

# **STORMWATER MANAGEMENT FACILITY OPERATIONS & MAINTENANCE MANUAL**

*for*

**Princeton Promenade, LLC**

**Proposed Retail and Residential Development**

**Block 34001; Lots 46.01, 56, 57, 77, 78 & 79**

Township of Montgomery  
NJSH Route 206 & County Route 518  
Somerset County, New Jersey

*Prepared by:*

**BOHLER //**

NJ Cert. of Authorization: 24GA28161700

30 Independence Blvd., Suite 200  
Warren, New Jersey 07059  
(908) 668-8300

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Brad A. Bohler, P.E.  
New Jersey Professional Engineer  
License No. 47421

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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.

**PART I: PROJECT DETAILS**

**A. *Introduction and Description of Facilities:***

The proposed retail and residential community is located on a parcel of 53.55 acres known as Block 34001, Lots 46.01, 56, 57, 77, 78 & 79, in the Township of Montgomery, Somerset County, New Jersey.

The site lies to the southwest of the intersection of NJSH Route 206 and County Route 518 in the Township of Montgomery. Under existing conditions, the property is surrounded by private residential properties to the north and northwest, Princeton Airport to the south; NJSH Route 206 and commercial properties beyond to the east of the property and farm lands to the west.

The proposed site development will consist of a future residential development at the north portion of the property with commercial development on the remainder of the property. Additionally, porous pavement, grass swales, and four (4) basins will be located throughout the site.

**B. *Project Contacts:***

Township Engineer: Gail Smith, P.E.  
Township Engineer  
2261 US-206  
Montgomery, NJ 08502  
(908)-359-8211 x2295

Owner: Jeff DeHeart  
Princeton Promenade, LLC  
1115 Howell Mill Road, Suite 777  
Atlanta, GA 30318  
(801)-425-6938

Maintenance by: Jeff DeHeart  
Princeton Promenade, LLC  
1115 Howell Mill Road, Suite 777  
Atlanta, GA 30318  
(801)-425-6938

Design Engineer: Brad A. Bohler, P.E.  
Bohler Engineering NJ, LLC  
30 Independence Blvd., Suite 200  
Warren, NJ 07059  
(908) 668-8300

## **PART II: INSPECTION AND MAINTENANCE:**

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

All stormwater management basins have been designed to control stormwater and reduce flooding and 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.

A consulting Professional Engineer should perform regularly scheduled maintenance inspections of the stormwater facilities 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, 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:

#### **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 as often as practicable, and to minimize the need for emergency or corrective maintenance. These procedures are as follows:

##### **a) *Maintenance of Adjacent Areas:***

Grass areas, trees, and shrubs adjacent to the basins require periodic 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 storm water management facility. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

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

All storm water 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. Such components may include bottoms, riprap or gabion aprons, trash racks and inflow points.

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

The basins should also be evaluated for excessive deposition of sediment. 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. This may be accomplished by opening the maintenance valve on the outlet structure. 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.

c) *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 function is removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

d) *Maintenance of Aboveground Sand Filter:*

All sand filter 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 1 inch of rainfall. Such components may include inlets and diversion structures, fore bays, sand beds, and overflows. Sediment removal should take place when all runoff has drained from the sand bed and the sand is reasonably dry. In addition, runoff should be drained or pumped from forebays with permanent pools before removing sediment. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. In surface sand filters with turf grass bottom surfaces, mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected for unwanted underbrush and tree growth at least once a year. Leaves, branches, and other debris from nearby trees shall be removed from the basin to prevent clogging of the sand filter. If the water fails to infiltrate 72 hours after the end of the stormwater quality design storm, corrective measures must be taken.

