

# STORMWATER MANAGEMENT FACILITIES OPERATIONS & MAINTENANCE MANUAL

*Prepared for*

**L'OREAL USA**

Block 86.03, Lot 10.32  
100 Commerce Drive  
Township of Franklin  
Somerset County, New Jersey

*Prepared by*

**BOHLER //**

N.J. Certificate of Authorization 24GA28161700

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5. "Inspection Log" – a summary table for recording the results of all inspections of the basins.
6. "Probable Annual Costs for Inspection and Preventive & Corrective Maintenance - Bioretention Basin"
7. "Probable Annual Costs for Inspection and Preventive & Corrective Maintenance - Detention Basin"
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## 1.0 PROJECT DETAILS

### 1.1 Introduction and Description of Facilities:

The subject property is located at 100 Commerce Drive in the Township of Franklin, Somerset County, New Jersey. The property is identified as Block 86.03, Lot 10.32 on the Township of Franklin tax maps and is a total of 29.58 acres in size. The site is bordered to the northeast and northwest by residential properties and Amwell Road beyond; to the east by Franklin Sewage Authority and other commercial uses, with Jiffy Road beyond; to the west by Dahmer Road with residential properties beyond; and to the south by Commerce Drive, Nature Flooring Industries and other commercial uses, with residential properties beyond.

The site is currently occupied with the existing ±305,200 SF L'Oréal USA Franklin building, along with other existing site features which include an extended detention basin and a bioretention basin, associated parking and driveway areas, loading docks, and landscaping. The proposed improvements include expanding the existing L'Oréal manufacturing building, which will occur in several phases and will ultimately increase the building floor area to a total of approximately 551,790 SF. Other proposed features include, but are not limited to, additional parking stalls, sidewalks, lighting and landscaping, and utility improvements. A proposed stormwater management system will convey the runoff from the proposed development and impervious areas to new small-scale bioretention basins before being discharged off of the site.

Stormwater designs are examined for water quality analysis, soil erosion and sediment control, and low impact development based on the NJDEP Stormwater Management Regulations of March 2021 and will require the construction of multiple areas of pervious pavement, bioretention basins, and associated pipes, inlets, and outlet structures.

This manual consists of three parts. The first part includes the introduction, project description and a list of project contacts. The second part provides the operation and maintenance instructions for the facilities and equipment. The third part (Appendix) provides information regarding the inspection and maintenance activities.

In accordance with NJAC 7:8-5.9(d), the maintenance plan and any future revisions must be recorded upon the deed of record for the property.

Deed Book# \_\_\_\_\_ Page # \_\_\_\_\_ Date deed filled by County Clerk \_\_\_\_\_

### 1.2 Project Contacts:

Municipal Engineer:

Engineering Department  
Address: 475 DeMott Lane, Somerset, NJ 08873  
Tel. (732) 873-2500 ext: 6230

Site Design Engineer:

Bohler Engineering  
Address: 10000 Midlantic Lane, Suite 410W, Mount Laurel, NJ 08054  
Tel. (856) 930-4000  
Attn: Ahmad Tamous, PE

Party Responsible for Maintaining Stormwater Management Facility:

L'Oreal USA Products, Inc.  
Address: 100 Commerce Drive, Township of Franklin, NJ 08873

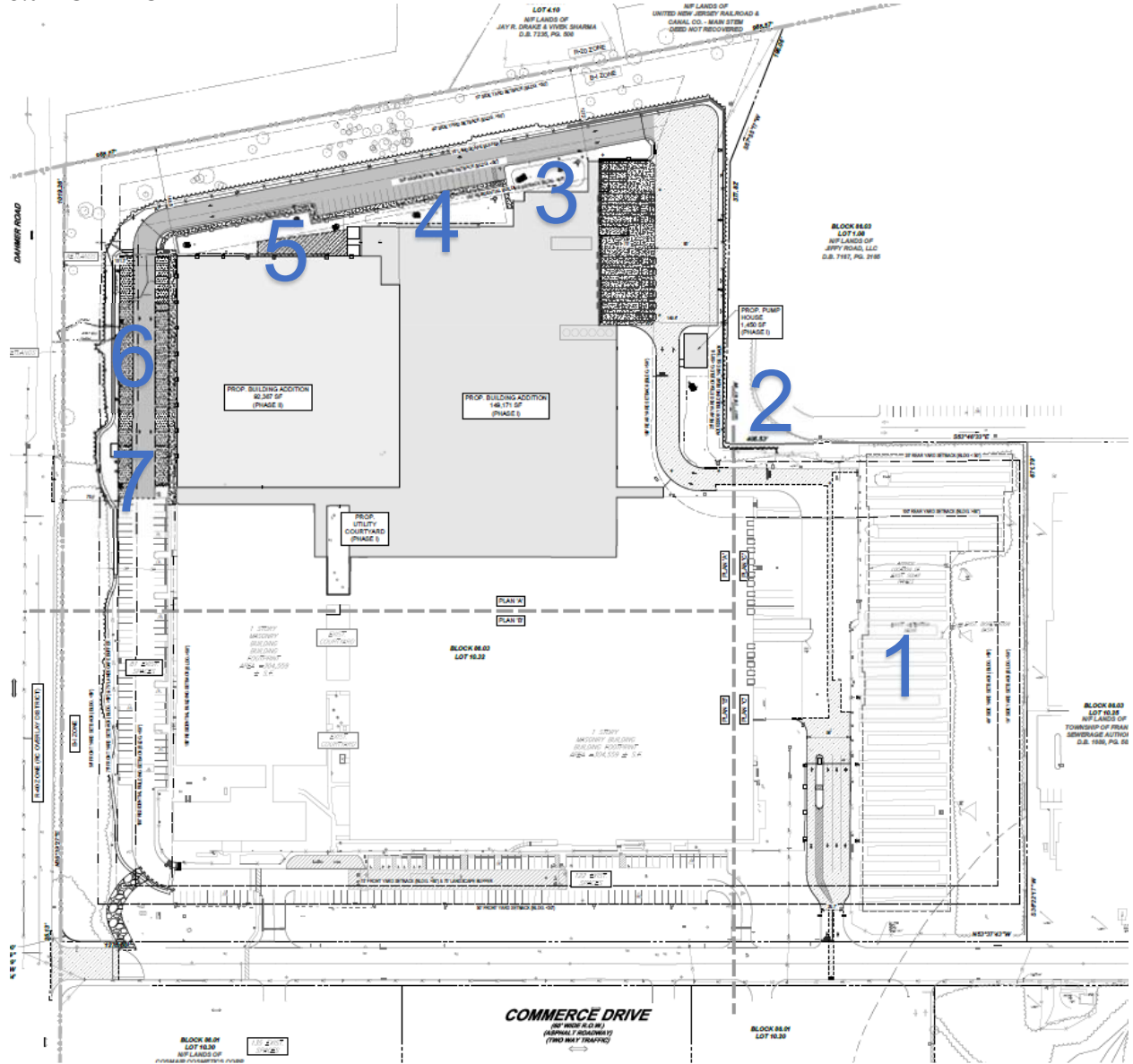
In accordance with NJAC 7:8-8.5(h), the person with maintenance responsibility must retain and, upon request, make available the maintenance plan and associated logs and other records for review by a public entity with administrative, health, environmental, or safety authority over the site.

In accordance with NJAC 7:8-8.5(g), operation and maintenance must be evaluated by the person responsible for the maintenance for updates and effectiveness at least once per year. The O&M Manual must be updated and recorded in the deed as needed at that time.

**2.0 LIST OF STORMWATER MANAGEMENT MEASURES**

<b>Type of Stormwater Management Measure</b>	<b>BMP No.</b>	<b>Location Description</b>	<b>State Plane Coordinates</b>
Exist. Detention Basin	1	East of existing building underneath solar panels	486,674, 602,262
Prop. Bioretention Basin #1	2	East of proposed building addition south to proposed pump house	486,681, 602,775
Prop. Bioretention Basin #2	3	North of proposed building addition, to the north of proposed loading docks	486,630, 603,069
Prop. Bioretention Basin #3	4	Middle basin north of building addition	486,486, 603,143
Prop. Bioretention Basin #4	5	West most basin north of building addition	486,311, 603,207
Pervious Pavement #1	6	West of proposed building addition, underneath proposed car parking	486,136, 603,301
Pervious Pavement #2	7	West of proposed building addition, underneath proposed car parking, to the south of Pervious Pavement #1 and adjacent to existing car parking lot to the west of the existing building	486,042, 603,121

### 3.0 LOCATION MAP



#### 4.0 BIORETENTION SYSTEM:

##### Functionality

Bioretention systems are used to remove a wide range of pollutants, such as suspended solids, nutrients, metals, hydrocarbons, and bacteria from stormwater runoff. They can also be used to reduce peak runoff rates and increase stormwater infiltration when designed as a multi-stage, multi-function facility.

A bioretention system can be configured as either a bioretention basin or a longer, narrower bioretention swale. In general, a bioretention basin has a flat bottom while a bioretention swale may have sloping bottom. Runoff storage depths above the soil bed surface are typically shallow. The TSS removal rate for bioretention systems is 80 or 90 percent, depending upon the thickness of the soil planting bed and the type of vegetation grown in the bed.

**Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.**

##### Type of BMP – Dry Basin / Infiltration

A bioretention system is a type of **dry** basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure that potential failure is recognized early.

