

**DRAFT OF STORMWATER DRAINAGE  
SYSTEM MAINTENANCE AGREEMENT**

**IN CONSIDERATION OF** the site plan approval granted by the Planning Board of the City of Portland to the proposed 155 Sheridan Street Redevelopment Project shown on the Site Plan recorded in the Cumberland County Registry of Deeds in Plan Book \_\_\_\_, Page \_\_\_\_ (the “Plan”) and associated Grading & Drainage Plan (Sheet C-30), dated \_\_\_\_\_ prepared by Acorn Engineering, Inc. of P.O. Box 3372, Portland, ME 04104 dated and pursuant to a condition thereof, BD Sheridan, LLC, a Maine limited liability company with a principal place of business in Portland, Maine, and having a mailing address of 1266 Furnace Brook Parkway Suite 300, Quincy, Massachusetts 02169, the owner of the subject premises, does hereby agree, for itself, its successors and assigns (the “Owner”), as follows:

Maintenance Agreement

That it, its successors and assigns, will, at its own cost and expense and at all times in perpetuity, maintain in good repair and in proper working order the underdrained subsurface sand filter, drainage manholes, storm drain pipes, and underdrain pipes (hereinafter collectively referred to as the “stormwater system”) as shown on the Grading & Drainage Plan, C-30 attached hereto as **Exhibit B** and in strict compliance with the approved Stormwater Inspection & Maintenance Plan and Stormwater Maintenance and Inspection Log, dated 03/28/2017, copies attached as **Exhibit A and C** respectively and Chapter 32 of the Portland City Code.

Owner of the subject premises further agrees, at its own cost, to keep a Stormwater Maintenance and Inspection Log in the forms attached as **Exhibit C**. Such log shall be made available for inspection by the City of Portland upon reasonable notice and request.

Said agreement is for the benefit of the said City of Portland and all persons in lawful possession of the property and abutters thereto; further, that the said City of Portland or said persons in lawful possession may enforce this Agreement by an action at law or in equity in any court of competent jurisdiction; further, that after giving the Owner written notice and a stated time to perform, the said City of Portland, by its authorized agents or representatives, may, but is not obligated to, enter upon said premises to maintain, repair, or replace said stormwater system, including but not limited to the underdrained subsurface

sand filter, drainage manholes, storm drain pipes, underdrain pipes, and other drainage structures thereon in the event of any failure or neglect thereof, the cost and expense thereof to be reimbursed in full to the said City of Portland by the Owner upon written demand. Any funds owed to the City under this paragraph shall be secured by a lien on the property.

This Agreement shall not confer upon the City of Portland or any other person the right to utilize said stormwater system for public use or for the development of any other property, and the Owner shall bear no financial responsibility by virtue of this Agreement for enlarging the capacity of said system for any reason whatsoever.

This Agreement shall also not be construed to allow any change or deviation from the requirements of the subdivision and/or site plan most recently and formally approved by the Planning Board of the City of Portland.

This Agreement shall bind the undersigned only so long as it retains any interest in said premises, and shall run with the land and be binding upon the Owner's successors and assigns as their interests may from time to time appear.

The Owner agrees to provide a copy of this Agreement to any successor or assign and to forward to the City an Addendum signed by any successor or assign in which the successor or assign states that the successor or assign has read the Agreement, agrees to all its terms and conditions and the successor or assign will obtain and forward to the City's Department of Public Works and Department of Planning and Urban Development a similar Addendum from any other successor or assign.

For the purpose of this Agreement and release "Owner" is any person or entity who is a successor or assign and has a legal interest in part, or all, of the real estate and any building. The real estate shown by chart, block and lot number in the records on file in the City Assessor's office shall constitute "the property" that may be entered by the City and liened if the City is not paid all of its costs and charges following the mailing of a written demand for payment to the owner pursuant to the process and with the same force and effect as that established by 36 M.R.S.A. §§ 942 and 943 for real estate tax liens.

Any written notices or demands required by the Agreement shall be complete on the date the notice is attached to one or more doors providing entry to any buildings or residential units and mailed by certified mail, return receipt requested or ordinary mail or both to the owner of record as shown on the tax roles on file in the City Assessor's Office.