e) *Maintenance of Bioretention Systems*

All basin 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 1 inch of rainfall. Sediment removal should take place when all runoff has drained from the planting bed and the basin is dry. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. Bi-weekly inspections are required when establishing/restoring vegetation, and a minimum of one inspection during the growing season and one inspection during the non-growing season is required to ensure the health, density and diversity of the vegetation. Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions; perimeter grass should be mowed at least once a month during growing season. Vegetative cover must be maintained at 85%; damage must be addressed through replanting in accordance with the original specifications. Vegetated areas must be inspected at least once annually for erosion, scour and unwanted growth; any unwanted growth should be removed 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 bioretention system. The planting bed should be inspected at least twice annually to determine if the permeability of the bed has decreased. If the water fails to infiltrate 72 hours after the end of the stormwater quality design storm, corrective measures must be taken.

f) *Maintenance of Grass Swales:*

All components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least twice annually as well as after every storm exceeding 1 inch of rainfall. Sediment removal should take place when the swale is thoroughly dry and should not result in the loss of vegetation. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. Additionally, all components must be inspected at least once annually for cracking, subsidence, spalling, erosion, and deterioration. Bi-weekly inspections are required when establishing/restoring vegetation, and a minimum of one inspection during the growing season and one inspection during the non-growing season is required to ensure the health, density and diversity of the vegetation. Vegetative cover must be maintained at 95%; damage must be addressed through replanting in accordance with the original specifications. Mowing and/or trimming of vegetation should be performed on a regular schedule based on site specific conditions. Grass outside of the swale should be mowed at least once a month during growing season, and grasses within the swale must be carefully maintained to fall within the required grass height range of 3 to 6 inches. Grass clippings must be either removed or sufficiently small to avoid both damage to the turf and the facilitation of mosquito breeding. Vegetated areas must be inspected at least once annually for erosion, scour and unwanted growth; any unwanted growth should be removed with minimum disruption to the soil bed and remaining vegetation. If disruption to the vegetation occurs, the area must be re-seeded. If ponding in excess of 72 hours occurs, action must be taken to either re-establish the appropriate slope and/or permeability rate of the soil bed.

g) *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 once a month. The disposal of the swept material must be properly hauled off the site and transferred to an approved disposal site. Other parking lot maintenance features include the use of on-site trash receptacle. These receptacles should be located in strategic areas where the majority of the pedestrian

traffic occurs. These receptacles should be emptied daily. The disposal of the solid waste must be properly hauled off the site and transferred to an approved disposal site.

2. Corrective Maintenance Procedures:

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. 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. The lack of an available disposal site should not delay the removal of trash, debris and sediment. Temporary disposal sites should be utilized if necessary.

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 and the design and performance of structural repairs should only be undertaken by the consulting Professional Engineer.

c) *Embankment and Slope Repairs:*

Damage to embankments, and side slopes must be repaired promptly. This damage can be the result of rain or flood events, vandalism, animals, vehicles or neglect. Typical problems 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 the safety and operation 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 shall be inspected quarterly and after each significant storm greater than one (1) inch of rainfall. 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 with specialized harvesters should be contacted to perform these operations. Note that such work may require the approval of various regulatory agencies.

e) *Extermination of Mosquitoes:*

If neglected, basins can become an ideal 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. All non-vegetative methods to control erosion must be approved by the Township Engineering Department.

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. 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.

i) *Basin Drain Time:*

Basin #1:

This basin acts as a bioretention system. In accordance with the Drainage Report, the amount of time for the water quality storm volume to drain is approximately 50 hours. If the basin fails to drain in the above-mentioned time, the basin's outlet structure's orifices and weirs shall be inspected for clogging. Any accumulated trash or debris must be removed and discarded accordingly.

Basin #2:

This basin acts as a bioretention system. In accordance with the Drainage Report, the amount of time for the water quality storm volume to drain is approximately 59 hours. If the basin fails to drain in the above-mentioned time, the basin outlet structure's orifices and weirs shall be inspected for clogging. Any accumulated trash or debris must be removed and discarded accordingly.