A bioretention system with infiltration can also be designed for extended detention, in which case it will attenuate peak flows from storms larger than the Water Quality Design Storm.

##### Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is <72 hours.

##### Basin Configuration Targets

1. Planting Soil Bed
  - o The depth of the soil planting bed is 1.5 feet.
  - o The system is designed with a planting soil permeability rate of 4.0 inches/hour.
2. Outlet Information:

Bioretention Basin #1 - Seasonal High Water Elevation: Not Encountered

Outlet Description	Orifice Size / Weir Length	Invert Elevation
Culvert	24" RCP @0.30% SL	105.40
Weir	4' Wide	108.63
Grate/Orifice	4' x 4'	108.80

Bioretention Basin #2 - Seasonal High Water Elevation: Not Encountered

Outlet Description	Orifice Size / Weir Length	Invert Elevation
Culvert	18" RCP @0.30% SL	107.07
Weir	3' Wide	110.90
Grate/Orifice	4' x 4'	111.50

Bioretention Basin #3 & 4 - Seasonal High Water Elevation: Not Encountered

Outlet Description	Orifice Size / Weir Length	Invert Elevation
Culvert	18" RCP @0.30% SL	110.40
Orifice	4" Diameter	111.10
Grate/Orifice	4' x 4'	112.90

3. Vegetation

- The vegetation type to be used in this bioretention system is a mix of native shrubs, ornamental grasses and perennials suited for bioretention basins. A Landscaping Plan should be included in the Reference Documents section of this field manual.

**Critical Maintenance Features**

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.

**5.0 PERVIOUS PAVEMENT SYSTEM:**

**Functionality**

Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers.

Pervious paving systems are divided into two general types. Each type depends primarily upon the nature of the pervious paving surface course and the presence or absence of a runoff storage bed beneath the surface course. Porous paving and permeable paver with storage bed systems treat the stormwater quality design storm runoff through storage and infiltration. Therefore, these systems have adopted TSS removal rates similar to infiltration structures. The adopted TSS removal rate for each type of pervious paving system is from 80%.

Pervious paving systems are used to reduce runoff rates and volumes from paved, on-grade surfaces such as patios, walkways, driveways, fire lanes, and parking spaces. Pervious paving systems with runoff storage beds achieve these reductions through storage of runoff and eventual infiltration into the subgrade soils. Through this infiltration process, these types of pervious paving systems also achieve stormwater quality requirements.

**Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.**

**Type of BMP – Dry Stormwater Management Measure**

The pervious pavement system shall fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of the porous pavement failure. It may also contribute to mosquito breeding and other health and safety issues. At no time shall there be ponding on the surface of the pavement.

### Hydrology Design Targets

1. The system is porous pavement with storage bed.
2. The design drain time is <72 hours.
3. The TSS removal rate is 80%.

Pervious Pavement #1 - Seasonal High Water Elevation: 106.0

Outlet Description	Orifice Size / Weir Length	Invert Elevation
Culvert	15" RCP @0.30% SL	111.00
Orifice	3" Diameter	111.00
Weir	4' Wide	112.00

Pervious Pavement #3 - Seasonal High Water Elevation: 106.0

Outlet Description	Orifice Size / Weir Length	Invert Elevation
Culvert	12" RCP @0.40% SL	108.06
Orifice	2.5" Diameter	108.60
Weir	2' Wide	109.50

### Critical Maintenance Features

1. Avoid sand or silt onto the porous pavement area.
2. Sweep and vacuum the porous pavement area often to prevent clog.
3. Do not apply sealant to cracks or entire surface.

### Wetland Disturbance Notice:

Maintenance of this BMP may disturb a wetland area. Contact NJDEP Division of Land Use Regulation for guidance and any required permit(s) before performing maintenance.

### Wildlife Disturbance Notice:

Maintenance of this BMP may disturb or remove vegetation in an area designated to endangered and/or threatened species. Contact NJDEP Division of Fishing and Wildlife for guidance and any required permit(s) before performing maintenance.

## 6.0 DETENTION BASIN

### Functionality

An extended detention basin is a stormwater management facility that temporarily stores and attenuates stormwater runoff. In addition, extended detention basins provide pollutant treatment for runoff from the Water Quality Design Storm through settling. The total suspended solid (TSS) removal rate is 40-60%, depending on the duration of runoff detention.

### Type of BMP – Dry Basin / Extended Detention Only

An extended detention basin is a type of **dry** basin. This extended detention basin is designed for **detention only** and is **not** designed to infiltrate runoff; therefore, the basin may not be completely dry after the **design detention time** (see the Hydrology Design Targets in the Basic Design Information section). However, standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. Therefore, all dry basins must fully drain within 72 hours of the most recent rainfall. The design drain time shall be closely monitored to ensure potential failure is recognized early. **Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.**



### Critical Maintenance Features

1. Grass clippings shall be collected from the basin and properly disposed.
2. Trash racks and discharge outlet shall be cleaned frequently.
3. Remove sediment in low flow channel.

### 7.0 VISUAL AID FOR DRY TYPE STORMWATER BASIN INSPECTION

(Note: Basins shown here include various types of dry basins, not limited to the category of basin in this field manual.)



Issue:

The inlet is not properly drained, assuming it has not rained within 72 hours.

Corrective Action:

Clear and remove sediment. Check whether the water table is at or above the bottom of the forebay. Also check the permeability of the underlying soil, if necessary.

Preventative Action:

Routine inspections and removal of sediment from the forebay.





Issue: The Inflow pipe is clogged by sediment and vegetation.  
Corrective Action: Clear and remove sediment and unwanted vegetation.  
Preventative Action: Routine inspection and removal of sediment and unwanted vegetation.



Issue: The Inflow pipe is entirely clogged by sediment and trees.  
Corrective Action: Clear and remove sediment and trees.  
Preventative Action: Routine inspection & removal of sediment and unwanted vegetation.



Issue: The excessive sediment in inflow pipe (shown above) might be caused by a blockage of flow to the basin due to excessive vegetation and overgrown trees.



Corrective Action: Clear and remove trees and vegetation. If necessary, re-grade the bottom slope to ensure the flow properly spreads over the basin bottom.  
Preventative Action: Routine inspection and removal of sediment and unwanted vegetation.



Issue: Eroded inflow apron.  
Corrective Action: Repair apron.  
Preventative Action: Routine inspection and rehabilitation, if necessary.





Issue: The vegetation loss and the blackish soil may indicate frequent inundation.  
Corrective Action: Check the permeability rate of the soil and the water table elevation.  
Preventative Action: Replace the soil if necessary.  
Routine inspection and tilling/aeration, if necessary.



Issue: The low flow channel has excessive accumulation of sediment and debris. The outflow orifice is clogged by a trash bag and debris. Note that there is no trash rack installed.  
Corrective Action: Check the permeability rate of the soil and the water table elevation.  
Preventative Action: Replace the soil if necessary.  
Routine inspection and cleaning.





Issue: Trash rack is damaged.  
Corrective Action: Repair the trash rack.  
Preventative Action: Routine inspection, especially after large storm events. Tighten any loose bolts and repair structural flaws.



A well maintained detention basin

## **8.0 DISPOSAL PLAN**

### **Disposal/Recycling Procedures**

- Dewatering procedures and requirements
  - Install and maintain temporary sediment control bags according to the manufacturer's recommendations. Place the sediment control bag on the slope to allow water to flow downhill through the bag. Place the discharge hose into the neck of sediment control bag and fasten to ensure that water does not leak at the connection. Ensure that the discharge from the sediment control bag does not cause erosion to, or scour of, the area onto which the water is being discharged. When the sediment control bag is 90% full, can no longer efficiently filter sediment, or does not allow water to pass at a reasonable rate, remove and replace in accordance with manufacturer's recommendations.

### **Disposal Field – Offsite**

#### **Description of the Offsite Disposal:**

Non-hazardous sediment and debris is to be disposed of by a private operator and conveyance entity at the local landfill in accordance with all local, state, and federal regulations. A copy of the contract should be included in the Documents section of the Maintenance Plan.

## **9.0 INSPECTION AND MAINTENANCE:**

### **9.1 Routine Inspection and Maintenance of the Stormwater Management Facilities:**

All stormwater management basins have been designed to control degradation of water quality. Without proper routine inspection and maintenance, the basins may lose some or all of their capability to function to their full capacity. Lack of adequate maintenance at these facilities could lead to system failures.

Regularly scheduled maintenance inspections of the stormwater facilities should be performed at least four (4) times each year. The primary purpose of these inspections is to ascertain the operational condition and safety of the facilities, particularly the condition of embankments, outlet structures, sedimentation and other safety-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled Preventative and Aesthetic Maintenance Procedures and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of Corrective Maintenance procedures.

Routine maintenance of these facilities should be separated into two (2) basic types: Functional Maintenance and Aesthetic Maintenance. Functional Maintenance is further broken down into two (2) categories: Preventative and Corrective. Aesthetic Maintenance, which is necessary to maintain the visual appeal and aesthetic quality of these facilities, should be incorporated on the same schedule as the preventative maintenance efforts. Listed below are the Preventative, Corrective and Aesthetic Maintenance Procedures to be performed on a routine basis:

#### **9.1.1 Preventative Maintenance Procedures:**

The purpose of Preventative Maintenance is to maximize the effectiveness of the stormwater management aspects of the basins so that they remain operational and safe

and to minimize the need for potential emergency or extensive corrective maintenance. These procedures are as follows:

**Preventative Maintenance Actions**

The frequency of the preventative maintenance actions listed here is adopted from Chapter 9, BMP Manual of Structural Stormwater Management Measures.