If the property has more than one owner on the tax rolls, service shall be complete by mailing it to only the first listed owner. The failure to receive any written notice required by this Agreement shall not prevent the City from entering the property and performing maintenance or repairs on the stormwater system, or any component thereof, or liening it or create a cause of action against the City.

Dated at Portland, Maine this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

BD Sheridan, LLC  
A Maine limited liability company

\_\_\_\_\_  
Bernie Saulnier, Manager

STATE OF MAINE  
CUMBERLAND, ss.

Date: \_\_\_\_\_

Personally appeared the above-named Bernie Saulnier, Manager of BD Sheridan, LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity.

Before me,

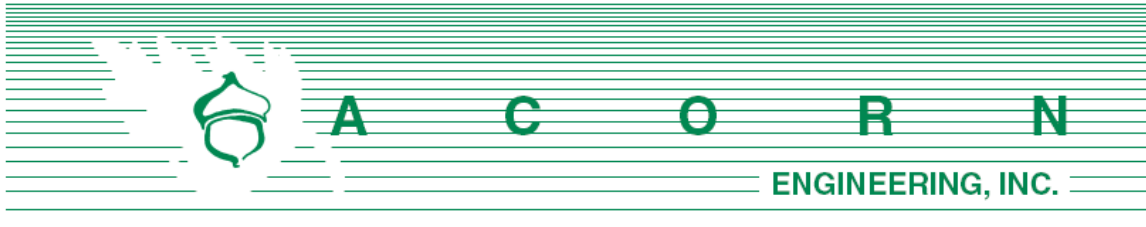
\_\_\_\_\_  
Notary Public/Attorney at Law

Print name: \_\_\_\_\_

Exhibit A: Stormwater Inspection & Maintenance Plan

Exhibit B: Grading & Drainage Plan

Exhibit C: Stormwater Maintenance and Inspection Log



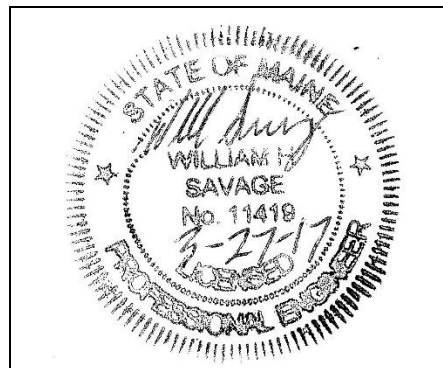
# **POST CONSTRUCTION - STORMWATER INSPECTION & MAINTENANCE PLAN**

Prepared For:

**BD Sheridan, LLC  
1266 Furnace Brook Parkway Suite 300  
Quincy, Massachusetts 02169**

Prepared By:

**Acorn Engineering, Inc.  
158 Danforth Street  
Portland, Maine 04102**



**March 2017**

## **RESPONSIBLE PARTY**

The owner, BD Sheridan, LLC, and/or their successor shall be responsible for contracting with a qualified stormwater professional to implement the Inspection and Maintenance Plan. The qualified stormwater professional shall maintain a stormwater log (report) summarizing inspections, maintenance, and corrective action taken. The Qualified Stormwater Professional shall annually submit the Stormwater Log to the Department of Public Works prior to June 30<sup>th</sup>.

The following is an example of a qualified stormwater professional that the association may contract through.

Organization: Will Savage, PE  
Acorn Engineering, Inc  
Portland, Maine

Phone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert. #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert. #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

The inspection and maintenance criteria is based upon the Maine DEP - Stormwater Management for Maine, Volume III: BMPs Technical Design Manual. Refer to the Grading and Drainage Plan for the location of the BMPs

## **PURPOSE**

This Inspection and Maintenance Plan has been individually tailored to this parcel's stormwater infrastructure, site characteristics, and their respective opportunities and limitations related to reducing the pollutant load on the receiving watershed. The maintenance of a parcel's impervious surfaces and stormwater infrastructure is critical to extending the long-term performance and effectiveness of Best Management Practices (BMPs). The Inspection and Maintenance Plan represents the parcel's minimum activities to meet the permit requirements. The parcel shall still be subject to any applicable Civil Site Plans, Permit Applications, Erosion and Sedimentation Control Plans Reports, Stormwater Management Plans, Inspection and Maintenance Manuals, and all Municipal, State, and Federal rules.

