

Long Term Pollution Prevention & Stormwater System Operation and Maintenance Plan

***Five Paths
Tax Map 39, Parcel 15A
Wayland, MA***

***July 2019
Rev 1 – 7/14/2020***

**Submitted to:
Wayland Planning Board
41 Cochituate Road
Wayland, MA 01778**

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**Project No:
171053**



LONG TERM POLLUTION PREVENTION AND STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Preface:

The goal of this manual is to improve water quality by initiating performance standards for the operation and maintenance of stormwater management structures, facilities, and recognized practices. The stormwater performance standards are set up to meet the statutory and regulatory authorities of the Department of Environmental Protection, including the Wetland Protection Act, surface water discharge permits under the Clean Waters Act, the 401 certification program for fill in wetlands, and the 401 certification of federal permits based on the water quality standards.

The local Conservation Commission and the Department of Environmental Protection are responsible for ensuring the protection of wetlands through the issuance of permits for activities in flood plains and in or near wetlands, as per the Wetlands Protection Act, MGL c.131 s. 40. Proposed work within a resource area or a one hundred (100') foot buffer zone requires an order of conditions.

Resource areas include freshwater and coastal wetlands, banks, beaches, and dunes bordering on estuaries, streams, riverfront, ponds, lakes, or the ocean; lands under any of these bodies of water; land subject to tidal action, coastal storm flowage, or flooding.

The discharge of pollutants to water of the Commonwealth without a permit is prohibited under the state Clean Waters Act, MGL c. 21, ss 26-53. Stormwater discharges are subject to regulations when two criteria are met under 314 CMR 3.04(2). First, there must be "conveyance or system of conveyances (including pipes, ditches, and channels) primarily used for collecting and conveying stormwater runoff." 314 CMR 3.04(2)(a). Second, the stormwater runoff must be "contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, or oil and grease," or, be designated on a case-by-case basis. Such designations must be made when the "stormwater discharge" is subject to effluent or toxic pollutant limitations, is located in an industrial plant area, or may be a significant contributor of pollutants to waters of the Commonwealth. Any activity resulting in a discharge to waters of the United States must comply with Section 401 of the Federal Clean Water Act and comply with state water quality standards. All stormwater discharges must be set back from the receiving waters or wetlands and best management practices (BMP) must be implemented. A permit is required for any stormwater discharge to an Outstanding Resource Water (ORW) which meets the regulatory definition in 314 CMR 3.04(2). Outstanding Resource Waters are defined under Surface Water Quality Standards 314 CMR 4.06 and include public surface water supplies, coastal and some inland Areas of Critical Environmental Concern (ACECs), and certified vernal pools.

This manual is set up to explain how to operate and maintain Best Management Practices that control erosion and minimize delivery of sediment and other pollutants to surrounding water and air.

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| Chapter 1 | is an introduction to the site and describes the Best Management Practices used on this site. |
| Chapter 2 | outlines the inspection and maintenance schedules for the site. |
| Chapter 3 | shows the location of the Best Management Practices used on-site. |
| Chapter 4 | outlines the operation and function of the Best Management Practices. |
| Chapter 5 | describes how and when the Best Management Practices should be inspected and how frequently they must be maintained and cleaned. |

1. Introduction:

This purpose of this project is to create a residential subdivision with 3 lots. Lot 1 shall be noted as the lot located on the northeastern portion of the project site adjacent to Shaw Drive. Lot 2 shall be noted as the lot located at the southwestern portion of the project site. Lot 3 shall be noted as the lot located at the south eastern portion of the project site. Each lot will be serviced by an onsite subsurface sewage disposal system and a public water supply. The development includes the construction of the three (3) 5-bedroom single-family dwellings, supporting utilities, stormwater management system, and associated clearing, grading, and grubbing. A proposed roadway "Five Paths Court" will provide access to each of the residential dwelling within the right of way.

The on-site stormwater runoff generated by the proposed impervious area (Pavement & roof) is to be collected and pre-treated prior to entering the two proposed Infiltration Chambers (IC) system. The Infiltration Chambers will provide sufficient stormwater infiltration and retention to mitigate the increase in overall impervious area from the proposed development per Massachusetts Stormwater Handbook.

To control erosion and minimize delivery of sediment and other pollutants into the atmosphere and adjacent wetlands, Best Management Practice (BMP) has been provided within the site's stormwater management system. These practices include but are not limited to:

- Deep Sump Hooded Catch Basin
- Drainage Channel
- Infiltration Chamber
- Stone Diaphragm

This manual is designed to help responsible parties become aware of urban non-point pollution problems and to provide detailed information about operating and maintaining stormwater management practices. The success of the Best Management Practices is dependent on their continued operations and maintenance.