Frequency	Preventative Maintenance Actions	Stormwater Measures/ No.
Monthly	Vegetation mowing and removal in growing season to prevent erosion	Throughout site
Quarterly	Vacuum sweeping followed by air blowing or high-pressure power washing. The first quarter maintenance must be in the spring. Maintenance in the autumn must be after fallen leaves are collected and removed.	All Bioretention Basin, Detention Basin and Pervious Pavement, Stormwater Structures (inlets, manholes, etc.) throughout the site
Annual	Surface course inspected for cracking, subsidence, spalling, erosion, deterioration, and unwanted vegetation	
Annual	Each spring after the last snow or ice event, test infiltration rate of surface course.	
Annual	Inspection of structural components (inlets, manholes, etc.) for cracking, subsidence, spalling, erosion, and deterioration.	
Unscheduled	Quick inspection of surface course for mud and sediment after every 1" rain	
Unscheduled	Quick inspection of inlets for debris and sediment after every 1" rain	Throughout site
(Other)		

a) *Weed Growth:*

Weeds associated with detention basins typically fall into three (3) categories: submergent, floating and emergent. All three (3) are typically found, to some extent, in a stormwater management system. However, excessive growth of any of these weeds can lead to problems.

The basins should be evaluated regularly to determine whether excessive invasive plant growth is evident. If it occurs, this situation can be corrected by appropriate application of fertilizers and weed killers. Weeds which have become a problem can be cleared through manual removal by professional pond maintenance technicians, in the case of the small wet pond, and by mowing for dry detention basins.

b) *Maintenance of Adjacent Areas:*

Grass areas, trees, and shrubs adjacent to the basins and conveyance swales require periodic routine maintenance to include fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide bank stabilization. The application of fertilizers should follow manufacturer's instructions to reduce run-off of these compounds into the basins. Additionally, provisions should be made to re-seed and re-establish grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. These tasks should be performed, or at least evaluated, on a quarterly basis. Lawn areas should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and scour as well as unwanted growth, which should be removed with minimum disruption to the remaining vegetation.

Note: All use of fertilizers, mechanical treatments, pesticides and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management facility. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible and if necessary, the minimum amount practical.

c) *Removal and Disposal of Trash/Debris and Sediment:*

All stormwater management components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding one inch of rainfall in 24 hours. Such components should include basin and swale bottoms and low flow channels, trash racks and inflow (headwall) points.

Removal of trash and debris will prevent possible damage to vegetated areas and minimize potential mosquito breeding habitats. Debris and trash must be properly hauled off the site and transferred to an approved disposal site.

Accumulated sediment should be removed before it threatens the storage volume of the basin. Before de-sedimentation activities are performed, consideration should be given to evacuating all standing water from the basins. Disposal of discharged water and sediment must comply with all local, county, state and federal regulations. Only suitable disposal sites should be utilized. If stable soil conditions exist around the basin, sediment deposition should not be an excessive maintenance issue. Should a recurrent stabilization situation develop, the inspector should identify the upstream sources of sediment and recommend required stabilization measures.



d) *Elimination of Potential Mosquito Breeding Habitats:*

The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes and may become the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is preferable to chemical means of controlling mosquitoes. The most important maintenance functions are removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

e) *Parking lot maintenance:*

This management measure involves employing pavement cleaning practices, such as parking lot sweeping on a regular basis, to minimize pollutant export to the stormwater conveyance system/ detention basins and eventually the receiving waters. These cleaning practices are designed to remove sediment, debris, and other pollutants from access drive and parking lot surfaces that are a potential source of pollution impacting urban waterways. Mechanical machines that use vacuum assisted dry sweeping to remove particulate matter shall be utilized as these have the ability to remove finer sediment particles. Parking lots and access drives shall be swept/ vacuumed at least semi-annually or more often as conditions warrant. The disposal of the swept material must be properly hauled off the site and transferred to an approved disposal site. The disposal of the solid waste must be properly hauled off the site and transferred to an approved disposal site.

**9.1.2 Corrective Maintenance Procedures:**

Depending on many factors, such as the performance of preventative maintenance actions, weather, or unexpected incidents, corrective maintenance requirements may not be precisely anticipated; however, a list of potential corrective maintenance actions may assist the responsible party in planning and estimating costs in advance.

<b>Potential Corrective Maintenance Actions</b>	<b>Stormwater Management Measures/No.</b>
<p><b>Example of corrective maintenance tasks</b></p> <ul style="list-style-type: none"> <li>- Repair/replacement of eroded or damaged riprap apron</li> <li>- Repair/replacement of missing or damaged trash racks</li> <li>- Repair/replacement of outlet pipes or orifices</li> <li>- Revegetation of eroded side slope, aquatic bench, marsh, basin bottom, grass swales, etc.</li> </ul>	<p>All Bioretention Basin, Detention Basin and Pervious Pavement, Stormwater Structures (inlets, manholes, etc.) throughout the site</p>
<p><b>Example of the corrective maintenance tasks</b></p> <ul style="list-style-type: none"> <li>- Repair/ Replacement of eroded or damages riprap apron</li> <li>- Repair/ Replacement of missing or damaged trash racks</li> <li>- Repair/ Replacement of outlet pipes or orifices</li> <li>- Revegetation of eroded side, aquatic bench, marsh, side slope, basin bottom, grass swales, etc.</li> </ul>	
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<p>Other</p>	

a) *Removal of Debris and Sediment:*

Sediment, debris and trash which threaten the discharge capacity of the basins should be removed immediately and properly disposed of. As noted previously, it is recommended that all water be evacuated from the basins before any significant amount of sediment, settled debris or trash is removed from the basins.

b) *Structural Repairs:*

Structural damage to outlet and inlet structures, trash racks, access hatches, roadways and headwalls as a result of vandalism, flood events, settlement or other causes must be repaired promptly. The urgency of the repairs will depend upon the nature of the damage and its effects on the safety and operation of the facility.

The analysis of structural damage if it occurs and the design and performance of structural repairs should only be undertaken by a Professional Engineer.

c) *Embankment and Slope Repairs:*

Damage to embankments, and side slopes must be repaired promptly. This damage can be the result of unusual rain or flood events, vandalism, animals, vehicles or neglect. Typical problems can include settlement, scouring, cracking, sloughing, seepage and rutting. The urgency of the repairs will depend upon the nature of the damage and its effect on safety and operational efficiency of the facility. The analysis of the damage and the design and performance of geotechnical repairs should only be undertaken by qualified personnel and under the direction of a consulting Professional Engineer. All basin embankments should be inspected quarterly and after each significant storm greater than one (1) inch of rainfall in 24 hours. Any damage or indication of erosion shall be immediately inspected by a Professional Engineer.

d) *Weed Harvesting:*

It may be necessary to remove congested weeds from the basin. Companies specializing in manual removal of weeds should be contacted to perform these operations. Note that such work does not usually but may in some cases require the approval of various regulatory agencies.

e) *Extermination of Mosquitoes:*

If neglected, basins can become a potential mosquito breeding area. The extermination of mosquitoes will usually require the services of the County Mosquito Commission. If mosquito control in the facility becomes necessary, the preventative maintenance program should be re-evaluated, and more emphasis should be placed on control of mosquito breeding habitats.

f) *Erosion Repair:*

Vegetative cover or other protective measures are necessary to prevent the loss of soil due to the forces of wind and water. Where a re-seeding program has not been effective in maintaining a non-erosive vegetative cover, or other factors have exposed soils to erosion, corrective steps should be initiated to prevent further loss of soil that may result in danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including rip-rap, gabion lining, geotextile fabrics, sod, seeding, concrete lining and re-grading.

g) *Elimination of Trees, Brush, Roots and Animal Burrows:*

The stability of embankments can be impaired by large roots and animal burrows. Additionally, burrows can present a safety hazard for maintenance personnel. Trees and brush with extensive, woody root systems should be completely removed to prevent destabilization and the creation of seepage routes. Regular mowing will prevent vegetation that can cause root problems. Roots should also be completely removed to prevent decomposition within the embankment. Root voids and burrows should be filled with material similar to the existing material, and capped just below grade with stone, concrete or other material. If the filling of the burrows does not discourage the animals from returning, further measures should be taken to either move the animal population or to make critical areas of the facility unattractive to them.

h) *Snow and Ice Removal:*

Accumulations of snow and ice can threaten the functioning of the inlets, outlets and emergency spillways. Provision of the equipment, material and personnel to monitor and remove snow and ice from critical areas will assure the function of the facility during the winter months.

**9.1.3 Aesthetic Maintenance Procedures:**

a) *Graffiti Removal:*

The timely removal of graffiti will restore the aesthetic quality of the basins. Removal can be accomplished by paint or other cover, or removal with scrapers, solvents or cleansers. Timely removal is important to discourage further graffiti and other acts of vandalism.

b) *Grass Trimming/Landscape Maintenance:*

The lawn areas around the basins shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3-inches. These areas shall also be fertilized twice a year, once in the spring and once in the fall. Fertilizer for lawn areas shall be 10-20-10 applied at a rate of 11 lbs. per 1,000 sf. or as determined by a soil test. Any bare, dead or damaged lawn areas shall be re-seeded in accordance with the original procedures as outlined in the Soil Erosion and Sediment Control Plans using the same mix and seeding rates. Stabilization of bare or damaged areas shall be done in a timely fashion so as to avoid exposing the soil to erosion.