## OPERATION AND MAINTENANCE ACTIVITY

### Underdrained Subsurface Sand Filter (USSF):

The maintenance of the underdrained subsurface sand filter shall be in accordance with the following activities identified below and the most recent version of the Maine DEP Volume III BMPs Technical Design Manual Chapter 7.3 Underdrained Subsurface Sand Filter. Refer the manufacturer's maintenance manual in Exhibit C for more information on maintenance activities.

- The system should be inspected after every major storm in the first few months to ensure proper function. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within 24 hours to 36 hours.
- Inspect Outlet Control Structures (OCS) to ensure they are in good working order and that the orifice and trash racks are unobstructed from trash and debris.
- Inspect and maintain the StormTech Isolator Row in accordance with the attached proprietary Operation and Maintenance Plan.

### Sweeping:

Annual sweeping of the driveway and parking areas following the snow melt for accumulated winter sand, if necessary. Appropriately dispose of all collected material.

### Storm Drains:

The storm drain shall be annually inspected for the presence of accumulated sediment or debris. Any sediment shall be removed as required.

- The equipment shall meet the following minimum specifications; power jet and water source for washing down the storm drain, vacuum attachment for catch basin cleaning, and a liquid handling method to dewater the material.
- Inspect and legally dispose of accumulated sediment and debris within the storm drains between basins. Liquids must be decanted on-site and returned to the catch basin.

### Drainage Manholes:

Drainage manholes shall be inspected to confirm the structure is operating properly.

- Inspect the presence of accumulated sediment or debris any sediment shall be removed. The equipment shall meet the following minimum specifications; power jet and water source for washing down the storm drain, vacuum attachment for catch basin cleaning, and a liquid handling method to dewater the material.
- Sediment shall be removed when accumulation is within 6 inches of the outfall pipe invert. Legally dispose of accumulated sediment and debris from the bottom of the basin, inlet grates, and inflow channels to the basin.
- If the basin outlet is designed with a hood to trap floatable materials (e.g. Snout), check to ensure watertight seal is working.



Landscaped, Vegetated and Areas Adjacent to Retaining Walls:

Inspect all landscaped and or vegetated slopes and embankments on an annual basis. Vegetated areas with bare areas or sparse growth (<90% coverage) shall be revegetated. Mulch shall be applied to landscaped areas, as necessary. Dead or decaying landscaping (ground cover, shrubs, trees etc.) shall be replanted in accordance with the approved Landscape Plan.

If signs of rill erosion or scour are present within areas tributary to the retaining walls, or stormwater flow is observed flowing over the wall, Acorn Engineering should be immediately contacted to perform an inspection and/or to contact the appropriate professional. Should concerns arise from the downhill abutters related to groundwater flow from the retaining wall weep hole outlets, Acorn Engineering should be contacted to perform a site inspection and to meet with the concerned abutter. Periodic inspections of the retaining walls shall be performed, under separate contract, by a Professional Geotechnical Engineer.

