nor shall the City's actions be deemed to vest in the public any right to use the property. If the City determines maintenance of the system by the City should continue beyond one year, the City shall hold, and provide advance written notice of, a further hearing at which Owner or Owner's successors, grantees or assigns, will not or cannot properly maintain the System, the City may continue to maintain the System for another year, and subject to a similar hearing and determination, in subsequent years. In the event the City determines an emergency condition caused by or relating to the System threatens the public health, safety or general welfare, the City shall have the right to immediately and without notice enter the property and undertake appropriate corrective action.

4. **Charges:** The City shall charge to the current owner of the property the cost of maintenance or other corrective action undertaken by the City in accordance with this agreement, plus a ten percent (10%) administrative fee. If not timely paid, the City may assess the charges on the City's tax roll, which charges shall be a lien on the real property and shall be collectable and enforceable in the same manner general property taxes are collected and enforced.

5. **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 JBD Grace Rochester, LLC:

300 E. Long Lake Rd.  
Suite 280  
Bloomfield Hills, MI 48304

To the City:

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

6. **Successors and Assigns:** This agreement shall bind and inure to the benefit of the parties and their respective successors, grantees and assigns. The rights, obligations and responsibilities hereunder shall run with the land and shall bind all current and future owners of the property.

7. **Recording of Agreement:** This agreement shall be recorded at the Oakland County Register of Deeds.

JBD GRACE ROCHESTER, LLC

By: \_\_\_\_\_

Print or type name: J B DAVIES

Title: MANAGER

CITY OF ROCHESTER HILLS

By: \_\_\_\_\_

Bryan K. Barnett, Mayor

STATE OF MICHIGAN  
COUNTY OF OAKLAND

This agreement was acknowledged before me on February 22, 2022,  
by J. B. Davies, who is the <sup>manager</sup> owner of JBD Grace Rochester, LLC, a Michigan  
Limited Liability Company.

\_\_\_\_\_, notary public  
NANCY G. GIRARDOT  
NOTARY PUBLIC, STATE OF MI  
COUNTY OF OAKLAND  
County, Michigan  
MY COMMISSION EXPIRES Sep 15, 2026 My commission expires:  
ACTING IN COUNTY OF OAKLAND

STATE OF MICHIGAN  
COUNTY OF OAKLAND

This agreement was acknowledged before me on \_\_\_\_\_, 20\_\_\_\_,  
by Bryan K. Barnett, Mayor, of the City of Rochester Hills, on behalf of the City.

Drafted By:  
Scott E. Bell  
116 S 3rd Street  
West Branch, MI 48661

\_\_\_\_\_, notary public  
\_\_\_\_\_  
County, Michigan  
My commission expires: \_\_\_\_\_

When Recorded Return to:  
Clerks Dept.  
City of Rochester Hills  
1000 Rochester Hills Drive  
Rochester Hills, MI 48309

John Stefan  
Approved 3/4/22

## EXHIBIT "A"

1. GRACE SENIOR LIVING: 2791 WALTON BOULEVARD, ROCHESTER HILLS, MI 48309
2. PROPERTY TAX ID NO. 15-17-103-002
3. LEGAL DESCRIPTION OF PROPERTY

THE LAND IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MI, DESCRIBED AS FOLLOWS:

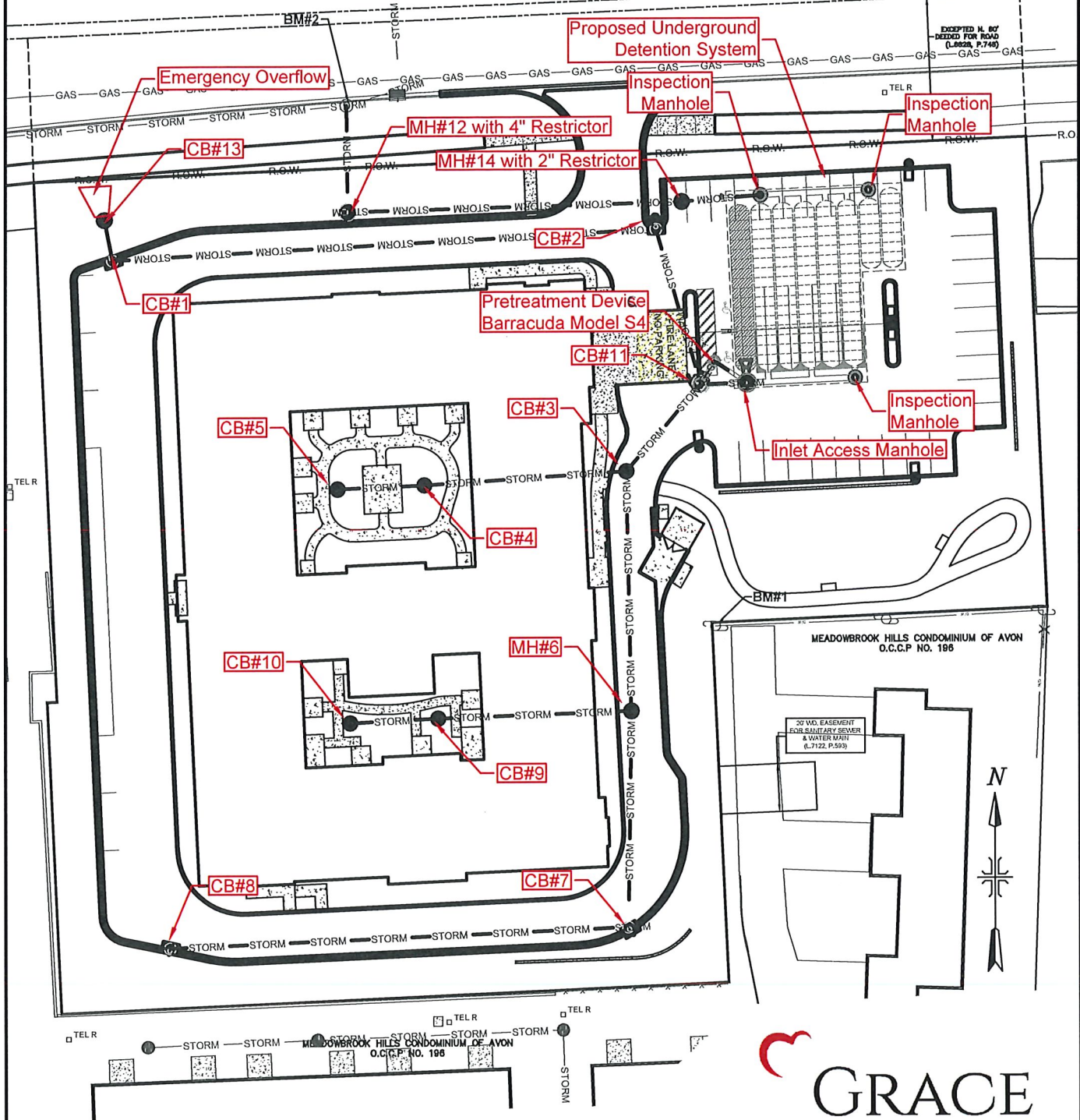
PART OF THE NORTHWEST ¼ OF SECTION 17, TOWN 3 NORTH, RANGE 11 EAST, TOWNSHIP OF AVON (NOW CITY OF ROCHESTER HILLS), OAKLAND COUNTY, MICHIGAN, DESCRIBED AS: BEGINNING AT A POINT DISTANT EAST 1144.60 FEET FROM THE NORTHWEST SECTION CORNER; THENCE SOUTH 280.00 FEET; THENCE WEST 4.00 FEET; THENCE SOUTH 130.00 FEET; THENCE EAST 279.00 FEET; THENCE NORTH 150.00 FEET; THENCE EAST 140.00 FEET; THENCE NORTH 260.00 FEET; THENCE WEST 415.00 FEET TO THE POINT OF BEGINNING. EXCEPT FOR THE NORTH 60 FEET DEEDED FOR ROAD, AS DISCLOSED BY QUIT ~~CLAIM~~ DEED RECORDED IN LIBER 6628, PAGE 748, OAKLAND COUNTY RECORDS.

4. TOTAL GROSS SITE AREA= 121,968 SQUARE FEET OR 2.8 ACRES.

Jenny M.  
Approved 2/25/22

# Exhibit B

PUBLICLY DEDICATED (Road Commission for Oakland County Jurisdiction)  
**WALTON BOULEVARD (WIDTH VARIES)**  
 ASPHALT PAVEMENT W/ CONC. CURB



**LAPHAM ASSOCIATES** ENGINEERING PLANNING ENVIRONMENTAL SURVEYING

116 South 3rd Street P (989) 345-5030  
 West Branch, MI 48661 F (989) 345-7302

www.laphamassoc.com

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**GRACE SENIOR LIVING**

Project No.: P-200415	Drawn By: S.E.BELL
Date: Feb. 18, 2022	Sheet No.: 1 of 1
Scale: 1"=60'	Checked By:

*OK ARS  
2/28/22*

# EXHIBIT "C"

## OPERATIONS AND MAINTENANCE MANUAL

GRACE SENIOR LIVING  
2791 WALTON BOULEVARD  
ROCHESTER HILLS, MI 48309

Property Manager:

Prepared by:



116 South Third Street  
West Branch, MI 48661

Email: [scott.bell@laphamassoc.com](mailto:scott.bell@laphamassoc.com)

DK-ARS  
2/28/22

## OPERATIONS AND MAINTENANCE MANUAL

### INTRODUCTION:

This manual identifies the ownership, operation, and maintenance responsibilities for all stormwater management systems, including the underground storm sewer system, and the stormwater treatment structure and device as incorporated into and detailed on the approved Site Construction Plans as prepared by Lapham Associates, Inc. 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 BMP's.

### PROPERTY OWNER:

Attn: JB Davies, Owner  
JBD Grace Rochester  
300 E. Long Lake Road, Suite 280  
Bloomfield Hills, MI 48304  
Phone: (248) 515-3947  
Fax: (248) 646-4598  
E-mail: left6jb@gmail.com

### PROPERTY INFORMATION:

This Operations and Maintenance Manual covers the stormwater system located at the following subject property:

### LEGAL DESCRIPTION OF PROPERTY:

THE LAND IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MI, DESCRIBED AS FOLLOWS:

PART OF THE NORTHWEST  $\frac{1}{4}$  OF SECTION 17, TOWN 3 NORTH, RANGE 11 EAST, TOWNSHIP OF AVON (NOW CITY OF ROCHESTER HILLS), OAKLAND COUNTY, MICHIGAN, DESCRIBED AS: BEGINNING AT A POINT DISTANT EAST 1144.60 FEET FROM THE NORTHWEST SECTION CORNER; THENCE SOUTH 280.00 FEET; THENCE WEST 4.00 FEET; THENCE SOUTH 130.00 FEET; THENCE EAST 279.00 FEET; THENCE NORTH 150.00 FEET; THENCE EAST 140.00 FEET; THENCE NORTH 260.00 FEET; THENCE WEST 415.00 FEET TO THE POINT OF BEGINNING. EXCEPT FOR THE NORTH 60 FEET DEEDED FOR ROAD, AS DISCLOSED BY QUIT CLAIM DEED RECORDED IN LIBER 6628, PAGE 748, OAKLAND COUNTY RECORDS.