Basin #3:

This basin acts as a bioretention basin. In accordance with the Drainage Report, the amount of time for the water quality storm volume to drain is approximately 31 hours. If the basin fails to drain in the above-mentioned time, the basin outlet structure's orifices and weirs shall be inspected for clogging. Any accumulated trash or debris must be removed and discarded accordingly.

Basin #4 (Aboveground Sand Filter):

The amount of time for the water quality storm volume to drain is less than 72 hours. If the sand filter fails to drain in the above-mentioned time, the sand filter should be dewatered down to the sand layer elevation and the 18" sand layer of the sand filter shall be replaced partially or completely depending on field inspection result. This task is to be followed by re-grading and leveling of the sand layer. The thickness of the sand layer should be checked to ensure that a minimum of 18" is maintained throughout the bottom area to ensure that the water quality treatment feature operates correctly. The sand material to be utilized shall be K5 sand with a maximum of 15% fines and a minimum permeability rate of 20 inches per hour. Any disturbed vegetated area should be re-vegetated immediately to prevent erosion.

j) *Possible Basin Malfunctions and Preventative Measures:*

Basin #1, #2 & Basin #3 (Bioretention):

- Clogging of basin components (trash racks, low flow channels, etc.)
  - Inspection for clogging should be performed at least 4 times per year and after every storm greater than 1 inch of rainfall.
- Cracking, subsidence, or deterioration of structural components.
  - Inspect structural components at least annually.
- Vegetative cover is below 85%.
  - Inspect vegetated areas at least annually for erosion, scour and unwanted growth.

Basin #4 (Sand Filter Basin):

- Clogging of basin components (trash racks, low flow channels, etc.)
  - Inspection for clogging should be performed at least 4 times per year and after every storm greater than 1 inch of rainfall.
- Decrease in normal drain time due to sediment accumulation in the sand layer.
  - Inspection of the sand layer should take place at least twice annually. Sediments can be removed from the sand layer if necessary.
- Permeability of soil may not be suitable for infiltration.
  - Stopcock to be opened subsequent to approval the township engineer

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 non-chemical means, or removal with scrapers. 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 as necessary, when recommended by a soil test. Use of lawn related maintenance chemicals, including insecticide and herbicides, should be kept to a minimum and used only when necessary. Fertilizer for lawn areas shall be applied 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 15th and June 15th and between September 15th and December 1st, 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.

The trees surrounding the basin areas will cause debris such as leaves and branches to accumulate inside the basins. This is a particular concern with the two infiltration basins with sand bottoms. All leaves, branches and other debris from nearby trees shall be removed from the infiltration basin every three months to prevent clogging of the sand bottom.

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 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. 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, this data does not have to be submitted to NJDEP.

4. Porous Pavement:

For maintenance requirements for porous pavement, see Table 1 below.

**Table 1**  
**Porous Pavement Maintenance**

<b>Required Action</b>	<b>Maintenance Objective</b>	<b>Frequency of Action</b>
Inspections	Inspect pavement to ensure proper structural operation, and that the permeable aspect of the pavement has not become clogged with debris. Measure water depth in storage layer.	Quarterly, and after every 1” rainfall events, until performance characteristics of the structure has been verified; thereafter, annually
Debris and Litter Control	Vacuum pavement surface followed by high pressure water washing. Do not use sand or other abrasives during winter weather as they will clog the surface.	Monthly
Component Repair and Replacement	No repair is possible. If pavement becomes clogged, complete replacement is required.	Depends on frequency and thoroughness of pavement cleaning

5. Summary of Maintenance Procedures:

Preventative Maintenance

- a) Maintenance of Adjacent Areas
- b) Removal and Disposal of Trash/Debris and Sediment
- c) Elimination of Mosquito Breeding Habitats
- d) Maintenance of Aboveground Sand Filter
- e) Maintenance of Bioretention Systems
- f) Maintenance of Grass Swales
- g) Parking Lot Maintenance