INSPECTION AND MAINTENANCE TABLE

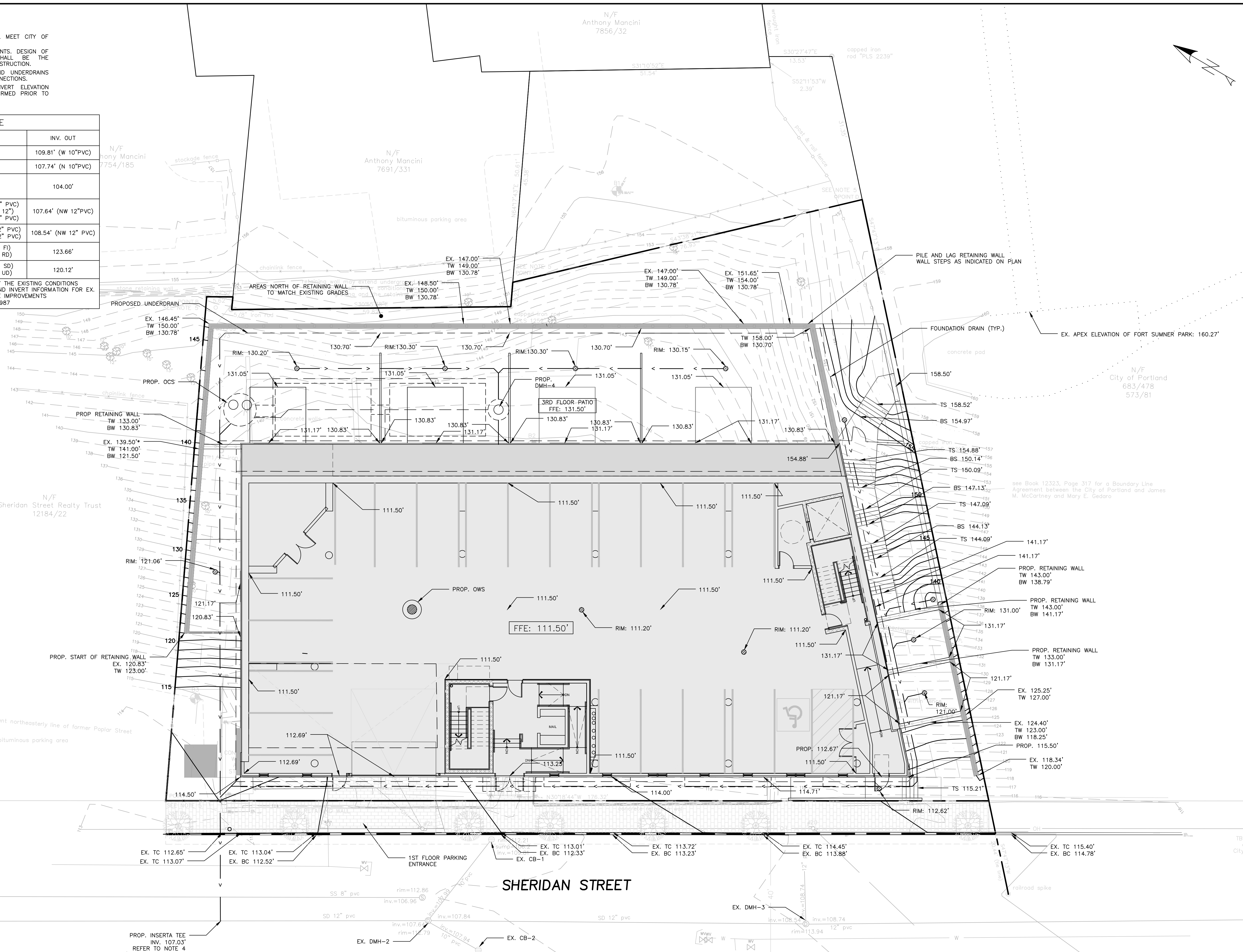
<b>Inspection and Maintenance Frequency</b>	Spring or Yearly	Summer	Fall	As Necessary
Underdrained Subsurface Sand Filter	X		X	X
Sweeping	X			X
Storm Drains		X		X
Drainage Manholes		X		X
Landscaped/Vegetated/Wall Areas	X			X



- GENERAL NOTES:
- ALL WORK WITHIN THE CITY STREET RIGHT OF WAY SHALL MEET CITY OF PORTLAND TECHNICAL MANUAL STANDARDS.
  - REFER TO STRUCTURAL PLANS FOR FOUNDATION REQUIREMENTS. DESIGN OF ADDITIONAL TEMPORARY SOIL RESTRAINT MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR IF NECESSARY FOR CONSTRUCTION.
  - CONTRACTOR SHALL ENSURE THAT FOUNDATION DRAINS AND UNDERDRAINS ARE CONSTRUCTED WITH POSITIVE OUTLET TO PROPOSED CONNECTIONS.
  - CONTRACTOR TO NOTE THAT THE EXISTING RIM AND INVERT ELEVATION INFORMATION PROVIDED FOR EX. DMH-1 ARE TO BE CONFIRMED PRIOR TO CONNECTING THE PROPOSED 8" SD OUTLET.