If season prevents the re-establishment of turf cover, exposed areas should be stabilized with straw or salt hay mulch as described in the Soil Erosion and Sediment Control Plans until permanent seeding can be done. Seeding can be

done between March 15<sup>th</sup> and June 15<sup>th</sup> and between September 15<sup>th</sup> and December 1<sup>st</sup>, only if adequate water is provided.

The shrubs around the basins should also be maintained in order to promote a neat appearance and healthy, vigorous growth. All shrubs should be allowed to grow together in masses as shown on the plans and not pruned into individual plants. The planting beds should be mulched with hardwood mulch every two (2) years in order to provide a suitable growing medium for the shrubbery and to retain moisture around the root zones.

Pruning of shrubs should also be done on a regular basis to maintain the shape and appearance of the shrub masses. The height of the shrubs may vary according to the plant's natural growth habits but should not exceed 6-feet. Pruning should be done as necessary throughout the year to remove dead branches and to control new growth. Any pruning, other than the removal of dead branches, should be done in either late winter/early spring or after the shrub has flowered in the spring.

In the event that a shrub should experience more than 2/3 die back, it should be replaced in kind as soon as possible in either the spring or fall planting season. The replacement shrub should be the same species as the original and installed at the size and condition as specified on the original landscape plans. If, for any reason, a substitution of species or size must be made, it shall be subject to the approval of the project Landscape Architect.

The trees surrounding the basin areas shall be maintained regularly to ensure good health and exhibit an attractive appearance. Their maintenance should include fertilization twice annually, with one application in the spring and another in early fall. The trees shall be pruned in the late winter or early spring. However, dead branches should be removed as soon as they are noticed. Care should be taken to avoid cutting off the central leader of a tree if one is present.

If a tree is severely damaged or experiences more than 2/3 die back, it should be replaced in either the spring or fall planting season, whichever comes first. The only exception to this is if the replacement tree has a fall transplanting hazard. Replacement trees should be planted at the same size and condition as specified on the landscape plans. Any tree or shrub maintenance, tree pruning, or plant material substitution of species or size shall be subject to the approval of the project Landscape Architect.

c) *Control of Weeds:*

Although a regular grass maintenance program will minimize weed intrusion, some weeds will appear. Periodic weeding, either chemically or mechanically, will help to maintain a healthy turf, and keep grassed areas looking attractive. Application

of chemicals should be minimized and monitored closely so as not to affect the ecosystems within the detention basin. Excessive growth of weeds within the basin can be controlled mechanically as discussed in the previous section.

The recording of all maintenance work and inspections provide valuable data on the facility's condition. Review of this information will also help to establish more efficient and beneficial maintenance procedures and practices. As the owner is ultimately responsible for site maintenance, all recorded information should be directed to the owners of the basins for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained; however, under current regulations, this data does not have to be submitted to NJDEP.

#### 9.1.4 Maintenance Equipment and Materials

Note: Only light equipment is allowed to be used within open basins to prevent compaction.

Personnel/Equipment/Tools Name	Quantity
General maintenance crew	1
Grass maintenance equipment, including: Mowers, trimmers, edgers, seed spreaders, fertilizer spreaders, de-thatching equipment, pesticide and herbicide equipment, and grass clipping and leaf collecting equipment	1
Vegetative maintenance equipment, including: Saws, pruning shears, hedge trimmers	1
Transportation equipment	1
Debris, trash, and sediment removal equipment, including: Dewatering pump, jet-vac equipment for cleaning pipes, vacuum sweeper, air blowing or high-pressure power washing equipment	1
Misc. equipment, including: Shovels, wheel barrows, gloves, safety goggles, face masks, high-visibility clothing, brooms, hoes, rakes	1
Standard mechanics tools	1
Tools for maintenance of equipment	1
Parking maintenance equipment, including: Sweeping/vacuumping equipment, trash receptacles, snow plowing equipment, snow shovels	1
T-Bar or crowbar for opening rims and grates	1

### 10.0 SAFETY MEASURES AND PROCEDURES

#### Safety Regulations and Requirements

- OSHA
- NJDEP
- Burlington County SCD

#### Safety Tools, Equipment and Garments

Safety Tools and Equipment	Location	Responsible Person/Contact #
Gloves & Boots	Office	Management Office / 856-231-4444
Ladder	Office	Management Office / 856-231-4444
First Aid Kit	Office	Management Office / 856-231-4444

#### Qualification for Performing the Task in Special Circumstances

Stormwater Measures	Location	(OSHA) Confined-Space Entry Permit
Inlets, manholes, pipes, and outfall structures	Throughout the developed site	

## **Safety Training**

Required safety training as listed in the Training Plan and Records section of this maintenance plan.

### **Safety Procedures**

- Check for poisonous plants prior to entering vegetated areas.
- Look for rodent holes and other obstacles to avoid stepping in or potentially damaging equipment.
- Check for nails, broken glass, or other sharp debris that may be present within the stormwater system.
- Lift manhole covers or other structural covers (grates, access covers, etc.) carefully, as these items can be heavy, and can be slippery when wet.
- Never enter a confined space unless you have proper Occupational Health and Safety Administration (OSHA) training. Do not enter any confined space unless the atmosphere has been checked and proper safety equipment is worn and/or erected. Avoid entering pipes or conduits without another individual present. If the structural strength of a pipe or conduit is questionable, then you should not enter the pipe or conduit at all.
- If water is present, check water depth before entering the water.

### **Emergency Procedures**

- Clean minor cuts and scratches with soap and clean water; use proper antiseptics immediately to avoid infection.
- If skin contact with poisonous plants, thoroughly clean skin area with soap and clean water.
- In case of serious medical emergency, contact 911.

## **11.0 TRAINING PLAN AND RECORDS**

### **I. Training Plan**

#### **Types of Training**

- Mandatory Stormwater Management Basic Training and Field Manual Usage Training for new maintenance crews
- Occupational Safety Training
- Subcontractor training, if applicable

#### **Content of Training**

- **Stormwater Management Basic Training**
  - Purposes and Functions of BMPs
    - NJDEP Stormwater BMP Manual, Chapter Nine: Structural Stormwater Management Measures
      - Chapter 9.5 Manufactured Treatment Devices
      - Chapter 9.6 Pervious Paving Systems

More training information is available at NJ Stormwater.org

(<http://www.nj.gov/dep/stormwater/training.htm>)

- Vegetation Care
  - NJDEP Stormwater BMP Manual, Chapter Seven: Landscaping
- Field Manual Usage Training
  - Pervious Paving System – attached to this Maintenance Plan
  - Filterra HC Owner’s Manual – attached to this Maintenance Plan
- Equipment and Tools Operation Training
  - Equipment or tool manufacturer’s Operation & Maintenance Manual



- Occupational Safety Training
  - OSHA Training
  - Equipment or tool manufacturer's Operation & Maintenance Manual

## **II. Training Records**

Training attendance sheets should be attached by the responsible party after each training.

### **12.0 ANNUAL EVALUATION OF THE EFFECTIVENESS OF THE PLAN**

As per N.J.A.C. 7:8-5.8(g), the person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

The responsible party should evaluate the effectiveness of the maintenance plan by comparing the maintenance plan with the actual performance of the maintenance. The items to evaluate may include, but not limited to,

- Whether the inspections have been performed as scheduled;
- Whether the preventive maintenance has been performed as scheduled;
- Whether the frequency of preventative maintenance needs to increase or decrease;
- Whether the planned resources were enough to perform the maintenance;
- Whether the repairs were completed on time;
- Whether the actual cost was consistent with the estimated cost;
- Whether the inspection, maintenance, and repair records have been kept.

If actual performance of those items has been deviated from the maintenance plan, the responsible party should find the causes and implement solutions in a revised maintenance plan.

**Annual Evaluation Records**

Evaluator(s)	Date of Evaluation	Decision
		__ Maintain current version OR  __ Revise current version Revision date _____ (also update the last revision date on the cover page)  __ Requires a new deed recording (also update the last recording information on the cover page)
		__ Maintain current version OR  __ Revise current version Revision date _____ (also update the last revision date on the cover page)  __ Requires a new deed recording (also update the last recording information on the cover page)
		__ Maintain current version OR  __ Revise current version Revision date _____ (also update the last revision date on the cover page)  __ Requires a new deed recording (also update the last recording information on the cover page)

**13.0 DOCUMENTS**

**Please attach the following:**

**Transfer Agreement**

As per N.J.A.C. 7:8-5.8(b), if the maintenance plan identifies a person other than the developer as having the responsibility for maintenance, the plan shall include documentation of such person’s agreement to assume this responsibility, or the developer’s obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

**Deed**

As per N.J.A.C. 7:8-5.8(d), if the person responsible for maintenance is not a public agency, the maintenance plan and any future revisions shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

**As-Built Drawings with Drainage Plans**

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), as-built construction plans of the stormwater management measure and copies of pertinent construction documents, such as laboratory test results, permits, and completion certificates should be included in this Maintenance Plan.