Corrective Maintenance

- a) Removal of Debris and Sediment
- b) Structural Repairs
- c) Embankment and Slope Repairs
- d) Weed Harvesting
- e) Extermination of Mosquitoes
- f) Erosion Repair
- g) Elimination of Trees, Brush, Roots and Animal Burrows from Embankments
- h) Snow and Ice Removal
- i) Basin Drain Time

Aesthetic Maintenance

- a) Graffiti Removal
- b) Grass Trimming/Landscape Maintenance
- c) Control of Weeds

Porous Pavement

- a) Structural Inspection/Debris Removal
- b) Debris and Litter Control
- c) Component Repair and Replacement

6. Maintenance Cost Estimate

In order to properly maintain all of the stormwater management facilities on-site, there is an anticipated cost of about \$50,000 per year. This price includes maintenance and inspection costs for all basins on site. The party responsible for all maintenance expenses is SJC Ventures Partners LLC.

**B. *Maintenance Equipment and Materials:***

Note: Only light equipment is allowed to be used within the bioretention basin to prevent compaction.

Grass Maintenance Equipment

- a) Riding Mowers
- b) Hand Mowers
- c) Gas Powered Trimmers
- d) Gas Powered Edgers
- e) Seed Spreaders
- f) Fertilizer Spreaders
- g) De-Thatching Equipment
- h) Pesticide and Herbicide Application Equipment
- i) Grass Clipping and Leaf Collection Equipment

Vegetative Maintenance Equipment

- a) Saws
- b) Pruning Shears
- c) Hedge Trimmers
- d) Wood Chippers
- e) Aquatic Weed Harvester (owned/operated by subcontractor)

Transportation Equipment

- a) Trucks for Transportation of Materials
- b) Trucks for Transportation of Equipment
- c) Vehicles for Transportation of Personnel

Debris, Trash and Sediment Removal Equipment

- a) Loader (not to be used in the bottom of the infiltration basin)
- b) Backhoe (not to be used in the bottom of the infiltration basin)
- c) Grader (not to be used in the bottom of the infiltration basin)
- d) Dredging Equipment (not to be used in the bottom of the infiltration basin)
- e) Portable Pump for Dewatering

- d) Snow Shovels

Miscellaneous Equipment

- a) Shovels
- b) Rakes
- c) Picks
- d) Wheel Barrows
- e) Painting Equipment
- f) Gloves
- g) Hand Pushed Tilling Machine
- h) Brooms

Materials

- a) Topsoil
- b) Fill
- c) Seed
- d) Soil Amenities (Fertilizer, Lime, etc.)
- e) Chemicals (Pesticides, Herbicides, etc.)
- f) Mulch
- g) Paint Removers
- h) Spare Parts for Equipment

Parking Maintenance Equipment

- a) Sweeping/Vacuuming Equipment
- b) Trash Receptacles
- c) Snow Plowing Equipment
- d) Snow Shovels

**C. Checklists and Logs**

Appendix of this report contains sample checklists and logs regarding various aspects of the basin maintenance and inspection. A brief description of the use of each form is listed below:

1. “Maintenance Work Order and Checklist” – a comprehensive form outlining both required and completed maintenance work.
2. “Maintenance Log” – a summary table for recording of all maintenance work at the site.
3. “Inspection Log” – a summary table for recording the results of all inspection of the basins and the dams.

## ***APPENDIX***

***MAINTENANCE WORK ORDER & CHECKLIST FOR  
STORMWATER MANAGEMENT FACILITIES***

**MAINTENANCE WORK ORDER AND CHECKLIST  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY \_\_\_\_\_  
 LOCATION \_\_\_\_\_ DATE \_\_\_\_\_  
 CREW \_\_\_\_\_ WORK STARTED \_\_\_\_\_  
 EQUIPMENT \_\_\_\_\_ WORK COMPLETED \_\_\_\_\_  
 WEATHER \_\_\_\_\_ TOTAL MANPOWER OF WORK \_\_\_\_\_