## **STORMWATER MAINTENANCE EXHIBIT:**

Exhibit "B" of the Stormwater Maintenance Agreement is the stormwater system plan which provides a clear presentation of all components of the stormwater system. This system is subject to the long-term operation and maintenance responsibilities detailed in this manual. The system includes:

- Storm sewer pipes
- Storm sewer structures (manholes, and catch basins)
- Roof drain pipes and cleanouts
- Pre-Treatment Device – Barracuda Model S4
- Underground Detention System

## **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 outlet control structures and pre-treatment devices may need to be inspected by a practicing civil engineer

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.

## **STORMWATER SYSTEMS MAINTENANCE:**

Regular inspection and maintenance of BMP's are necessary if these facilities are to consistently perform up to expectations. Stormwater 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 bodily injury and/or loss of life or property damage resulting from catastrophic failure of the facility
- Aesthetic or nuisance conditions, such as mosquitoes or reduced property values due to a degraded facility condition
- Noxious or unpleasant odors
- Flooding
- Loss of site use and business

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 stormwater 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 stormwater 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 owner's cost. Refer to the *Agreement for Stormwater System Maintenance* for additional details.

#### **GENERAL MAINTENANCE ITEMS:**

##### Parking Lot Sweeping:

Routine sweeping of all paved surfaces provides a more attractive appearance and removes accumulations of sediment and trash that tend to migrate into stormwater management systems during rainfall events. Parking lot sweeping should be performed quarterly or as necessary to limit sediment and trash build up.

##### Grass Mowing and Maintenance:

Mowing requirements at a facility should be designed to the specific site conditions, grass types and seasonal variations in climate. Grassed areas require periodic fertilizing, dethatching 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, stormwater 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.

##### 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 enter or inhibit the operation of any of the stormwater 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.

## **STORMWATER SYSTEM MAINTENANCE ITEMS:**

The following narratives give an overview of the maintenance requirements of the different components of the stormwater 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 oil or grease, floatable debris, sticks, stones, wood, cups, dead vegetation, and any other debris. The structures and sewer 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.

### Stormwater Pre-Treatment Device:

Refer to the attached maintenance manual from manufacturer for the BaySaver Barracuda Device.

### Stormwater Underground Detention Structure:

Refer to the attached maintenance manual from manufacturer for the MC-4500 Stormtech Chamber System.

### Checklists:

The following page includes an inspection checklist for the various devices and components listed above. A written record of all required inspections shall be made as stipulated in the checklist. All written inspection documents shall be properly organized and filed, and they shall be readily accessible.

## STORMWATER SEWER SYSTEM INSPECTION CHECKLIST

Date/Time of Inspection: \_\_\_\_\_

Inspector: \_\_\_\_\_

### STORMWATER SEWER SYSTEM MAINTENANCE TASKS AND SCHEDULE

POST CONSTRUCTION MAINTENANCE ACTIVITIES (Monitoring/ Inspection)	SYSTEM COMPONENTS						FREQUENCY	COMMENTS
	Catch Basins & Manholes	Floatable Trap	Storm Sewer & Root Drain Pipes	Parking Lot	Greenbelts & Land- scaping			
Inspect for floatables, sediment, oil, grease, dead vegetation, & debris							Annually	
Inspect for sediment and debris accumulation							Every grass mowing	
Inspect for erosion							Annually and after major rainfall	
Inspect all components during wet weather and compare to as-built plans							Annually	
Inspect inside of structures and pipes for cracks, spalling, joint failure, settlement, sagging and misalignment							Annually	
<b>PREVENTIVE MAINTENANCE</b>								
Remove accumulated sediment							Annually or as needed	
Remove floatables, sediment, oil, grease, dead vegetation, & debris							Annually or as needed	
<b>REMEDIAL ACTIONS</b>								
Repair/ stabilize areas of erosion							As needed	
Structural repairs							As needed	
Make adjustments/ repairs to ensure proper functioning							As needed	