2. Maintenance Requirements:

BMP's Owners:

- The OWNERS of the BMP's shall be the person, persons, trust, corporation, etc., or their successors who have title to the land on which the BMP is located. It is anticipated that all BMP's will be owned and maintained by the owners of the subdivision. Should the title of land upon which they are located is transferred the purchaser of the property, at that time, will assume all responsibilities set forth within this document.

Operation and Maintenance Responsibilities:

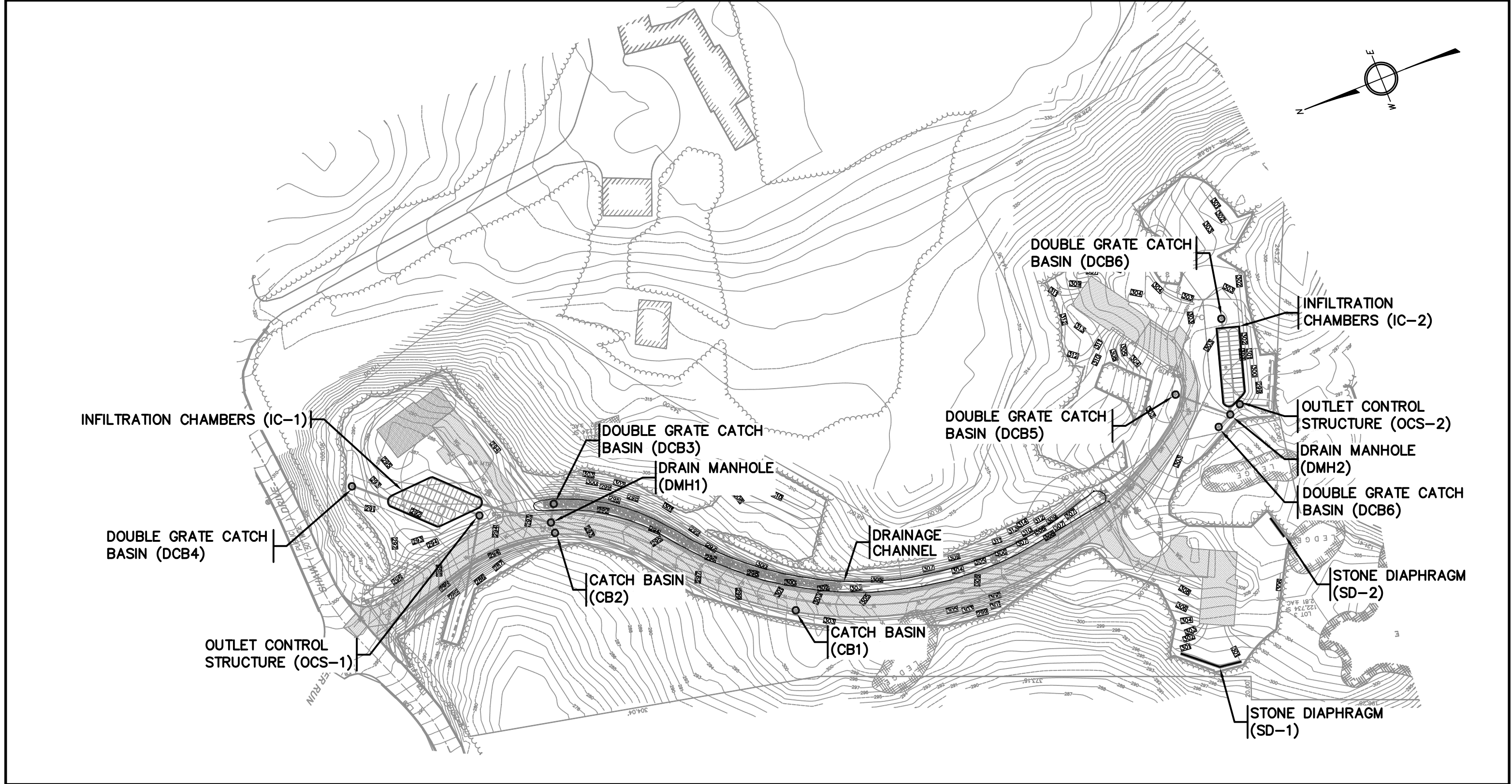
- The party or parties responsible for the funding, operation and maintenance of the BMP's shall be the OWNER or their designees.
- BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis **by a qualified professional with expertise in inspecting drainage system components**. All of the stormwater BMP's shall be kept in good working order at all times.
- A maintenance agreement providing for the funding, operation and maintenance of all the stormwater management BMP's shall be provided.