**A. PREVENTATIVE MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
<b>1. GRASS CUTTING</b>			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. OTHERS			
<b>2. GRASS MAINTENANCE</b>			
A. FERTILIZING			
B. RE-SEEDING			
C. DE-THATCHING			
D. PEST CONTROL			
E. OTHERS			
<b>3. VEGETATIVE COVER</b>			
A. FERTILIZING			
B. PRUNING			
C. PEST CONTROL			
D. OTHERS			
<b>4. TRASH AND DEBRIS REMOVAL</b>			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OUTLETS AND TRASH RACKS			
G. OTHERS			
<b>5. SEDIMENT REMOVAL</b>			
A. INLETS			
B. OUTLETS AND TRASH RACKS			
C. BOTTOM			
D. OTHERS			
<b>6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS</b>			
<b>7. UNDERGROUND BASIN MAINTENANCE</b>			
A. BOTTOMS			
B. OUTLETS AND TRASH RACKS			
C. ACCESS HATCHES			
D. OTHERS			
<b>8. INFILTRATION BASIN - TILING BOTTOM SAND LAYER</b>			
<b>9. OTHER PREVENTIVE MAINTENANCE</b>			
A. PARKING LOT SWEEPING			
B. EMPTYING TRASH RECEPTACLES			

**MAINTENANCE WORK ORDER AND CHECKLIST  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY \_\_\_\_\_  
 LOCATION \_\_\_\_\_ DATE \_\_\_\_\_  
 CREW \_\_\_\_\_ WORK STARTED \_\_\_\_\_  
 EQUIPMENT \_\_\_\_\_ WORK COMPLETED \_\_\_\_\_  
 WEATHER \_\_\_\_\_ TOTAL MANPOWER OF WORK \_\_\_\_\_

**B. CORRECTIVE MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. REMOVAL OF DEBRIS AND SEDIMENT			
2. STRUCTURAL REPAIRS			
3. EMBANKMENTS AND SIDE SLOPES			
4. DEWATERING			
5. BASIN MAINTENANCE			
6. CONTROL OF MOSQUITOES			
7. EROSION REPAIR			
8. FENCE REPAIR			
9. SNOW AND ICE REMOVAL			
10. SAND LAYER REPLACEMENT			
11. OTHER			

**C. AESTHETIC MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED ( X )	ITEMS DONE ( X )	LOCATION AND COMMENTS
1. GRAFFITI REMOVAL			
2. GRASS TRIMMING			
3. WEEDING			
4. OTHERS			

REMARKS (REFER TO ITEM NO. IF APPLICABLE) \_\_\_\_\_

WORK ORDER PREPARED BY: \_\_\_\_\_

***MAINTENANCE LOG FOR STORMWATER MANAGEMENT  
FACILITIES***

**MAINTENANCE LOG  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____	DATE _____
LOCATION _____	WORK STARTED _____
CREW _____	WORK COMPLETED _____
EQUIPMENT _____	TOTAL MANPOWER OF WORK _____
WEATHER _____	

**A. PREVENTATIVE MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
<b>1. GRASS CUTTING</b>					
A. BOTTOMS					
B. EMBANKMENTS AND SIDE SLOPES					
C. PERIMETER AREAS					
D. ACCESS AREAS AND ROADS					
E. OTHERS					
<b>2. GRASS MAINTENANCE</b>					
A. FERTILIZING					
B. RE-SEEDING					
C. DE-THATCHING					
D. PEST CONTROL					
E. OTHERS					
<b>3. VEGETATIVE COVER</b>					
A. FERTILIZING					
B. PRUNING					
C. PEST CONTROL					
D. OTHERS					
<b>4. TRASH AND DEBRIS REMOVAL</b>					
A. BOTTOMS					
B. EMBANKMENTS AND SIDE SLOPES					
C. PERIMETER AREAS					
D. ACCESS AREAS AND ROADS					
E. INLETS					
F. OUTLETS AND TRASH RACKS					
G. OTHERS					
<b>5. SEDIMENT REMOVAL</b>					
A. INLETS					
B. OUTLETS AND TRASH RACKS					
C. BOTTOM					
D. OTHERS					
<b>6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS</b>					
<b>7. UNDERGROUND BASIN MAINTENANCE</b>					
A. BOTTOMS					
B. OUTLETS AND TRASH RACKS					
C. ACCESS HATCHES					
D. OTHERS					
<b>8. INFILTRATION BASIN - TILING BOTTOM SAND LAYER</b>					
<b>9. OTHER PREVENTIVE MAINTENANCE</b>					
A. PARKING LOT SWEEPING					
B. EMPTYING TRASH RECEPTACLES					