**Permeability Test/Infiltration Test Report**

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), if a permeability test or infiltration test is required and available, the reports for pre-construction and post-construction testing should be included in this Maintenance Plan.

**Local, State, Federal Permits**

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), local, state, or federal permits related to the stormwater management measures for this development should be included in this Maintenance Plan. See Cost Estimate Section of This Maintenance Plan for more information.

The requirement to obtain State permits depends on specific circumstances, such as, but not limited to, the specific design of the stormwater management measures, the maintenance actions, the access and disturbance, the disposal methods, the location of disposal, the method to empty a basin, the method to dredge the basin, the pollutants in the basin, the damages to the basin, and the method to repair the basin.

Check Maintenance Guidance in NJDEP Stormwater Management Website for details and links to the relevant permits and program areas ( <http://www.njstormwater.org>).

**Safety Regulations and Requirements**

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), all local ordinances and state and federal regulations regarding occupational safety should be included in this Maintenance Plan.

**Devices/Tools/Equipment Operation and Maintenance Manual and Warranties**

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), maintenance, repair, and replacement instructions for specialized, proprietary, and nonstandard equipment, tools, supplies, manufacturers' product instructions, and user manuals should be included in this Maintenance Plan.

# ***A P P E N D I X***

**INSPECTION  
CHECKLIST/MAINTENANCE ACTIONS:  
BIORETENTION BASIN**

## Inspection Checklist / Maintenance Actions Bioretention 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

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
A1 Pretreatment (Forebay)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__  Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__  Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__  Work Order # _____
A2 Pretreatment (MTD)	1	MTD inspection (if installed)	Y__ N__  (If a MTD is used for pretreatment, see Maintenance Manual Provided by the manufacturer)
A3 Pretreatment (Structural BMP)	1	BMP inspection	Y__ N__  (See BMP No. _____ Field Manual)

Note:

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B Basin Bed	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>Remove any sediment buildup</p> <p>Check the soil permeability</p> <p>Till the soil bed with rotary tiller or disc harrow</p> <p>Replace the planting soil, if necessary</p> <p>Work Order # _____</p>
	2	Excessive sediment, silt, or trash accumulation on basin bed	<p>Y__</p> <p>N__</p> <p>Clean pretreatment system</p> <p>Remove silt, sediment, and trash</p>
	3	Erosion or channelization is present	<p>Y__</p> <p>N__</p> <p>Check whether the flow bypass or diversion device is clogged</p> <p>Re-grade the infiltration bed</p> <p>Work Order # _____</p>
	4	Animal burrows/rodents are present	<p>Y__</p> <p>N__</p> <p>Pest control</p> <p>Work Order # _____</p>

Note:



Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B Basin Bed	5	Uneven bed	Y__ N__ Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__ Monitor for sinkhole development
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__ Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost. Check Landscaping plan for guidance (if available) Work Order # _____
	2	Invasive plants are present	Y__ N__ Remove the invasive plants and restore the vegetation in accordance with the landscaping plan Work Order # _____
	3	The vegetation in the basin has been mowed or removed	Y__ N__ Revegetate the system in accordance with the vegetation plan Work Order # _____ Note: The vegetation in a bioretention system should <b>not</b> be mowed or removed
Note:			

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
D Bioretention System Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__  Check for excessive overland runoff flow through the embankment.  Check for any sink hole development  Direct the overland runoff to the forebay or pretreatment area  Restabilize the bank  Work Order # _____
	2	Overgrown perimeter vegetation	Y__ N__  Mow the vegetation on the perimeter of the embankment  Work Order # _____ Note: Mowing of vegetation should only take place in the area <b>outside</b> the basin. Dense vegetation must be maintained in the basin.
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__  Clean and remove  Determine source of trash and address to reduce future maintenance costs or basin failure
	2	Trash rack is damaged or rusted greater than 50%	Y__
		Trash rack is bent, loose, or missing parts	N__
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__
4	Discharge pipe apron is eroded or scoured	Y__ N__	

Note:

Component No. Component Name	For Inspector		For Maintenance Crew	
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions	
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary  Work Order # _____
	2	Damaged structure	Y__ N__	Repair  Work Order # _____
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace  Work Order # _____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace  Work Order # _____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace  Work Order # _____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance  Work Order # _____

Note:

Follow Up Items (Component No. / Inspection Item No.):

(e.g., B/1, C/2)

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Associated Work Orders: # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_

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Inspector Name	Signature	Date
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Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

## Preventative Maintenance Record

Corresponding Checklist No. \_\_\_\_\_  
 Component No. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_

### Work Logs

Activities	Components	Date Completed
Sediment/debris removal <b>Sediment removal should be taken place when the basin is thoroughly dry.</b>	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Bioretention System Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	
(List additional tasks, if applicable)		

Vegetation is removed by \_\_\_\_\_ (type of equipment) with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure. The fertilizer applied is \_\_\_\_\_ (type), and \_\_\_\_\_ (quantity per usage) is applied \_\_\_\_\_ (frequency of use).

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., orifice plate is loose and bent)

3. The issue was from Corresponding Checklist \_\_\_\_\_, Component No. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_.

**4. Required Actions**

Actions	Planned Date	Date Completed
Install new bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron with 100 cubic yards of aggregate		
Revegetate		
(If there are additional tasks, list them here.)		

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.**

**INSPECTION  
CHECKLIST/MAINTENANCE ACTIONS:  
DETENTION BASIN**

## Inspection Checklist / Maintenance Actions Extended Detention Basin

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

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.



Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
A1 Pretreatment (Forebay)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__  Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__  Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__  Work Order # _____
A2 Pretreatment (MTD, if installed)	1	MTD inspection	Y__ N__  (If a MTD is used for pretreatment, see manufacturer's maintenance manual)
A3 Pretreatment (Structural BMP)	1	BMP inspection	Y__ N__  (See BMP No. _____ Field Manual)

Note:

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B Basin Bed	1	Observed detention time is longer than the design detention time.  Observed detention time is approximately _____ hours.	Y__  N__  Check if outlets are clogged, see section E-Outlet of this checklist
	2	Standing water is present after the design drain time  The observed drain time is approximately _____ hours.	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  Check if the low flow outlet is clogged
	3	Excessive sediment, silt, or trash accumulation on low flow channel (if applicable)	Y__  N__  Clean pretreatment system  Remove silt, sediment, and trash
	4	Excessive sediment, silt, or trash accumulation on basin bed	Y__  N__  Clean pretreatment system  Remove silt, sediment, and trash
	5	Erosion or channelization is present	Y__  N__  Check whether the flow bypass or diversion device is clogged  Re-grade the basin bed  Work Order # _____
	6	Damaged low flow channel or scouring under the channel	Y__  N__  Check for new runoff source to the drainage area  Repair or replace low flow channel  Work Order # _____
Note:			

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B Basin Bed	7	Animal burrows/rodents are present	Y__ N__ Pest control Work Order # _____
	8	Liner of the basin is visible and/or is damaged (if applicable)	Y__ N__ Repair or replace liner Work Order # _____
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__ Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost Check Landscaping plan for guidance (if available) Work Order # _____
	2	Overgrown vegetation	Y__ N__ Mow/trim the vegetation Work Order # _____
	3	Tree growth in the basin	Y__ N__ Clear, trim, or prune the trees according to the original Landscaping Plan Inspect to determine if the tree roots caused any structural damage Work Order # _____
Note:			

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
D Basin Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__  Check for excessive overland runoff flow through the embankment.  Check for any sink hole development  Direct the overland runoff to the forebay or pretreatment area  Restabilize the bank  Work Order # _____
	1	Trash or debris accumulation more than 20%	Y__ N__  Clean and remove  Determine source of trash and address to reduce future maintenance costs or basin failure
E Outlet	2	Trash rack is damaged or rusted greater than 50%	Y__ N__  Repair or replace trash rack  Work Order # _____
	2	Trash rack is bent, loose, or missing parts	Y__ N__  Work Order # _____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__  Repair or replace component  Work Order # _____
	4	Discharge pipe apron is eroded or scoured	Y__ N__  Restabilize the discharge riprap apron  Work Order # _____
	5	Standing water is present in the outlet structure longer than 72 hours	Y__ N__  Pump out the standing water  Work Order # _____
Note:			

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__ Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__ Repair Work Order #_____
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__ Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__ Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__ Repair or replace Work Order #_____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__ Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____
Note:			

Follow Up Items (Component No. / Inspection Item No.):

(e.g., B/1, C/2)

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Associated Work Orders: # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_

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Inspector Name

Signature

Date

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

## Preventative Maintenance Record

Corresponding Checklist No. \_\_\_\_\_  
 Component No. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_

### Work Logs

Activities	Components	Date Completed
Sediment/debris removal <b>Sediment removal should be taken place when the basin is thoroughly dry</b>	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	
(List additional tasks, if applicable)		

Vegetation is removed by \_\_\_\_\_ (type of equipment) with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure. The fertilizer applied is \_\_\_\_\_ (type), and \_\_\_\_\_ (quantity per usage) is applied \_\_\_\_\_ (frequency of use).

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., orifice plate is loose and bent)

3. The issue was from Corresponding Checklist \_\_\_\_\_, Component No. (e.g., E-Outlet), Inspection Item No. (e.g., 2, 3) \_\_\_\_\_.