**SUMMARY:**

Inspector's Remarks: \_\_\_\_\_

Overall Condition of Facility: \_\_\_\_\_

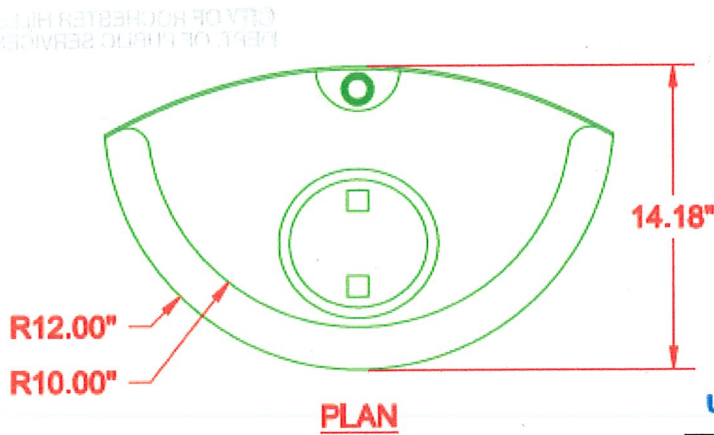
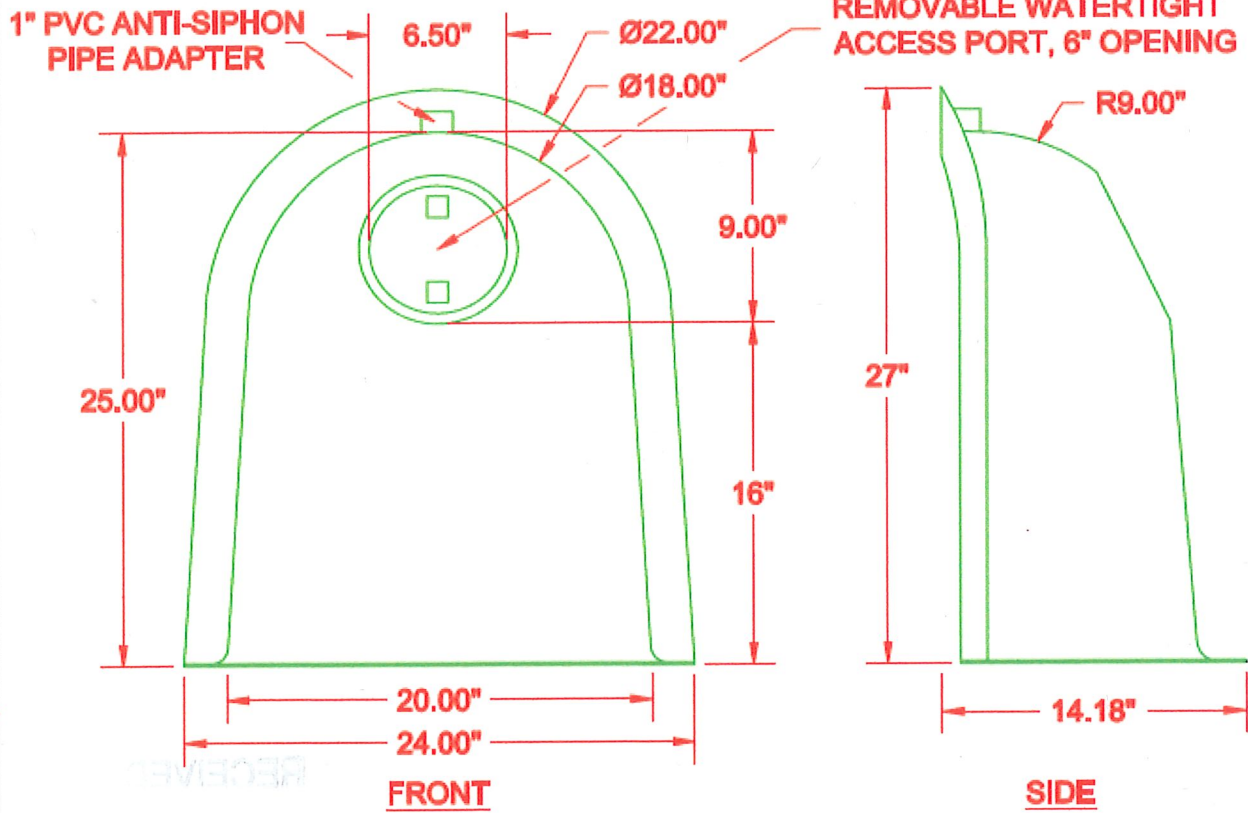
Recommended Actions Needed: \_\_\_\_\_

Dates Any Maintenance Must Be Completed By: \_\_\_\_\_

Prepared by:  
 **LAPHAM ASSOCIATES**  
ENGINEERING  
PLANNING  
ENVIRONMENTAL  
SURVEYING  
 116 South Third Street  
 West Branch, MI 48661

**PRODUCT SPECIFIC ITEMS**

FLOATABLE TRAPS FOR STRUCTURES CB7, CB3, CB6, CB1



U.S. PATENT #6126817 ADDITIONAL PATENTS PENDING

DESIGNED TO FIT  
48"-60" DIAM.  
STRUCTURES

<b>BMP, INC.</b>		
53 MT. ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 FAX: (860)434-3195		
DESCRIPTION	DATE	SCALE
18R SNOOT OIL & DEBRIS STOP	09/06/99	NONE
DRAWING NUMBER		18R



## Maintenance Considerations for SNOUT® Stormwater Quality Systems

### Background:

The SNOUT system from Best Management Products, Inc. (BMP, Inc.) is based on a vented hood that can reduce floatable trash and debris, free oils, and other solids from stormwater discharges. In its most basic application, a SNOUT hood is installed over the outlet pipe of a catch basin or other stormwater quality structure with a deep sump (see Installation Drawing). The SNOUT forms a baffle that traps floatable debris and free oils on the surface, while permitting heavier solids and sediment to sink to the bottom of the sump. The clarified intermediate layer is forced out of the structure through the open bottom of the SNOUT by displacement from incoming flow. The resultant discharge contains considerably less unsightly trash and other gross pollutants, and can also offer reductions of free-oils and finer solids. To increase pollutant removal capabilities of the SNOUT system, various accessories are available. The most popular options include: the Bio-Skirt® for higher hydrocarbon capture and retention, the Stainless TrashScreen™ for Full Trash Capture and the Turbo Plate® for turbulence reduction and higher sediment capture.