STRUCTURE SCHEDULE				
STRUCTURE	INTERIOR DIAMETER	RIM	INV. IN	INV. OUT
EX. CB-1	-	112.21'	-	109.81' (W 10" PVC)
EX. CB-2	-	112.58'	-	107.74' (N 10" PVC)
EX. DMH-1*	-	111.46'	104.21'	104.00'
EX. DMH-2	-	112.79'	107.99' (W 10" PVC) 107.84' (NW 12") 107.94' (N 10" PVC)	107.64' (NW 12" PVC)
EX. DMH-3	-	113.94'	108.74' (SW 12" PVC) 108.74' (NW 12" PVC)	108.54' (NW 12" PVC)
DMH-4	4'	130.80'	125.50' (6" FI) 125.50' (8" HD)	123.66'
OCS	6'	130.80'	126.44' (12" SD) 120.22' (4" UD)	120.12'

\* EXISTING STRUCTURES EXCEPT FOR EX. DMH-1 AS DEFINED BY THE EXISTING CONDITIONS SURVEY DATED MARCH 6, 2016 BY TITCOMB ASSOCIATES. RIM AND INVERT INFORMATION FOR EX. DMH-1 AS DEFINED BY SHEET 5 OF SHERIDAN STREET DRAINAGE IMPROVEMENTS (#86103-30-64-04) BY CITY OF PORTLAND DPW DATED JUNE 1987



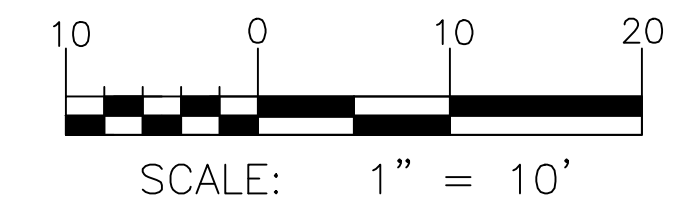
EX. DMH-1

PROP. INSERTA TEE  
INV. 107.03'  
REFER TO NOTE 4

EX. DMH-2

EX. DMH-3

SHERIDAN STREET



PRELIMINARY  
NOT ISSUED FOR  
CONSTRUCTION

ISSUED FOR	BY
PRELIM. APP.	WHS
	3/28/17

DRAWING NAME: GRADING & DRAINAGE PLAN  
PROJECT NAME: 155 SHERIDAN STREET  
CLIENT: VAZZA REAL ESTATE GROUP  
BD SHERIDAN, LLC  
1266 FURNACE BROOK PARKWAY SUITE 300 QUINCY, MA 02169

ACORNER ENGINEERING, INC.

158 BANKFOUL ST. PORTLAND, MAINE 04102  
(207) 775-2655

FILE: 1069\_CIVIL  
JN: 1069  
SCALE: 1" = 10'  
DESIGNED BY: WHS  
DRAWN BY: QUD  
CHECKED BY: WHS

DRAWING NO. C-30



# STORMWATER MAINTENANCE AND INSPECTION AGREEMENT: INSPECTION LOG

<b>FILTRATION BMP:</b>	
<b>Location:</b> 155 Sheridan Street, Portland, ME 04101	<b>Latitude:</b> 43.667553° N <b>Longitude:</b> -70.251461° W
<b>Description of Located Point:</b> Northeast to the rear of the property	<b>Inspector:</b> <b>Date of Inspection:</b> <b>Weather Conditions:</b>
<b>Days since last precipitation:</b>	<b>MEDEP Permit #:</b> N/A
<b>Quantity of last precipitation (in):</b>	<b>Design Drawings:</b> YES

Maintenance Items	Inspect In Spring	Inspect In Fall	Inspect As Necessary		Maintenance Requested (Date)	Maintenance Completed (Date)	Summary of Maintenance Required
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Underdrained Subsurface Sand Filter (USSF)							
Sand filter retains the design volume for a drain down time greater than 24-hours and less than 36-hours	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
The outlet control structure is in good working condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Inlet and pre-treatment measures are free of sediment and floatables accumulation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Maintain in accordance with manufacturer's recommendations	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Treatment device is working properly and is free of debris and sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Sediment is less than 3 inches within the isolator row	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Manhole is working properly and is free of debris and sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Basin outlet hood (if any) is working properly.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			

The outlet control structure is in good working condition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No			
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## STORMWATER MAINTENANCE AND INSPECTION AGREEMENT: INSPECTION LOG

Maintenance Items	Inspect In Spring	Inspect In Fall	Inspect As Necessary		Maintenance Requested (Date)	Maintenance Completed (Date)	Summary of Maintenance Required
good working condition				<input type="checkbox"/> N/A			
Inter-basin storm drain is functioning properly and free of sediment and debris.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
<b>General</b>							
Access to facility is adequate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Photographs of most recent site inspection are included	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				Photographs are attached.
Additional Comments:							