**4. Required Actions**

Actions	Planned Date	Date Completed
Install new bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron with 100 cubic yards of aggregate		
Revegetate		
(List additional tasks, if applicable)		

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.**



**INSPECTION  
CHECKLIST/MAINTENANCE ACTIONS:  
PERVIOUS PAVEMENT**

## 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

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.

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:

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"> <li>- Sweep the surface</li> <li>- Vacuum the surface</li> <li>- Excavate to inspect the storage bed for clogging, replace the storage bed material if it is severely clogged</li> <li>- Check the permeability rate of the subsoil</li> </ul> <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:			

Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
C Vegetation (for permeable pavers with vegetation)	1 Vegetation is overgrown	Y__ N__	Remove the vegetation according to the permeable paver manufacturer's instruction  Work Order # _____
D Outlet	1 Clogged overflow outlet	Y__ N__	Clear and remove sediment
	2 Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron  Work Order # _____
Note:			

**Follow Up Items (Component No. / Inspection Item No.):**

(e.g., B/1, C/2) \_\_\_\_\_

**Associated Work Orders:** # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_

\_\_\_\_\_  
Inspector Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.**

**File this checklist in the Maintenance Log after performing maintenance.**

## Preventative Maintenance Record

Corresponding Checklist No. \_\_\_\_\_  
 Component No. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_

### Work Logs

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

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. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_.

### 4. Required Actions

Actions	Planned Date	Date Completed
Repair pavers		
(If there are additional tasks, list them here.)		

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.**

PROBABLE ANNUAL COSTS FOR  
INSPECTION AND PREVENTIVE &  
CORRECTIVE MAINTENANCE



**PROBABLE ANNUAL COSTS FOR INSPECTION AND, PREVENTIVE & CORRECTIVE MAINTENANCE**

**OPERATION AND MAINTENANCE OF STORMWATER MANAGEMENT STRUCTURES**

Location: Block 86.03 | Lot 10.32  
Township of Franklin, Somerset County, NJ

	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>TOTAL COST</u>
<b>INSPECTION</b>				
Monthly inspection for excessive grass growth	12	Visit	\$250.00	\$3,000.00
Quarterly Inspection for clogging, damage, sedimentation	4	Visit	\$250.00	\$1,000.00
Inspection for clogging, ponding, sedimentation after storm event exceeding 1"	5	Visit	\$250.00	\$1,250.00
Annual inspection for erosion, scour & damage	1	Visit	\$250.00	\$250.00
Annual time-to-drain tests, condition of outlet valves	1	Visit	\$250.00	\$250.00
	<b>Annual Inspection costs</b>			<b>\$5,750.00</b>
<b>PREVENTIVE AND CORRECTIVE MAINTENANCE - DETENTION BASIN</b>				
Mow/Trim grass	3.8	Acres	\$50.00	\$190.00
Unblock and vacuum stormwater inlets	1	No	\$20.00	\$20.00
Clean, unblock, and remove sediments from RCP, Manhole	1	Lumpsum	\$1,500.00	\$1,500.00
Clean and unblock basin inlets & outlets	1	No	\$50.00	\$50.00
Clean, unblock, and flush stormwater pipes	716	FT	\$0.75	\$537.00
Replace soil cover	94510	SF	\$1.00	\$94,510.00
Re-establish vegetative cover	94510	SF	\$1.50	\$141,765.00
Clean soil erosion devices (rip-rap)	1	No	\$20.00	\$20.00
Repair riprap	300	SF	\$4.50	\$1,350.00
Repair outlet structures	1	No	\$500.00	\$500.00
Replace outlet valve	1	No	\$550.00	\$550.00
Muck out and re-stabilize bottom of basins	2.17	Acres	\$1,000.00	\$2,170.00
<b>PREVENTIVE AND CORRECTIVE MAINTENANCE - BIORETENTION BASIN</b>				
Use of fertilizers, pesticides, mechanical treatments and other measures to ensure vegetation health	1.1	Acres	\$50.00	\$55.00
Establishing/restoring vegetation	1.1	Acres	\$1,000.00	\$1,100.00
Trim grass using lightweight equipment	0.56	Acres	\$50.00	\$28.00
Unblock and vacuum stormwater inlets	3	No	\$20.00	\$60.00
Clean, unblock, and remove sediments from manholes	1	Lumpsum	\$1,500.00	\$1,500.00
Clean and unblock basin outlets	3	No	\$50.00	\$150.00
Clean, unblock, and flush stormwater pipes & underdrains	949	FT	\$0.75	\$711.75
Clean soil erosion devices (rip-rap & scour holes)	7	No	\$20.00	\$140.00
Repair soil erosion devices (rip-rap & scour holes)	336	SF	\$4.50	\$1,512.00
Repair outlet structures	3	No	\$500.00	\$1,500.00
<b>PREVENTIVE AND CORRECTIVE MAINTENANCE - PERVIOUS PAVEMENT</b>				
Keep pervious pavement surface free of sediment by blowing, sweeping or vacuuming	0.23	Acres	\$30.00	\$6.90
Mow/Trim grass	0.23	Acre	\$50.00	\$11.50
Unblock and vacuum cleanouts & inlets	15	No	\$20.00	\$300.00
Clean, unblock, and remove sediments from storm structures	1	Lumpsum	\$1,500.00	\$1,500.00
Clean and unblock outlet	2	No	\$50.00	\$100.00
Repair outlet structures	2	No	\$500.00	\$1,000.00
Replace outlet valve	2	No	\$550.00	\$1,100.00
Clean, unblock, and flush under drains	818	FT	\$0.75	\$613.50

**Note: Maintenance shall be carried out when and to the extent of the situation as it arises.**

**OVERALL GRADING & DRAINAGE PLAN &  
DRAINAGE PLAN 'A' TO 'C'**



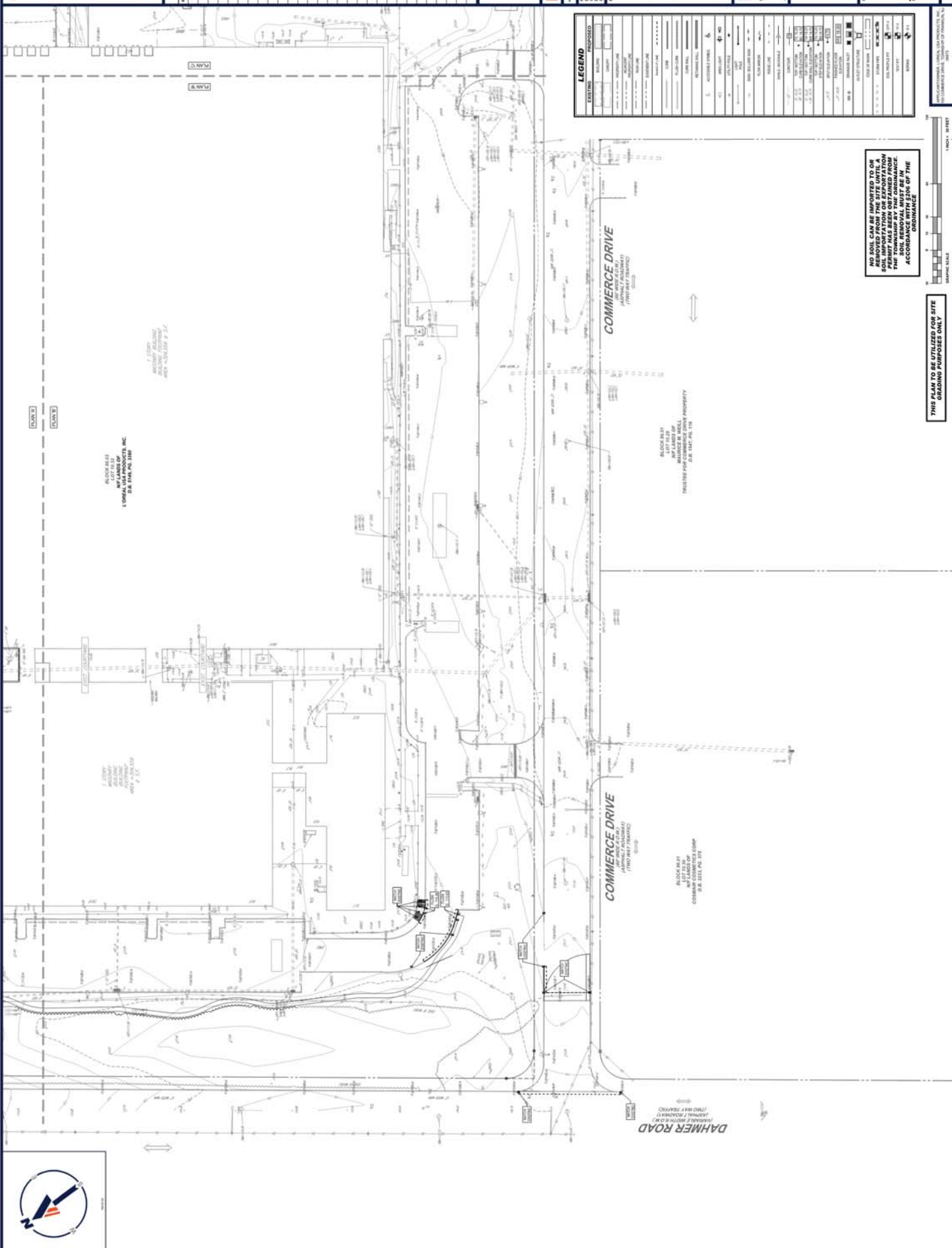
NO.	DATE	DESCRIPTION

PROJECT NO: 10000000000000000000  
 SHEET NO: C-405  
 DATE: 11/21/2022

**BOHLER**  
 1500 N. GREENBRIER BLVD., SUITE 200  
 ROCKY HILL, CT 06067  
 TEL: 860.366.7700 FAX: 860.366.7701  
 WWW.BOHLERENGINEERING.COM