### Maintenance Recommendations:

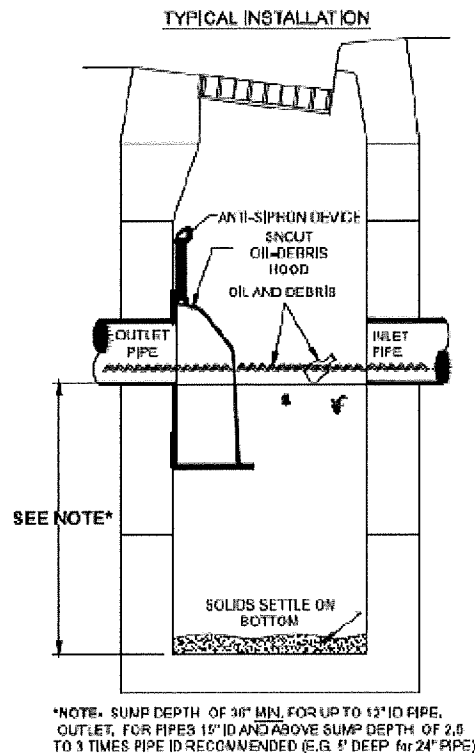
- Monthly monitoring for the first year of a new installation after the site has been stabilized is a recommended practice.
- Measurements should be taken after each rain event of .5 inches or more, or monthly, as determined by local weather conditions.
- Checking sediment depth and noting the surface pollutants in the structure will be helpful in planning maintenance.
- The pollutants collected in SNOUT equipped structures will consist of floatable debris and oils on the surface of the captured water, and grit and sediment on the bottom of the structure.
- It is best to schedule maintenance based on the solids collected in the sump.
- Optimally, the structure should be cleaned when the sump is half full (e.g. when 2 feet of material collects in a 4 foot sump, clean it out).
- Structures should also be cleaned if a spill or other incident causes a larger than normal accumulation of pollutants in a structure.
- Maintenance is best done with a vacuum truck.
- If Bio-Skirts are being used in the structure to enhance hydrocarbon capture, they should be checked on a monthly basis for the first year, and serviced or replaced when more than 2/3 of the boom is submerged, indicating a nearly saturated state. Assuming a typical pollutant-loading environment exists, Bio-Skirts should be serviced\* annually or replaced as necessary.
- In the case of an oil spill, the structure should be checked and serviced and

Bio-Skirts (if present) replaced or serviced immediately.

- All collected wastes must be handled and disposed of according to local environmental requirements.
- To maintain the SNOUT hoods, an annual inspection of the anti-siphon vent and access hatch are recommended. A simple flushing of the vent, or a gentle rodding with a flexible wire are all that's typically needed to maintain the anti-siphon properties. Opening and closing the access hatch once a year ensures a lifetime of trouble-free service.

\*To extend the service life of a Bio-Skirt, the unit may be "wrung out" to remove oils and washed in an industrial washing machine with warm water. The Bio-Skirt may then be re-deployed if the material maintains it's structural integrity. A maintained Bio-Skirt can last for several years. Each Bio-Skirt can hold about on gallon of oils.

#### SNOUT INSTALLATION:



#### BIO-SKIRT INSTALLATION:



# Maintenance Guide



BaySaver Barracuda

July 2017

One of the advantages of the BaySaver Barracuda is the ease of maintenance. Like any system that collects pollutants, the BaySaver Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes from 2 to 4 hours, depending on the size of the system, the captured material, and the capacity of the vacuum truck.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

## Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and thereafter on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

## Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

## BaySaver Barracuda Storage Capacities

Model	Manhole Diameter	Treatment Chamber Capacity	Standard Sediment Capacity (20" depth)	NJDEP Sediment Capacity (50% of standard depth)
S3	36"	212 gallons	0.44 cubic yards	0.22 cubic yards
S4	48"	564 gallons	0.78 cubic yards	0.39 cubic yards
S5	60"	881 gallons	1.21 cubic yards	0.61 cubic yards
S6	72"	1269 gallons	1.75 cubic yards	0.88 cubic yards
S8	96"	3835 gallons	3.10 cubic yards	1.55 cubic yards
S10	120"	7496 gallons	4.85 cubic yards	2.43 cubic yards

## Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. You'll access this area through the 10" diameter access cylinder.

4640 TRUEMAN BLVD. HILLIARD, OH 43026 (800) 821-6710 www.ads-pipe.com

1

MG1.01

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2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
  - Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
  - Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
  - Additional local regulations may apply to the maintenance procedure.