Source of Funding for Operation and Maintenance:

- The party or parties responsible for the funding, operation and maintenance of the BMP's shall be the OWNER or their designees.
- A maintenance agreement providing for the funding, operation and maintenance of all the stormwater management BMP's shall be provided.
- Approximate estimated annual maintenance costs for the site are:
 - Deep Sump Hooded Catch Basins \$250
 - Drainage Channel \$250
 - Stone Diaphragm \$500
 - Infiltration Chambers See manufacturer's manual

Schedule for Inspection and Maintenance:

- * BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis in accordance with this manual. All of the stormwater BMP's shall be kept in good working order at all times.
- * As a minimum, the OWNER shall follow the general guidelines outlined herein for the BMP's provided on this site.
- * An Operation and Maintenance log must be maintained for the last three years, outlining inspections, repairs, replacement and disposal for each Best Management Practice (BMP). In the case of disposal, the log shall indicate the type and material and the disposal location. This rolling log shall be made available to the Mass DEP and/or the Wayland Conservation Commission upon request.



<p>GRAPHIC SCALE</p> <p>(IN FEET) 1 INCH = 80 FEET</p>	<p>GPR</p> <p>Engineering Solutions for Land & Structures</p> <p>GOLDSMITH, PREST & RINGWALL, INC. 39 MAIN ST., SUITE 301, AYER, MA 01432 CIVIL ENGINEERING • LAND SURVEYING • LAND PLANNING VOICE: 978.772.1590 FAX: 978.772.1591 www.gpr-inc.com</p>	<p>PREPARED FOR:</p> <p>ROSS C. WILKINSON, PERSONAL REP., ESTATE OF PAULA D. WILKINSON PO BOX 98 WILTON, NH 03086</p> <table><tr><td>DESIGNED BY: LT</td><td>CHECKED BY: KFB</td></tr><tr><td colspan="2">DATE: REV 2 – JULY 13, 2020</td></tr></table>	DESIGNED BY: LT	CHECKED BY: KFB	DATE: REV 2 – JULY 13, 2020		<p>BEST MANAGEMENT PRACTICES (BMP) LOCUS</p> <p>FIVE PATHS ASSESSORS MAP#39 PARCEL 15A WAYLAND, MA</p> <table><tr><td>PROJECT: 171053</td><td>5 of 8</td></tr></table>	PROJECT: 171053	5 of 8
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4. Operation of Best Management Practices:

Deep Sump Hooded Catch Basins – are underground concrete structures which are designed to retain removed trash, debris and coarse sediment from stormwater runoff and serve as temporary spill containment devices for floatables such as oil and greases prior to discharge into a storm sewer pipe. The functions of a deep sump hooded catch basin include:

- A grate and/or vertical notch found in the curbing, that allow stormwater to enter the structure while filtering out larger objects such as trash and leaves;
- A four-foot (minimum) sump below the invert of the storm sewer pipe provides an area for detention time which allows sands and other sediments to settle out of the runoff prior to discharge.

Drainage Channel – are traditional vegetated open channels that are designed to provide for non-erosive conveyance of stormwater runoff. The functions of the drainage channels include:

- Vegetated, stormwater conveyance;
- Compatible with LID design practices and accents landscaping;

Infiltration Chambers – are subsurface plastic chambers with an open bottom and laid over a field of crushed stone bed which allow for the recharge of treated runoff into the groundwater. The functions of the infiltration chambers include:

- Provide groundwater recharge;
- Reduce local flooding;
- Preserve the natural water balance of the site

Stone Diaphragm – is a crushed stone trench that is open to the surface that collects stormwater runoff from lawn area and other “clean” runoff. The stone trench will allow stormwater to infiltration into the groundwater prior to filling up and overflowing. The functions of Stone Diaphragm include:

- Provide some groundwater recharge;
- Provide some stormwater retention;

5. Inspection and Maintenance of Best Management Practices:

Deep Sump Hooded Catch Basins and Drain Manholes - at a minimum, deep sump hooded catch basins and drain manholes shall be inspected four times per year. Ideally, inspection should be conducted at the end of the foliage and snow removal seasons, with remaining inspections at regular intervals between these times. Each structure should be cleaned whenever the depth of sediment deposits is greater than or equal to one half the depth of the sump from the bottom of the structure to the bottom of the lowest pipe invert, or at a minimum once per year. Structures shall be inspected for a buildup of sediments, oils and debris, cracks, breaks, or deformations. Any function of the catch basin and drain manhole that is not in working order will be replaced with similar materials, as per the detail, to prevent the storm sewer system from failing.

