



***Stormwater Best Management Practices (BMP)
Operation and Maintenance Manual***

October 16, 2019

Prepared for

***Pillar of Fire
Block 516.01, Lot 1.01
Franklin Township
Somerset County, New Jersey***

Prepared By:

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**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

**For
Block 516.01, Lot 1.01
Franklin Township
Somerset County, New Jersey
PREPARATION DATE 10-16-19**

**PREPARED BY
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32 Brower Lane
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INTRODUCTION

The purpose of this manual is to provide guidelines for the operation and maintenance of the stormwater BMP's utilized on this site. This manual has been prepared for the use of the manager of the site to ensure that the designs of the BMP's will function properly with proper maintenance. The primary function of these BMP's is to provide water quality, control stormwater runoff and provide ground water recharge. The stormwater Best Management Practices (BMPs) for the project consist of the following:

- Porous Pavement

RESPONSIBLE PERSONS

The stormwater Best Management Practices (BMPs) in accordance with this manual, including the maintaining of the records for the inspection, maintenance, and corrective measures undertaken are the responsibility of:

**Robert Saydee
Pillar of Fire
2 Ministry Center Drive
Zarephath, NJ 08890**

The responsibility for the maintenance and record keeping requirements of BMP components may be transferred to another party with notice given to the appropriate agencies.

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

Table of Contents

<u>Title</u>	<u>Page</u>
List of Stormwater Management Measures	4
Location Map	4
Description of Stormwater Maintenance Measures.....	5
Preventative Measures.....	5-6
Corrective Maintenance/Records.....	6-7
Porous Pavement Inspection and Maintenance Log	Appendix A

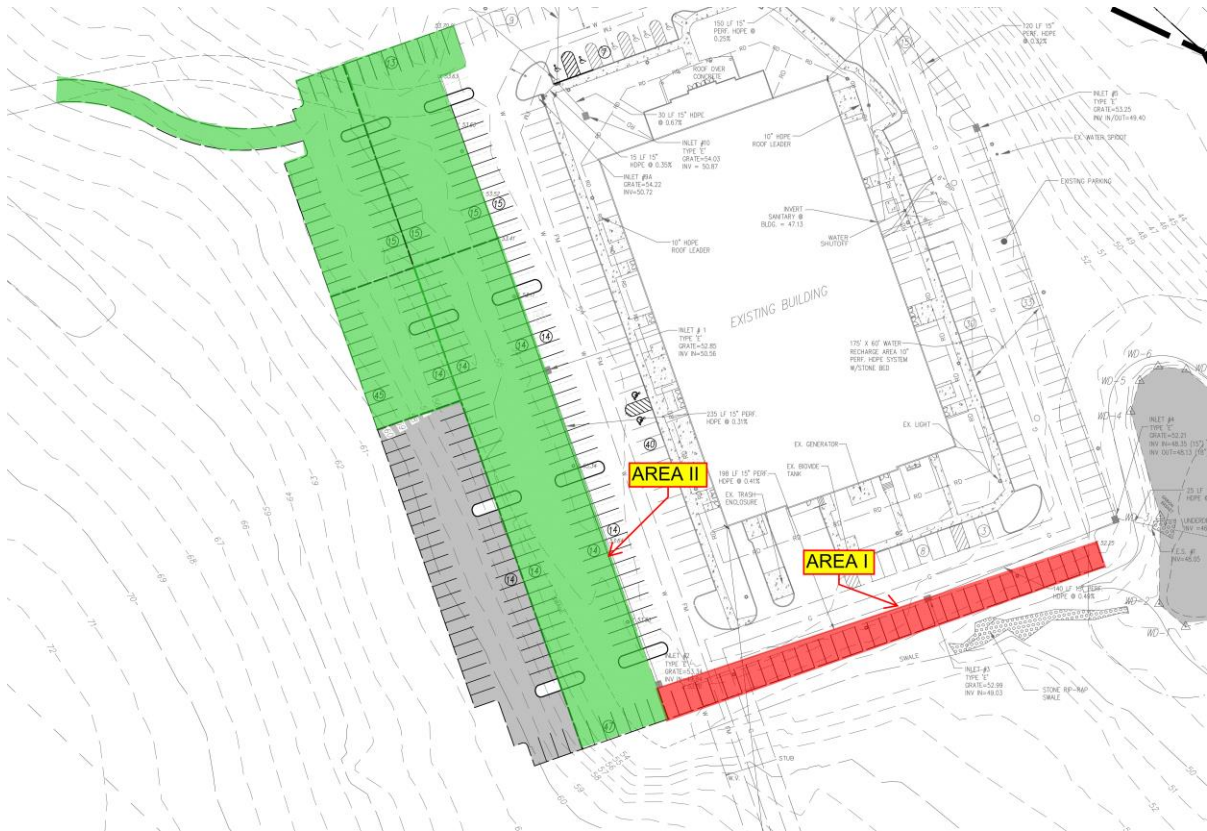
**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

List of Stormwater Management Measures

The stormwater management measures incorporated into this development are listed below.