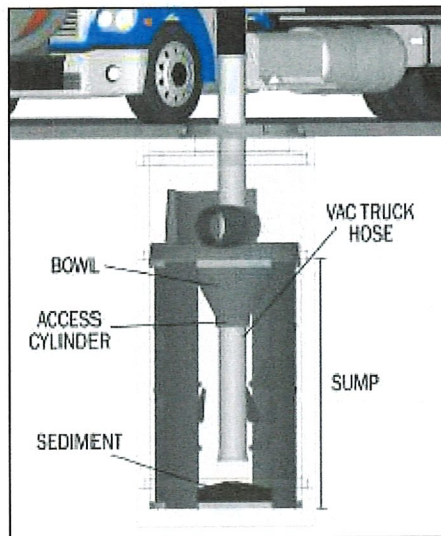


Figure 1

# ADS® Barracuda™ Max

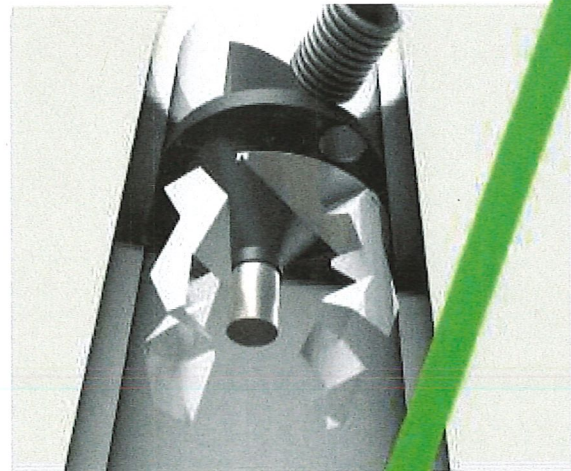
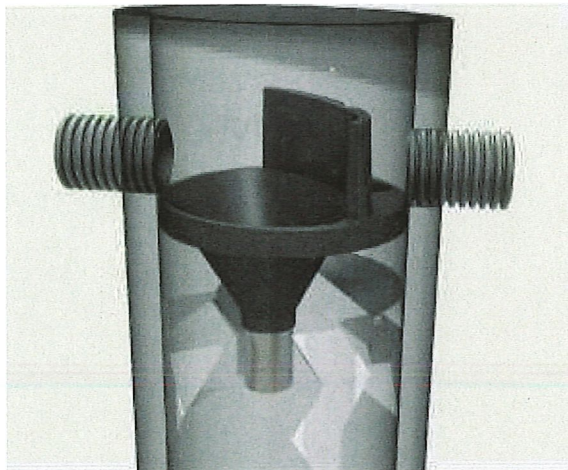
The Barracuda Max is market-changing stormwater quality technology. This high-performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda Max is also an outstanding value that offers multiple pipe configurations, and quick installation. The "Max" version of the Barracuda is built on the base platform of the original ADS Barracuda with improved removal efficiencies and installation components.

## Features

- Single manhole design
- No elevation loss between the inlet and outlet
- Variable inlet/outlet angle configurations (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent-pending "teeth" mitigate turbulence in the sump area to prevent re-suspension of captured contaminants and an added deflector plate and bowl extension enhance the unit's removal capabilities

## Benefits

- Internal components are in stock for quick delivery
- The S3, S4, S6, and S8 can be installed in a standard 36" (900 mm), 48" (1200 m), 72" (1800 m), and 96" (2400 m) precast manhole, respectively
- The S3 & S4 can be provided factory installed within a 36" (900 mm) and 48" (1200 mm) ADS HP manhole and delivered to the jobsite
- The Barracuda Max "teeth" and deflector plate apparatus are fabricated and designed for quick and easy field assembly
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry



# Barrucuda Specification

## Materials and Design

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 36" (900 mm) and 48" (1200 mm) HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

## Performance

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.
- The Barracuda Max unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

- OR -

The Barracuda Max unit shall be designed to remove at least 50% of TSS using a media mix with  $d_{50}$ =75 micron and 200 mg/L influent concentration.

- OR -

The Barracuda Max unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol.

- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly, which includes the "teeth".

Barracuda Max Model	Manhole Diameter	NJDEP (50% removal)	OK-110 (80% removal)
S3	36" (900 mm)	0.85 CFS (24.1 L/s)	0.86 CFS (24.1 L/s)
S4	48" (1200 mm)	1.52 CFS (43.0 L/s)	1.52 CFS (43.0 L/s)
S6	72" (1800 mm)	3.40 CFS (96.3 L/s)	3.42 CFS (96.8 L/s)
S8	96" (2400 mm)	6.08 CFS (172.2 L/s)	6.08 CFS (172.2 L/s)

\* Peak bypass flows are dependent on final design

## Installation

Installation of the stormwater treatment unit(s) shall be performed per manufacturer's installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at 800-821-6710 or by logging on to [www.adspipe.com](http://www.adspipe.com).



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[adspipe.com](http://adspipe.com)  
800-821-6710

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	MIGUEL VARGAS 419-215-8020 MIGUEL.VARGAS@ADS-PIPE.COM
ADS SALES REP:	RANDY NOSEK 810-348-8914 RANDY.NOSEK@ADS-PIPE.COM
PROJECT NO:	S217657



ADVANCED DRAINAGE SYSTEMS, INC.

**SiteASSIST**  
by StormTech  
FOR STORMTECH  
INSTRUCTIONS,  
DOWNLOAD THE  
INSTALLATION APP



## SENIOR HOUSING DEVELOPMENT ROCHESTER HILLS, MI

### MC-4500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-4500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
  - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
  - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.65 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
  - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

### IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

- STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
  - STONESHOOTER LOCATED OFF THE CHAMBER BED.
  - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
  - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
- STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

### NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
  - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
  - NO RUBBER Tired LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
  - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2894 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

## **BAYSAVER BARRACUDA SPECIFICATIONS**

### **MATERIALS AND DESIGN**

CONCRETE STRUCTURES: DESIGNED FOR H-20 TRAFFIC LOADING AND APPLICABLE SOIL LOADS OR AS OTHERWISE DETERMINED BY A LICENSED PROFESSIONAL ENGINEER. THE MATERIALS AND STRUCTURAL DESIGN OF THE DEVICES SHALL BE PER ASTM C857 AND ASTM C858.

48" HP MANHOLE STRUCTURES: MADE FROM AN IMPACT MODIFIED COPOLYMER POLYPROPYLENE MEETING THE MATERIAL REQUIREMENTS OF ASTM F2764. THE ECCENTRIC CONE REDUCER SHALL BE MANUFACTURED FROM POLYETHYLENE MATERIAL MEETING ASTM D3350 CELL CLASS 213320C. GASKETS SHALL BE MADE OF MATERIAL MEETING THE REQUIREMENTS OF ASTM F477.

SEPARATOR INTERNALS SHALL BE SUBSTANTIALLY CONSTRUCTED OF STAINLESS STEEL, POLYETHYLENE, OR OTHER THERMOPLASTIC MATERIAL APPROVED BY THE MANUFACTURER.

### **PERFORMANCE**

THE STORMWATER TREATMENT UNIT SHALL BE AN INLINE UNIT CAPABLE OF CONVEYING 100% OF THE DESIGN PEAK FLOW. IF PEAK FLOW RATES EXCEED MAXIMUM HYDRAULIC RATE, THE UNIT SHALL BE INSTALLED OFFLINE.