**MAINTENANCE LOG  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY	_____	
LOCATION	_____	DATE _____
CREW	_____	WORK STARTED _____
EQUIPMENT	_____	WORK COMPLETED _____
WEATHER	_____	TOTAL MANPOWER OF WORK _____

**B. CORRECTIVE MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. REMOVAL OF DEBRIS AND SEDIMENT					
2. STRUCTURAL REPAIRS					
3. EMBANKMENTS AND SIDE SLOPES					
4. DEWATERING					
5. BASIN MAINTENANCE					
6. CONTROL OF MOSQUITOES					
7. EROSION REPAIR					
8. FENCE REPAIR					
9. SNOW AND ICE REMOVAL					
10. SAND LAYER REPLACEMENT					
11. OTHER					

**C. AESTHETIC MAINTENANCE**

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRAFFITI REMOVAL					
2. GRASS TRIMMING					
3. WEEDING					
4. OTHERS					

REMARKS (REFER TO ITEM NO. IF APPLICABLE) \_\_\_\_\_

WORK PERFORMED BY: \_\_\_\_\_

***INSPECTION LOG FOR  
STORMWATER MANAGEMENT FACILITIES***

**INSPECTION LOG  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 DATE \_\_\_\_\_  
 WEATHER \_\_\_\_\_

**A. PREVENTIVE MAINTENANCE**

FACILITY ITEM	OK (1)	ROUTINE (2)	URGENT (3)	COMMENTS (4)
<b>1. GRASS CUTTING</b>				
A. BOTTOMS				
B. EMBANKMENTS AND SIDE SLOPES				
C. PERIMETER AREAS				
D. ACCESS AREAS AND ROADS				
E. OTHERS				
<b>2. GRASS MAINTENANCE</b>				
A. FERTILIZING				
B. RE-SEEDING				
C. DE-THATCHING				
D. PEST CONTROL				
E. OTHERS				
<b>3. VEGETATIVE COVER</b>				
A. FERTILIZING				
B. PRUNING				
C. PEST CONTROL				
D. OTHERS				
<b>4. TRASH AND DEBRIS REMOVAL</b>				
A. BOTTOMS				
B. EMBANKMENTS AND SIDE SLOPES				
C. PERIMETER AREAS				
D. ACCESS AREAS AND ROADS				
E. INLETS				
F. OUTLETS AND TRASH RACKS				
G. OTHERS				
<b>5. SEDIMENT REMOVAL</b>				
A. INLETS				
B. OUTLETS AND TRASH RACKS				
C. BOTTOM				
D. OTHERS				
<b>6. ELIMINATION OF POTENTIAL MOSQUITO</b>				
<b>7. UNDERGROUND BASIN MAINTENANCE</b>				
A. BOTTOMS				
B. OUTLETS AND TRASH RACKS				
C. ACCESS HATCHES				
D. OTHERS				
<b>8. INFILTRATION BASIN - TILING BOTTOM</b>				
<b>9. OTHER PREVENTIVE MAINTENANCE</b>				
A. PARKING LOT SWEEPING				
B. EMPTYING TRASH RECEPTACLES				