Type of Stormwater Management Measure	Location Description	State Plane Coordinates / Lat., Long.
Porous Pavement	Block 516.01, Lot 1.01 Parking Lot for Zarephath Christian Church	X = 472012 Y = 620216

Location Map



**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

Description of Stormwater Management Measures

The porous pavement system consists of five areas of varying depth (see Location Map on page 4). The total volume of runoff generated by the proposed 1.58 acres of additional pavement during the 100-year storm event is 45,622 cubic feet. The corresponding peak flow rate is 10.82 cubic feet per second. The system has been designed to infiltrate the aforementioned runoff volume generated by the 100-year storm event and to provide water quality (80% TSS removal) and quantity control. Information pertaining to each of the five areas is below:

Area I

- Area: 5,905 SF
- Depth of Storage: 8" to 22"
- Design Permeability Rate: 61.5 in/hr
- Drain Time: <1 hr
- Seasonal High Water Table: 49.07
- Bottom of Stone Bed Elevation: 51.08

Area II

- Area: 48,297 SF
- Depth of Storage: 2" to 88"
- Design Permeability Rate: 7.5 in/hr
- Drain Time: 11.7 hr
- Seasonal High Water Table: 50.05
- Bottom of Stone Bed Elevation: 52.18

Preventative Measures

Preventative maintenance of the stormwater Best Management Practices (BMPs) shall be performed on a regular basis, and is intended to keep the facilities operational and in an aesthetic condition at all times. Preventative maintenance includes the following procedures:

Porous Pavement

First, the use of porous pavement will decrease the amount of runoff from the impervious surface with some storage occurring in the stone bed under the asphalt pavement. The second, and more important reason, is the use of porous pavement is considered a Best Management Practice by the NJDEP and results in an 80% removal of TSS therefore, eliminating any additional structures needed to meet the State requirement for site runoff.

General Maintenance

The surface course of all pervious paving systems must be inspected for cracking, subsidence, spalling, deterioration, erosion, and the growth of

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

unwanted vegetation at least once a year. Remedial measures must be taken as soon as practical.

Care must be taken when removing snow from the pervious paving surface courses. Pervious paving surface courses can be damaged by snow plows or loader buckets that are set too low to the ground. This is particularly true at permeable paver systems where differential settlement of pavers has occurred. Sand, grit, or cinders should not be used on pervious paving surface courses for snow or ice control. In no case can ice or snow be controlled by products that can contaminate the ground.

If the porous asphalt surface needs repair, only a porous pavement mix installed by a contractor that has experience in the installation of porous pavement can be used. At no time can the surface be seal coated or be repaired using an impervious product.

If mud or sediment is tracked onto the surface course of a pervious paving system, it must be removed as soon as possible. Removal should take place when the surface course is thoroughly dry. Disposal of debris, trash, sediment, and other waste matter removed from pervious paving surface courses should be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

The surface course of a porous paving system must be **vacuum swept** at least four (4) times a year. This should be followed by a high pressure hosing. All dislodged sediment and other particulate matter must be removed and properly disposed.

Corrective Maintenance

Corrective maintenance shall be provided as soon as practicable after a situation that requires attention is reported. Corrective maintenance includes repair of damage caused by vandalism, removal of debris and sediment that threatens the operation of the facilities and correction of any problems that jeopardize the safety or operation of the facilities.

Records

A written log detailing each inspection and of all preventive and corrective maintenance, including any maintenance-related work orders and receipts, shall be maintained by the person responsible for the maintenance of the BMP. The inspection and maintenance record should be reviewed annually by the person responsible to assess the effectiveness of the existing inspection and maintenance schedules, and as a guide for revising the plan, if necessary, to effectively maintain the operational integrity of the facilities.

Copies of all reports shall be submitted to the Municipal Engineer annually, prior to April 1.