THE STORMWATER TREATMENT UNIT INTERNALS SHALL CONSIST OF (1)SEPARATOR CONE ASSEMBLY, AND (1)SUMP ASSEMBLY WHICH INCLUDES(4) LEGS WITH "TEETH".

THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 80% OF THE SUSPENDED SOLIDS ON AN ANNUAL AGGREGATE REMOVAL BASIS. SAID REMOVAL SHALL BE BASED ON FULL-SCALE THIRD PARTY TESTING USING OK-110 MEDIA GRADATION OR EQUIVALENT AND 300 mg/L INFLUENT CONCENTRATION. SAID FULL SCALE TESTING SHALL HAVE INCLUDED SEDIMENT CAPTURE BASED ON ACTUAL TOTAL MASS COLLECTED BY THE STORMWATER TREATMENT UNIT.

-OR-

THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS USING A MEDIA MIX WITH  $d_{50}=75$  MICRON AND 200 MGL INFLUENT CONCENTRATION.

-OR-

THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS PER CURRENT NJDEP/NJCAT HDS PROTOCOL .

### **MANUFACTURER**

EACH STORMWATER TREATMENT SYSTEM SHALL BE A BARRACUDA SYSTEM AS MANUFACTURED BY BAYSAVER, LLC, 1030 DEER HOLLOW DR., MOUNT AIRY, MD 21771, PHONE (301) 829-6470, FAX (301) 829-3747, TOLL FREE 1-800-229-7283 (1-800-BAYSAVER), EMAIL [INFO@BAYSAVER.COM](mailto:INFO@BAYSAVER.COM)

## **BARRACUDA MAINTENANCE**

BARRACUDA SYSTEMS MUST BE INSPECTED AND MAINTAINED PERIODICALLY. INSPECTION IS MADE BY CHECKING THE DEPTH OF SEDIMENT IN EACH MANHOLE WITH A GRADE STICK OR SIMILAR DEVICE. MAINTENANCE IS REQUIRED WHEN THE SEDIMENT DEPTH IN EXCEEDS 20 INCHES. MINIMUM INSPECTION IS RECOMMENDED TWICE A YEAR TO MAINTAIN OPERATION AND FUNCTION OF THE UNIT.

### **MAINTENANCE INSTRUCTIONS**

1. REMOVE THE MANHOLE COVER TO PROVIDE ACCESS TO THE POLLUTANT STORAGE. POLLUTANTS ARE STORED IN THE SUMP, BELOW THE BOWL ASSEMBLY VISIBLE FROM THE SURFACE. YOU'LL ACCESS THIS AREA THROUGH THE 10" DIAMETER ACCESS CYLINDER.
2. USE A VACUUM TRUCK OR OTHER SIMILAR EQUIPMENT TO REMOVE ALL WATER, DEBRIS, OILS AND SEDIMENT.
3. USE A HIGH PRESSURE HOSE TO CLEAN THE MANHOLE OF ALL THE REMAINING SEDIMENT AND DEBRIS. THEN, USE THE VACUUM TRUCK TO REMOVE THE WATER.
4. FILL THE CLEANED MANHOLE WITH WATER UNTIL THE LEVEL REACHES THE INVERT OF THE OUTLET PIPE.
5. REPLACE THE MANHOLE COVER.
6. DISPOSE OF THE POLLUTED WATER, OILS, SEDIMENT AND TRASH AT AN APPROVED FACILITY.
  - LOCAL REGULATIONS PROHIBIT THE DISCHARGE OF SOLID MATERIAL INTO THE SANITARY SYSTEM. CHECK WITH THE LOCAL SEWER AUTHORITY FOR AUTHORITY TO DISCHARGE THE LIQUID.
  - SOME LOCALITIES TREAT THE POLLUTANTS AS LEACHATE. CHECK WITH LOCAL REGULATORS ABOUT DISPOSAL REQUIREMENTS.
  - ADDITIONAL LOCAL REGULATIONS MAY APPLY TO THE MAINTENANCE PROCEDURE.

## **BARRACUDA INSTALLATION NOTES**

INSTALLATION OF THE STORMWATER TREATMENT UNIT(S) SHALL BE PERFORMED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUCH INSTRUCTIONS CAN BE OBTAINED BY CALLING ADVANCED DRAINAGE SYSTEMS AT (800) 821-6710 OR BY LOGGING ON TO [WWW.ADS-PIPE.COM](http://WWW.ADS-PIPE.COM) OR [WWW.BAYSAVER.COM](http://WWW.BAYSAVER.COM).





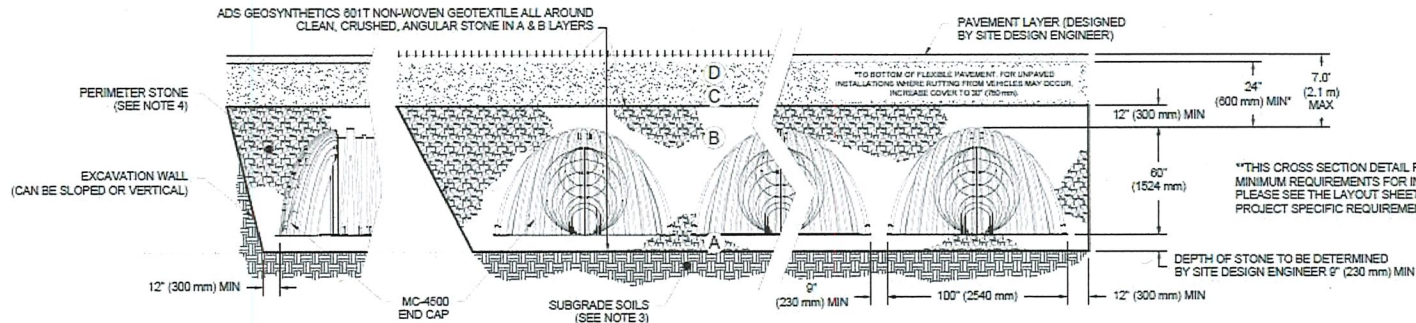


### ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE.  MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145* A-1, A-2.4, A-3  OR  AASHTO M43* 3, 3S7, 4, 4S7, 5, 5S, 57, 6, 67, 6S, 7, 7S, 8, 8S, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43* 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43* 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>