# STORMWATER MAINTENANCE AND INSPECTION AGREEMENT: INSPECTION LOG

<b>DRAINAGE MANHOLE:</b>	
<b>Location:</b> 155 Sheridan Street, Portland, ME 04101	<b>Latitude:</b> 43.667553° N
	<b>Longitude:</b> -70.251461° W
<b>Description of Located Point:</b> Northeast to the rear of the property	<b>Inspector:</b>
	<b>Date of Inspection:</b>
	<b>Weather Conditions:</b>
<b>Days since last precipitation:</b>	<b>MEDEP Permit #</b> N/A
<b>Quantity of last precipitation (in):</b>	<b>Design Drawings:</b> YES

Maintenance Items	Inspect In Spring	Inspect In Fall	Inspect As Necessary		Maintenance Requested (Date)	Maintenance Completed (Date)	Summary of Maintenance Required
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<b>Drainage Manhole</b>
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Manhole is working properly and is free of debris and sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Inter-basin storm drain is functioning properly and free of sediment and debris.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Sediment sacks and hydrocarbon absorptive pads are working properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			

<b>General</b>
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Access to facility is adequate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Photographs of most recent site inspection are included	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				Photographs are attached.
Additional Comments:							

# STORMWATER MAINTENANCE AND INSPECTION AGREEMENT: INSPECTION LOG

<b>STORMWATER PIPE:</b>	
<b>Location:</b> 155 Sheridan Street, Portland, ME 04101	<b>Latitude:</b> 43.667647°N
	<b>Longitude:</b> -70.251671° W
<b>Description of Located Point:</b> In between the OCS and Sheridan Street	<b>Inspector:</b>
	<b>Date of Inspection:</b>
	<b>Weather Conditions:</b>
<b>Days since last precipitation:</b>	<b>MEDEP Permit #</b> N/A
<b>Quantity of last precipitation (in):</b>	<b>Design Drawings:</b> YES

Maintenance Items	Inspect In Spring	Inspect In Fall	Inspect As Necessary		Maintenance Requested (Date)	Maintenance Completed (Date)	Summary of Maintenance Required
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**Inlets, Outlets, Culverts & Storm Drains**

Pipe/culvert is free of obstruction, accumulated sediment and debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Pipe inlet and outlet is free of obstruction, accumulated sediment and debris	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Pipe/culvert, inlet and outlet is free of collapses and structural damage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Outlet and inlet are properly conveying stormwater and no erosion is visible	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			

**General**

Access to facility is adequate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Photographs of most recent site inspection are included	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				Photographs are attached.

Additional Comments:	
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# STORMWATER MAINTENANCE AND INSPECTION AGREEMENT: INSPECTION LOG

<b>VEGETATED AREAS:</b>	
<b>Location:</b> 155 Sheridan Street, Portland, ME 04101	<b>Latitude:</b> 43.667440°N <b>Longitude:</b> -70.251540° W
<b>Description of Located Point:</b> Landscape Areas within the property	<b>Inspector:</b> <b>Date of Inspection:</b> <b>Weather Conditions:</b>
<b>Days since last precipitation:</b>	<b>MEDEP Permit #</b> N/A
<b>Quantity of last precipitation (in):</b>	<b>Design Drawings:</b> YES

Maintenance Items	Inspect In Spring	Inspect In Fall	Inspect As Necessary		Maintenance Requested (Date)	Maintenance Completed (Date)	Summary of Maintenance Required
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<b>Embankments</b>							
Slopes and embankments are in good condition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Site is free of rill erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			

<b>General</b>							
Site is free of locations with less than 90% vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Plantings are capable of withstanding concentrated flows	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Access to facility is adequate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Photographs of most recent site inspection are included	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				Photographs are attached.