**A. TAMOUS**  
 PROFESSIONAL ENGINEER  
 REG. NO. 25188  
 STATE OF CONNECTICUT

**GRADING PLAN 'B'**  
**C-405**  
 REVISION 1 - 03/15/22



LEGEND	
EXISTING	PROPOSED
[Symbol]	[Symbol]
[Symbol]	[Symbol]
[Symbol]	[Symbol]

THIS PLAN TO BE UTILIZED FOR SITE GRADING PURPOSES ONLY

NO SOILS WILL BE IMPORTED TO OR EXPORTED FROM THE SITE. SOIL INFORMATION OR EXPORTATION INFORMATION WILL BE PROVIDED TO THE TOWNSHIPS BY THE ORDINANCE ACCORDANCE WITH 270c OF THE ORDINANCE



APPROPRIATE L'OREAL, USA PROPERTY, INC.  
 COMMERCIAL DEVELOPMENT OF FACILITY, INC.  
 11/21/2022





REVISIONS		
NO.	DATE	DESCRIPTION
1	12/15/18	ISSUED FOR PERMITTING
2	01/10/19	REVISED TO REFLECT COMMENTS



**PRELIMINARY**  
PROPOSED FACILITY EXPANSION  
BLOCK 48 LOT 1212  
MOUNT LAUREL, NJ 08054  
SOMERSET COUNTY, NEW JERSEY  
SHEET 1 OF 1 (TAX MAP SHEET 99)

**L'OREAL**  
FOR  
**PRELIMINARY & FINAL MAJOR SITE PLAN**

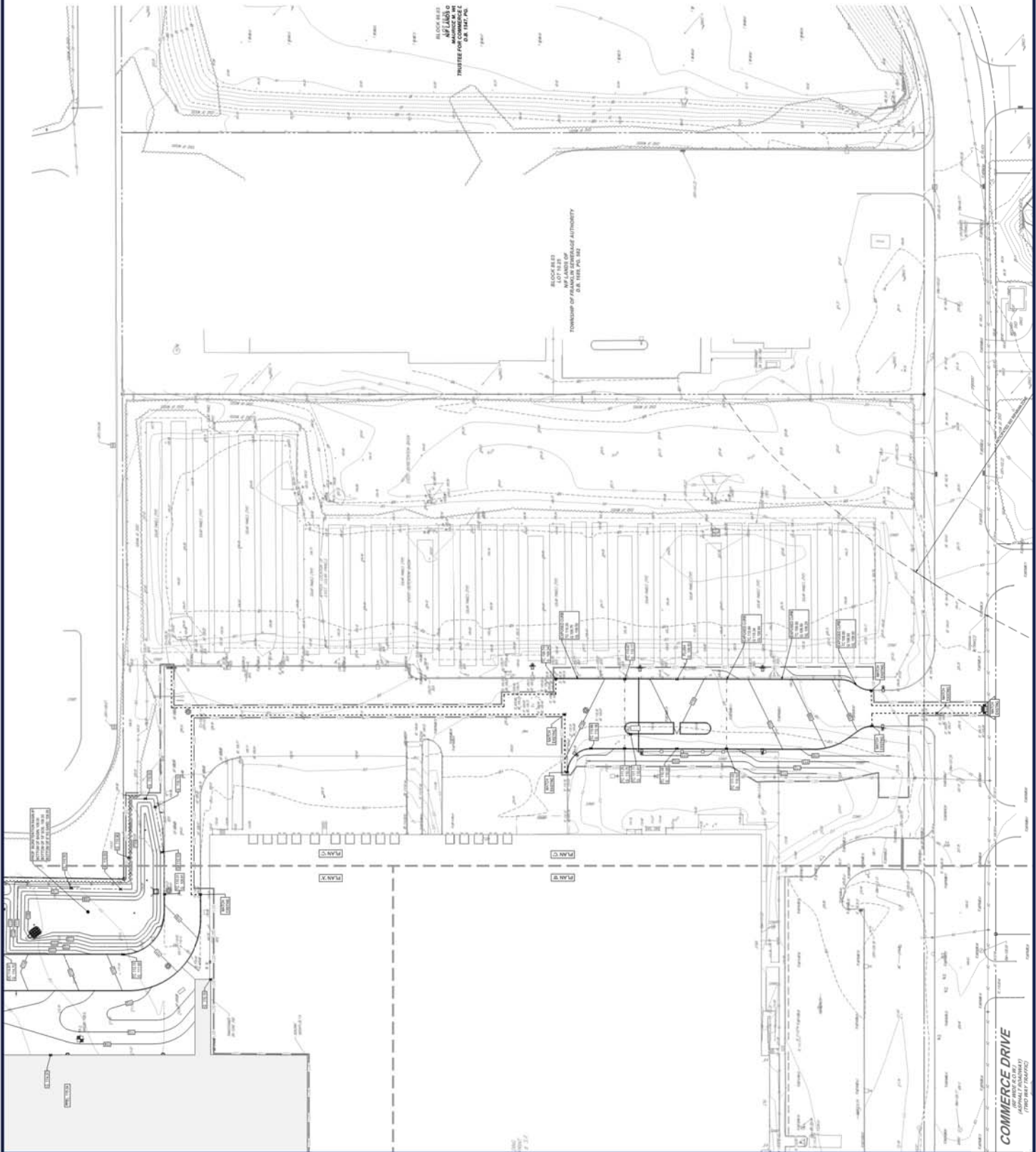
**BOHLER**  
1000 NEWCASTLE DRIVE, SUITE 1000  
MOUNT LAUREL, NJ 08054  
www.BohlerEngineering.com

**A. TAMOUS**  
PROFESSIONAL ENGINEER  
STATE OF NEW JERSEY  
No. 052710

**GRADING PLAN 'C'**

**C-406**  
REVISION 1 - 03/18/22

LEGEND	
EXISTING	PROPOSED
1.00	1.00
2.00	2.00
3.00	3.00
4.00	4.00
5.00	5.00
6.00	6.00
7.00	7.00
8.00	8.00
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99.00	99.00
100.00	100.00



NO SOIL CAN BE IMPORTED TO OR EXPORTED FROM THE SITE. SOIL IMPORTATION OR EXPORTATION SHALL BE DONE IN ACCORDANCE WITH THE ORDINANCE AND THE TOWNSHIP BY THE ORDINANCE. ACCORDANCE WITH THE ORDINANCE.

THIS PLAN TO BE UTILIZED FOR SITE GRADING PURPOSES ONLY



1 INCH = 30 FEET  
PROFESSIONAL ENGINEER  
STATE OF NEW JERSEY  
No. 052710

**COMMERCE DRIVE**  
MOUNT LAUREL, NJ 08054  
SOMERSET COUNTY, NEW JERSEY



DAHMER ROAD



**LEGEND**

EXISTING	PROPOSED
1" DIA. PIPE	6" DIA. PIPE
18" DIA. PIPE	24" DIA. PIPE
36" DIA. PIPE	48" DIA. PIPE
60" DIA. PIPE	72" DIA. PIPE
12" DIA. MANHOLE	18" DIA. MANHOLE
24" DIA. MANHOLE	36" DIA. MANHOLE
48" DIA. MANHOLE	60" DIA. MANHOLE
72" DIA. MANHOLE	96" DIA. MANHOLE
12" DIA. CATCH BASIN	18" DIA. CATCH BASIN
24" DIA. CATCH BASIN	36" DIA. CATCH BASIN
48" DIA. CATCH BASIN	60" DIA. CATCH BASIN
72" DIA. CATCH BASIN	96" DIA. CATCH BASIN
12" DIA. VALVE	18" DIA. VALVE
24" DIA. VALVE	36" DIA. VALVE
48" DIA. VALVE	60" DIA. VALVE
72" DIA. VALVE	96" DIA. VALVE
12" DIA. CLEANOUT	18" DIA. CLEANOUT
24" DIA. CLEANOUT	36" DIA. CLEANOUT
48" DIA. CLEANOUT	60" DIA. CLEANOUT
72" DIA. CLEANOUT	96" DIA. CLEANOUT
12" DIA. CURB	18" DIA. CURB
24" DIA. CURB	36" DIA. CURB
48" DIA. CURB	60" DIA. CURB
72" DIA. CURB	96" DIA. CURB
12" DIA. WALL	18" DIA. WALL
24" DIA. WALL	36" DIA. WALL
48" DIA. WALL	60" DIA. WALL
72" DIA. WALL	96" DIA. WALL
12" DIA. GROUND	18" DIA. GROUND
24" DIA. GROUND	36" DIA. GROUND
48" DIA. GROUND	60" DIA. GROUND
72" DIA. GROUND	96" DIA. GROUND
12" DIA. SAND	18" DIA. SAND
24" DIA. SAND	36" DIA. SAND
48" DIA. SAND	60" DIA. SAND
72" DIA. SAND	96" DIA. SAND
12" DIA. GRAVEL	18" DIA. GRAVEL
24" DIA. GRAVEL	36" DIA. GRAVEL
48" DIA. GRAVEL	60" DIA. GRAVEL
72" DIA. GRAVEL	96" DIA. GRAVEL