The catch basins and drain manholes shall be cleaned by means of hand held shovels, scallop

shovel and/or vacuor truck. The grate opening shall be clear of any foreign or lodged object. Sands and salts used in the winter will be removed from the catch basin sumps in the early spring. Leaves, pine needles, and branches brought down by autumn winds, rain, and cold weather will be removed from the catch basin and drain manhole sumps in the late fall.

Collected sediment and debris will be properly disposed of per local, state and federal requirements. Any sediment and debris removed from a catch basin deemed to be contaminated must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

Drainage Channels - At a minimum, the drainage channel shall be inspected after every major storm event (1-inch of rain or greater) for the first six (6) months and twice per year thereafter. Sediment and debris shall be removed from the drainage channel once per year. Sediment should be removed from the channel by hand methods in a manner to limit the disturbance of vegetation and underlying soils. Grass within the channel shall be mowed as necessary to maintain the grass height between three (3) and six (6) inches. Remove grass clippings and inspect for signs of erosion and the formation of rills and/or gullies. Reseed or re-sod with an alternative grass species if the original grass cover is not successfully established. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket or similar practice to ensure that no scour occurs in the drainage channel, while the seeds germinate and develop roots.

Collected sediment and debris will be properly disposed of per local, state and federal requirements. Any sediment and debris removed from the drainage channel deemed to be contaminated must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

Infiltration Chambers – At a minimum shall be inspected after every major storm event (1-inch of rain or greater) for the first six (6) months, then in the spring and fall of every year, thereafter. Note how long water remains standing in basin after a storm; standing water within the basin >72 hours after storm events suggests potential clogging and should be immediately addressed. Also, check for signs of differential settlement, cracking, erosion, leakage in embankments, tree growth in embankments, condition of riprap, sediment accumulation and the health of the turf.

Infiltration basins shall be mowed a minimum of twice per year. Grass clippings and accumulated organic matter should be removed to a non-sensitive area. Repairs and reseeding should be done as required. Sediment and debris should be removed manually when infiltration basin is thoroughly dry, a minimum of once per year or when the sediment level reaches a depth of 3".

Collected sediment and debris will be properly disposed of per local, state and federal requirements. Any sediment and debris removed from the infiltration basin deemed to be contaminated must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

Stone Diaphragm – inspect the stone diaphragm after the major storms and every 6 months. Remove any debris that may clog the surface of the stone diaphragm. Water ponding up inside the stone trench may indicate that the bottom of the stone diaphragm has failed. To rehabilitate a fail trench, all accumulated sediment must be stripped from the bottom, the bottom of the trench must be scarified and tilled to induce infiltration and all stone aggregate and filter fabric must be removed and replaced.

Collected sediment and debris will be properly disposed of per local, state and federal requirements. Any sediment and debris removed from the constructed stormwater wetlands deemed to be contaminated must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

MC-4500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-4500 CHAMBER

(not to scale)

Nominal Chamber Specifications

Size (L x W x H)

52" x 100" x 60"

1321 mm x 2540 mm x 1524 mm

Chamber Storage

106.5 ft³ (3.01 m³)

Min. Installed Storage*

162.6 ft³ (4.60 m³)

Weight

Nominal 125 lbs (56.7 kg)

Shipping

7 chambers/pallet

5 end caps/pallet

11 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-4500 END CAP

(not to scale)

Nominal End Cap Specifications

Size (L x W x H)

38" x 90" x 61"

965 mm x 2286 mm x 1549 mm

End Cap Storage

39.5 ft³ (1.12 m³)