**INSPECTION LOG  
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 DATE \_\_\_\_\_  
 WEATHER \_\_\_\_\_

**B. CORRECTIVE MAINTENANCE**

FACILITY ITEM	OK (1)	ROUTINE (2)	URGENT (3)	COMMENTS (4)
1. REMOVAL OF DEBRIS AND SEDIMENT				
2. STRUCTURAL REPAIRS				
3. EMBANKMENTS AND SIDE SLOPES				
4. DEWATERING				
5. BASIN MAINTENANCE				
6. CONTROL OF MOSQUITOES				
7. EROSION REPAIR				
8. FENCE REPAIR				
9. SNOW AND ICE REMOVAL				
10. SAND LAYER REPLACEMENT				
11. OTHER				

**C. AESTHETIC MAINTENANCE**

FACILITY ITEM	OK (1)	ROUTINE (2)	URGENT (3)	COMMENTS (4)
1. GRAFFITI REMOVAL				
2. GRASS TRIMMING				
3. WEEDING				
4. OTHERS				

REMARKS (REFER TO ITEM NO. IF APPLICABLE) \_\_\_\_\_

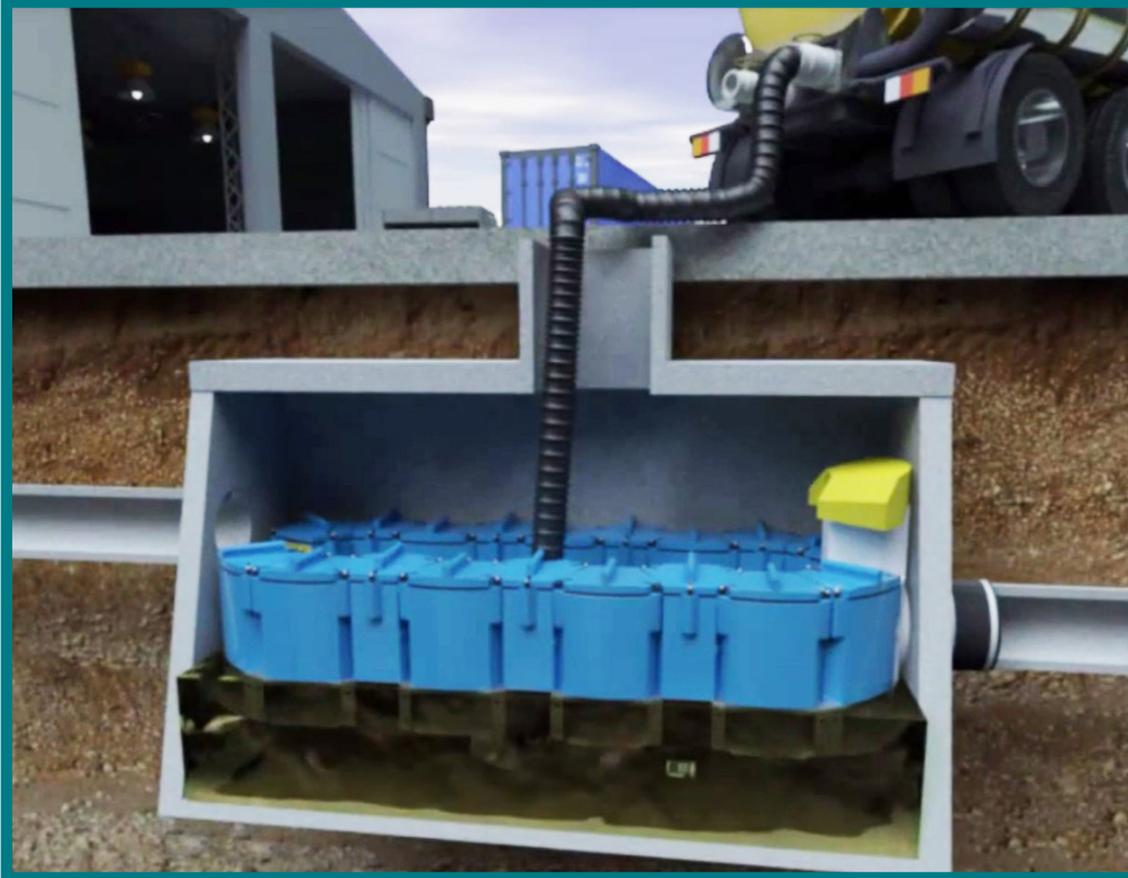
- (1) ITEMS CHECKED IS IN GOOD CONDITION, AND THE MAINTENANCE PROGRAM IS ADEQUATE.  
 (2) ITEMS CHECKED REQUIRES ATTENTION, BUT DOES NOT PRESENT AN IMMEDIATE THREAT TO THE FACILITY FUNCTION OR OTHER FACILITY COMPONENTS.  
 (3) THE ITEMS CHECKED REQUIRES IMMEDIATE ATTENTION TO KEEP THE FACILITY OPERATIONAL OR TO PREVENT DAMAGE TO OTHER FACILITY COMPONENTS.  
 (4) PROVIDE EXPLANATION AND DETAILS IF COLUMNS 2 OR 3 ARE CHECKED.  
 REMARKS (REFER TO ITEM NO. IF APPLICABLE)