**BOHLER**  
 CIVIL AND CONSULTING ENGINEERS  
 LAND SURVEYING  
 PROGRAM MANAGEMENT  
 PROJECT ADMINISTRATION  
 LABORATORY SERVICES  
 PERMITTING SERVICES  
 SUSTAINABLE DESIGN  
 TRANSPORTATION SERVICES

**REVISIONS**

NO.	DATE	DESCRIPTION
1	11/15/2023	ISSUE FOR PERMITTING

**811**  
 CALL BEFORE YOU DIG  
 1-800-4-A-DAWG

**PRELIMINARY**  
 THIS PLAN IS FOR PERMITTING AND DRAINAGE PURPOSES ONLY

**PRELIMINARY & FINAL MAJOR SITE PLAN**  
 FOR  
**L'OREAL**  
 FACILITY EXPANSION  
 BLOCK 8712 OF  
 TOWNSHIP OF HADDONFIELD, NEW JERSEY  
 8-11 ZONE 1 TIA MAP SHEET 89

**BOHLER**  
 10000 WILKINSON ROAD, SUITE 2000  
 MOUNT LAUREL, NJ 08054  
 TEL: 856-234-4600  
 WWW.BOHLERENGINEERING.COM

**A. TAMOUS**  
 PROFESSIONAL ENGINEER  
 LICENSE NO. 350020800  
 STATE OF NEW JERSEY

**DRAINAGE PLAN 'A'**  
 SHEET TITLE  
**C-407**  
 REVISION 1 - 03/15/2022

APPROXIMATE TOTAL JOB FOOTPRINT, INC.  
 1" = 30' HORIZONTAL SCALE  
 1" = 10' VERTICAL SCALE  
 THIS PLAN IS FOR PERMITTING AND DRAINAGE PURPOSES ONLY





**REVISIONS**

NO.	DATE	DESCRIPTION
1	08/14/2013	ISSUED FOR PERMITTING
2	08/14/2013	ISSUED FOR PERMITTING
3	08/14/2013	ISSUED FOR PERMITTING
4	08/14/2013	ISSUED FOR PERMITTING
5	08/14/2013	ISSUED FOR PERMITTING
6	08/14/2013	ISSUED FOR PERMITTING
7	08/14/2013	ISSUED FOR PERMITTING
8	08/14/2013	ISSUED FOR PERMITTING
9	08/14/2013	ISSUED FOR PERMITTING
10	08/14/2013	ISSUED FOR PERMITTING
11	08/14/2013	ISSUED FOR PERMITTING
12	08/14/2013	ISSUED FOR PERMITTING
13	08/14/2013	ISSUED FOR PERMITTING
14	08/14/2013	ISSUED FOR PERMITTING
15	08/14/2013	ISSUED FOR PERMITTING
16	08/14/2013	ISSUED FOR PERMITTING
17	08/14/2013	ISSUED FOR PERMITTING
18	08/14/2013	ISSUED FOR PERMITTING
19	08/14/2013	ISSUED FOR PERMITTING
20	08/14/2013	ISSUED FOR PERMITTING
21	08/14/2013	ISSUED FOR PERMITTING
22	08/14/2013	ISSUED FOR PERMITTING
23	08/14/2013	ISSUED FOR PERMITTING
24	08/14/2013	ISSUED FOR PERMITTING
25	08/14/2013	ISSUED FOR PERMITTING
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44	08/14/2013	ISSUED FOR PERMITTING
45	08/14/2013	ISSUED FOR PERMITTING
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48	08/14/2013	ISSUED FOR PERMITTING
49	08/14/2013	ISSUED FOR PERMITTING
50	08/14/2013	ISSUED FOR PERMITTING



**PRELIMINARY**  
 PROJECT: L'OREAL FACILITY EXPANSION  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 DATE: [Date]

**PRELIMINARY & FINAL MAJOR SITE PLAN**  
 FOR

**L'OREAL**  
 PROPOSED FACILITY EXPANSION  
 BLOCK 68 LOT 1032  
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 BLOCK 68 LOT 1163  
 BLOCK 68 LOT 1164  
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 BLOCK 68 LOT 1166  
 BLOCK 68 LOT 1167  
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 BLOCK 68 LOT 1169  
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 BLOCK 68 LOT 1179  
 BLOCK 68 LOT 1180  
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 BLOCK 68 LOT 1187  
 BLOCK 68 LOT 1188  
 BLOCK 68 LOT 1189  
 BLOCK 68 LOT 1190  
 BLOCK 68 LOT 1191  
 BLOCK 68 LOT 1192  
 BLOCK 68 LOT 1193  
 BLOCK 68 LOT 1194  
 BLOCK 68 LOT 1195  
 BLOCK 68 LOT 1196  
 BLOCK 68 LOT 1197  
 BLOCK 68 LOT 1198  
 BLOCK 68 LOT 1199  
 BLOCK 68 LOT 1200

**BOHLER**  
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**A. TAMOUS**  
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 STATE OF NEW JERSEY

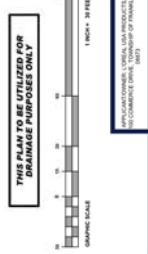
**DRAINAGE PLAN 'C'**

**C-409**  
 REVISION 1 - 03/18/2022



**LEGEND**

EXISTING	PROPOSED
1. 1" = 10' HORIZONTAL SCALE	1. 1" = 10' HORIZONTAL SCALE
2. 1" = 10' HORIZONTAL SCALE	2. 1" = 10' HORIZONTAL SCALE
3. 1" = 10' HORIZONTAL SCALE	3. 1" = 10' HORIZONTAL SCALE
4. 1" = 10' HORIZONTAL SCALE	4. 1" = 10' HORIZONTAL SCALE
5. 1" = 10' HORIZONTAL SCALE	5. 1" = 10' HORIZONTAL SCALE
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7. 1" = 10' HORIZONTAL SCALE	7. 1" = 10' HORIZONTAL SCALE
8. 1" = 10' HORIZONTAL SCALE	8. 1" = 10' HORIZONTAL SCALE
9. 1" = 10' HORIZONTAL SCALE	9. 1" = 10' HORIZONTAL SCALE
10. 1" = 10' HORIZONTAL SCALE	10. 1" = 10' HORIZONTAL SCALE
11. 1" = 10' HORIZONTAL SCALE	11. 1" = 10' HORIZONTAL SCALE
12. 1" = 10' HORIZONTAL SCALE	12. 1" = 10' HORIZONTAL SCALE
13. 1" = 10' HORIZONTAL SCALE	13. 1" = 10' HORIZONTAL SCALE
14. 1" = 10' HORIZONTAL SCALE	14. 1" = 10' HORIZONTAL SCALE
15. 1" = 10' HORIZONTAL SCALE	15. 1" = 10' HORIZONTAL SCALE
16. 1" = 10' HORIZONTAL SCALE	16. 1" = 10' HORIZONTAL SCALE
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19. 1" = 10' HORIZONTAL SCALE	19. 1" = 10' HORIZONTAL SCALE
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21. 1" = 10' HORIZONTAL SCALE	21. 1" = 10' HORIZONTAL SCALE
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27. 1" = 10' HORIZONTAL SCALE	27. 1" = 10' HORIZONTAL SCALE
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30. 1" = 10' HORIZONTAL SCALE	30. 1" = 10' HORIZONTAL SCALE
31. 1" = 10' HORIZONTAL SCALE	31. 1" = 10' HORIZONTAL SCALE
32. 1" = 10' HORIZONTAL SCALE	32. 1" = 10' HORIZONTAL SCALE
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35. 1" = 10' HORIZONTAL SCALE	35. 1" = 10' HORIZONTAL SCALE
36. 1" = 10' HORIZONTAL SCALE	36. 1" = 10' HORIZONTAL SCALE
37. 1" = 10' HORIZONTAL SCALE	37. 1" = 10' HORIZONTAL SCALE
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40. 1" = 10' HORIZONTAL SCALE	40. 1" = 10' HORIZONTAL SCALE
41. 1" = 10' HORIZONTAL SCALE	41. 1" = 10' HORIZONTAL SCALE
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44. 1" = 10' HORIZONTAL SCALE	44. 1" = 10' HORIZONTAL SCALE
45. 1" = 10' HORIZONTAL SCALE	45. 1" = 10' HORIZONTAL SCALE
46. 1" = 10' HORIZONTAL SCALE	46. 1" = 10' HORIZONTAL SCALE
47. 1" = 10' HORIZONTAL SCALE	47. 1" = 10' HORIZONTAL SCALE
48. 1" = 10' HORIZONTAL SCALE	48. 1" = 10' HORIZONTAL SCALE
49. 1" = 10' HORIZONTAL SCALE	49. 1" = 10' HORIZONTAL SCALE
50. 1" = 10' HORIZONTAL SCALE	50. 1" = 10' HORIZONTAL SCALE



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# AS-BUILT SURVEY