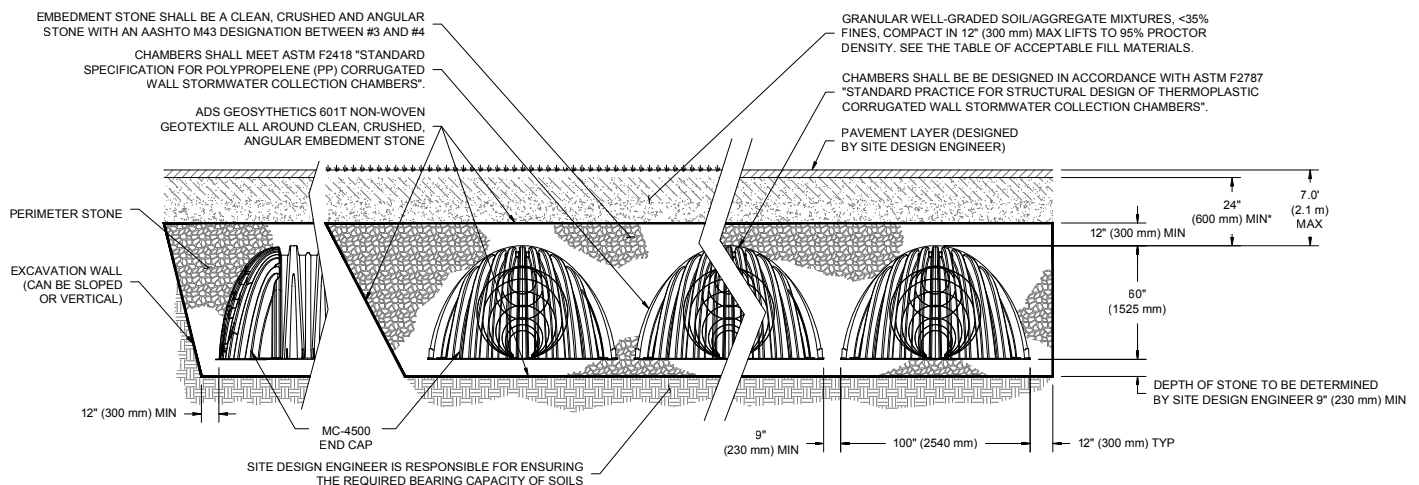
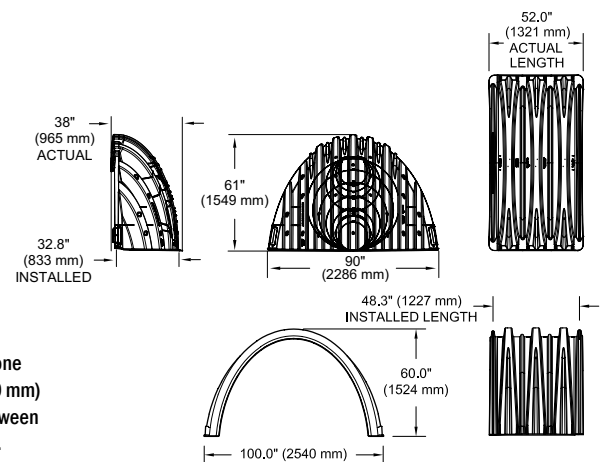
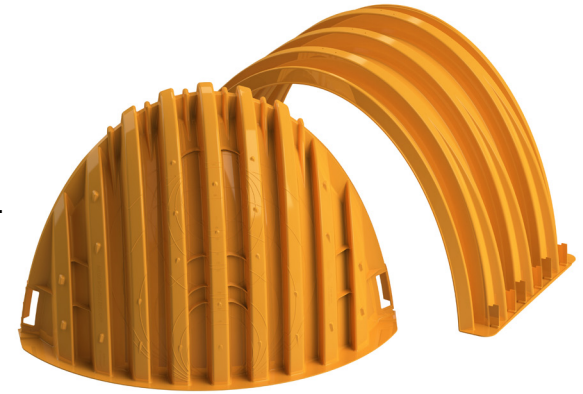
Min. Installed Storage*

115.3 ft³ (3.26 m³)

Weight

Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 12" (300 mm) of stone perimeter, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

MC-4500 CHAMBER SPECIFICATIONS

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft ³ (m ³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-4500 Chamber	106.5 (3.01)	162.6 (4.60)	166.3 (4.71)	169.9 (4.81)	173.6 (4.91)
MC-4500 End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds ³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-4500 Chamber	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
MC-4500 End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC KILOGRAMS (m ³)	230 mm	300 mm	375 mm	450 mm
MC-4500 Chamber	6713 (4.0)	7076 (4.2)	7529 (4.5)	7983 (4.7)
MC-4500 End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-4500 Chamber	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
MC-4500 End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.



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and utilize the StormTech Design Tool

For more information on the StormTech MC-4500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™

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4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

Best Management Practices (BMP) Inspection Log

General Information			
Project Name	Five Path		
Location	Tax Map 39, Parcel 15A, Wayland, MA		
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Type of Inspection: <input type="checkbox"/> Regular <input type="checkbox"/> Emergency			
Weather Information			
Weather at time of this inspection? <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: _____ Temperature: _____			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			

Site-specific BMPs

- The structural BMPs are identified on the BEST MANAGEMENT PRACTICES LOCUS included within the LONG TERM POLLUTION PREVENTION & STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN. Carry a copy of the Locus map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Long Term Pollution Prevention &
Stormwater System Operation & Maintenance Plan Inspection Form
Five Path at Tax Map 39, Parcel 15A, Wayland, MA

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are storm drain inlets properly working?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Is trash/litter from site areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ **Date:** _____