**PLEASE NOTE:**

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



**NOTES:**

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
- MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN<sup>2</sup>. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

**SENIOR HOUSING DEVELOPMENT**  
ROCHESTER HILLS, MI

DATE: 01/19/2021 DRAWN: GJC  
PROJECT #: 8217657 CHECKED: JPR

REV	BY	DATE	DESCRIPTION

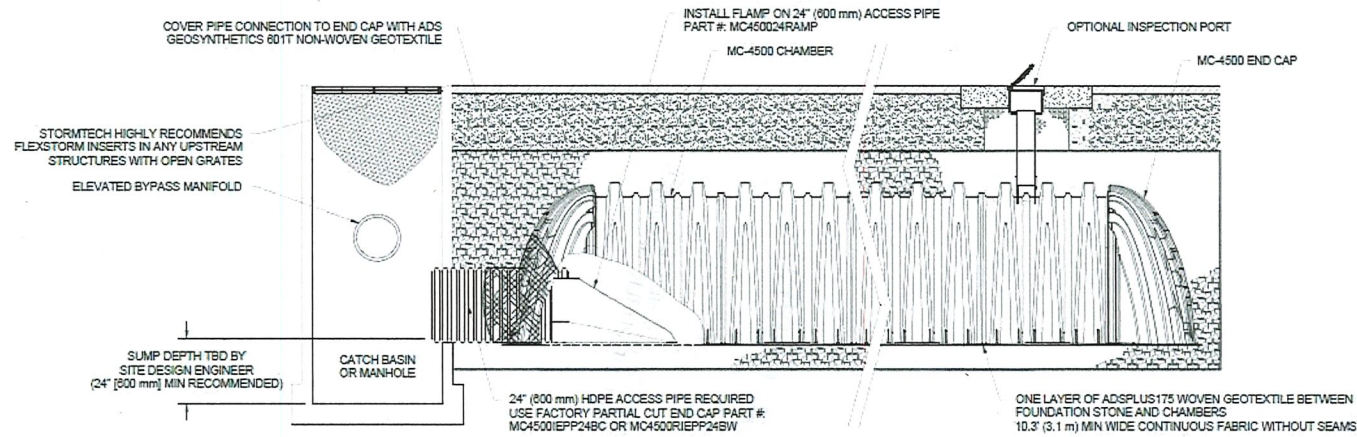
**StormTech**  
CORPORATION

800 GROHMAN AVENUE SUITE 400 | CT 06039  
BRIDGEVILLE, OH 45028

**ADS**  
A DESIGN SOLUTIONS FIRM, INC.

4640 GROHMAN BLVD  
HILLIARD, OH 43028

5 SHEET  
OF 7



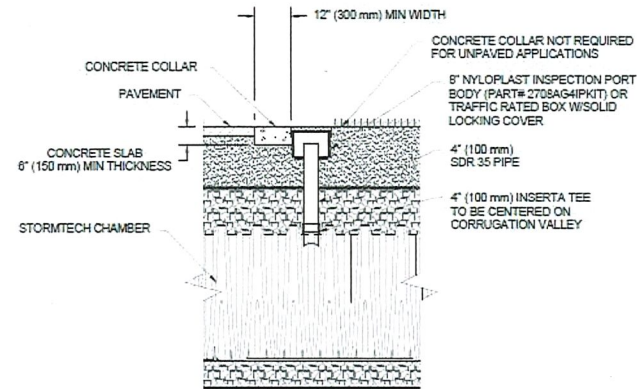
**MC-4500 ISOLATOR ROW PLUS DETAIL**  
NTS

**INSPECTION & MAINTENANCE**

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
    - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
    - A.2. REMOVE AND CLEAN FLEXFORM FILTER IF INSTALLED
    - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
    - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
    - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
  - B. ALL ISOLATOR PLUS ROWS
    - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
    - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
      - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
      - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
    - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
  - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
  - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

**NOTES**

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:  
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

**4" PVC INSPECTION PORT DETAIL**  
(MC SERIES CHAMBER)  
NTS

<b>SENIOR HOUSING DEVELOPMENT</b>		ROCHESTER HILLS, MI	GIC
DATE:	01/19/2021	DRAWN:	GIC
PROJECT #:	S217657	CHECKED:	JPR
REVISION	NO.	DATE	DESCRIPTION
1	1	01/19/2021	ISSUE FOR PERMIT
2	2	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
3	3	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
4	4	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
5	5	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
6	6	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
7	7	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
8	8	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
9	9	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
10	10	01/19/2021	REVISED TO MEET INDEPENDENTLY SIGNED
<p style="text-align: center; font-size: small;">                 4660 TULLEMAN BLVD.                  HILLIARD, OH 43026                  614.885.1100                  WWW.STORMTECH.COM             </p>			
<p style="text-align: center; font-size: x-small;">                 ADVANCED DESIGN SYSTEMS, INC.                  10000 WOODBURN AVENUE, SUITE 100                  WOODBURN, OH 43084                  614.885.1100                  WWW.ADS-DESIGN.COM             </p>			
6 SHEET OF 7			