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

The person responsible for the maintenance of the Stormwater Management System shall retain and make available, upon request by any public entity with administrative, health, environmental or safety authority over the site, the maintenance plan and the documentation required above

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

APPENDIX A

**Porous Pavement
INSPECTION AND MAINTENANCE LOG**

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

**Inspection Checklist / Maintenance Actions
Pervious Pavement System**

Checklist (circle one): Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date:** _____

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
A Pretreatment (Vegetative Filter Strip)	1 Poor quality vegetation, erosion, sedimentation, or debris	Y___ N___	(See Vegetative Filter Strip Field Manual)
B1 Pavement Surface (Porous Pavement)	1 Standing water is present after the design drain time The observed drain time is approximately _____ hours. Excessive sediment or mud accumulation on top of the pavement	Y___ N___	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission. If excessive sediment is present, the system may be clogged - Sweep the surface - Power wash (at 45 degree angle to the top) - Vacuum the surface - Excavate to inspect the storage bed for clogging, replace the storage bed material if it is severely clogged - Check the permeability rate of the subsoil Work Order # _____
B 1 Pavement Surface (Porous Pavement)	2 Cracking, subsidence, spalling, or other damage to the pavement	Y___ N___	Repair according to the manufacturer's procedures and material. See Reference Documents section. Work Order # _____
	3 Weeds or other vegetation on the porous pavement	Y___ N___	Remove the vegetation
Note:			

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B 2 Pavement Surface (Permeable Paver)	1	<p>Standing water is present after the design drain time</p> <p>The observed drain time is approximately _____ hours..</p>	<p>Y__</p> <p>N__</p> <p>Recheck to determine if there is standing water after 72 hours</p> <p>If standing water is present longer than 5 days, report to mosquito commission.</p> <p>If excessive sediment is present, the system may be clogged</p> <ul style="list-style-type: none"> - Sweep the surface - Vacuum the surface - Excavate to inspect the storage bed for clogging, replace the storage bed material if it is severely clogged - Check the permeability rate of the subsoil <p>Work Order # _____</p> <p>(Note: Do not power wash a permeable paver system)</p>
	2	Excessive sediment or mud accumulation on the system	<p>Y__</p> <p>N__</p> <p>Sweep and/or vacuum surface</p> <p>Replenish aggregate in joints</p> <p>Work Order # _____</p>
	3	Cracking, subsidence, spalling, deformation, uneven settlement, broken unit(s), or other damage to the pavers	<p>Y__</p> <p>N__</p> <p>Repair according to the manufacturer's procedures and material. See Reference Documents section.</p> <p>Work Order # _____</p>
	4	Loss of aggregate between joints	<p>Y__</p> <p>N__</p> <p>Replenish aggregate in joint</p> <p>Work Order # _____</p>
Note:			

**STORMWATER
BEST MANAGEMENT PRACTICES (BMPs)
OPERATION AND MAINTENANCE MANUAL**

Preventative Maintenance Record

Corresponding Checklist No. _____
Component No. _____, Inspection Item No. _____

Work Logs

Activities	Components	Date Completed
Sediment/debris removal	A – Pretreatment (<i>Vegetative Filter Strip</i>)	
	B1 – Pavement Surface (Porous Pavement)	
	B2 – Pavement Surface (Permeable Paver)	
	D – Outlet	
Vegetation removal	A – Pretreatment (<i>Vegetative Filter Strip</i>)	
	B2 – Pavement Surface (Permeable Paver)	
	C – Vegetation	
<i>(List additional tasks, if applicable)</i>		

Debris, sediment, and trash are handled (*onsite / by _____ (contractor name) to disposal site _____*). (See Part I: Maintenance Plan – Disposal Plan Section)

Crew member: _____ / _____ **Date:** _____
(name/ signature)

Supervisor: _____ / _____ **Date:** _____
(name/ signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order #** _____ **Date Issued** _____

2. **Issue to be resolved:**
(e.g., clogged surface)

3. The issue was from **Corresponding Checklist No.** _____, **Component No.** (e.g., B – Pavement Surface), **Inspection Item No.** (e.g., 2, 3).

4. **Required Actions**

Actions	Planned Date	Date Completed

5. **Responsible person(s):**

6. **Special requirements**

- Time of the season or weather condition: _____
- Tools/equipment: _____
- Subcontractor (name or specific type): _____

Approved by _____ / _____ **Date** _____
(name/signature)

Verification of completion by _____ / _____ **Date** _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.