<b>Additional Comments:</b>	
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**Save Valuable Land and  
Protect Water Resources**



**Isolator<sup>®</sup> Row O&M Manual**  
StormTech<sup>®</sup> Chamber System for Stormwater Management



# 1.0 The Isolator<sup>®</sup> Row

## 1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

## 1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

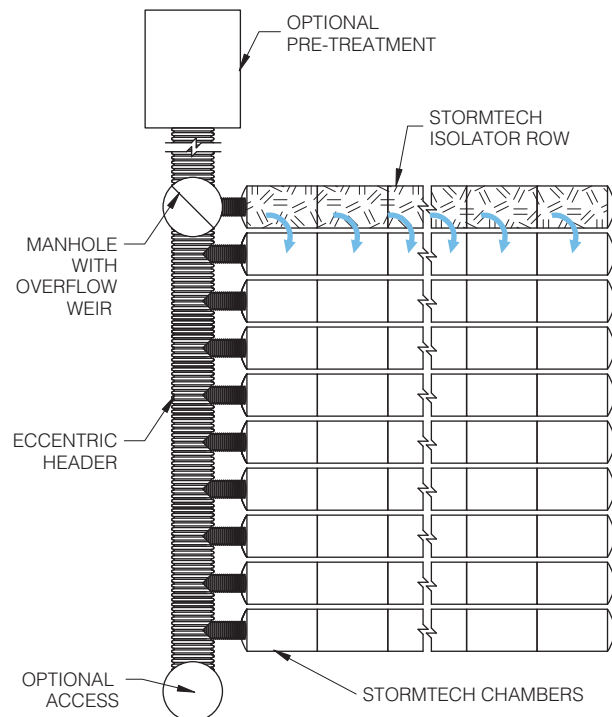
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

### StormTech Isolator Row with Overflow Spillway (not to scale)



## 2.0 Isolator Row Inspection/Maintenance



### 2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

### 2.2 MAINTENANCE

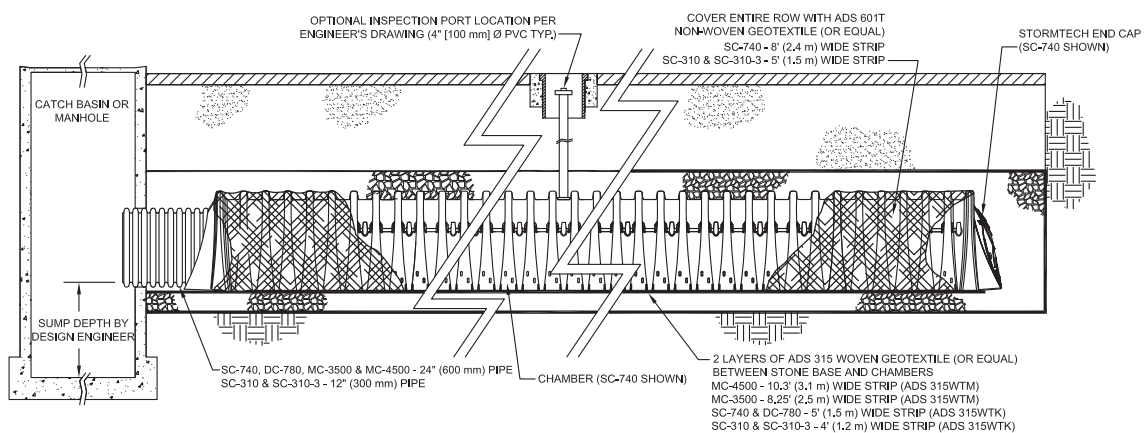
The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

### StormTech Isolator Row (not to scale)



**NOTE:** NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

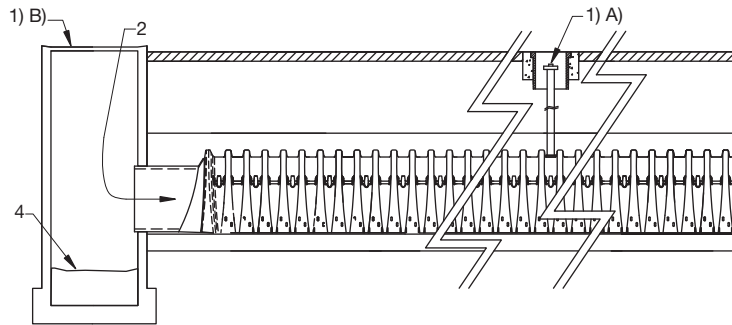


## 3.0 Isolator Row Step By Step Maintenance Procedures

### Step 1) Inspect Isolator Row for sediment

- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

StormTech Isolator Row (not to scale)



### Step 2) Clean out Isolator Row using the JetVac process

- A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

### Step 3) Replace all caps, lids and covers, record observations and actions

### Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

### Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in Isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm



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