INSPECTOR: \_\_\_\_\_

***STRUCTURAL STORMWATER MANAGEMENT DEVICE  
INSPECTIONS AND MAINTENANCE BMPs***

It's Your Site. Have it Done Right.

Regular Maintenance Ensures Optimal System Performance



## Stormwater BMP Services

---

Inspection & Maintenance Services

**Stormwater Maintenance Solutions**

94 Hutchins Drive  
Portland, ME 04102  
1 (888) 382-7808  
[services@hydro-int.com](mailto:services@hydro-int.com)

## WHY IS STORMWATER BMP MAINTENANCE NECESSARY?

- Many stormwater permits require that stormwater **Best Management Practices (BMPs)** be maintained in order to be compliant
- Commercial properties contributing runoff to municipal drainage lines can be held liable for discharge exceedances
- BMPs that are not maintained will eventually reach treatment capacity and allow harmful pollution to discharge into local water bodies
- Going long periods in between cleanouts may cost you more money than doing more frequent maintenance
- Some commercial property lease agreements obligate renters to ensure their site is not polluting
- Industrial permit holders have to continually discharge within allowed benchmark pollutant concentrations

**DON'T RISK DAMAGING YOUR BUSINESS REPUTATION: MAINTAIN YOUR STORMWATER BMP**

### IT'S YOUR COMMUNITY

You would never intentionally litter in your neighborhood or within the town or city that you work. A stormwater treatment BMP left uncleaned however will have the same effect as throwing garbage and other harmful pollutants into the lakes, rivers and oceans in your area. Other unintended consequences may include:

- Harming local ecosystems
- Negatively affecting regional fishing industry
- Creating visual eye sores that affect tourism and local economy
- Damaging your business reputation

### DON'T DELAY!

Those who put off maintenance are at greater risk of receiving a **NOTICE OF VIOLATION** and often **PAY MORE** than those who consistently tend to system upkeep.

## STORMWATER TREATMENT SYSTEMS

Stormwater BMPs are installed to prevent the trash, debris and pollutants captured in stormwater runoff from reaching receiving water bodies and causing harm to ecosystems.

Very much the way a dumpster needs to be emptied, so too does a stormwater treatment system need to be cleaned out to prevent pollutant overflow. If you have a system on your site, ensure that it is regularly inspected and cleaned.

## TYPES OF STORMWATER TREATMENT BMP SYSTEMS SERVICED BY HYDRO

### SAVE MONEY

#### AVOID SERVICE NEGLIGENCE

Sanitation services providers not intimately familiar with stormwater treatment systems are at risk of the following:

- Inadvertently breaking parts or failing to clean/replace system components appropriately.
- Charging you for more frequent maintenance because they lacked the tools to service your system properly in the first place.
- Billing you for replacement parts that might have been covered under your Hydro warranty plan
- Charging for maintenance that may not yet have been required.

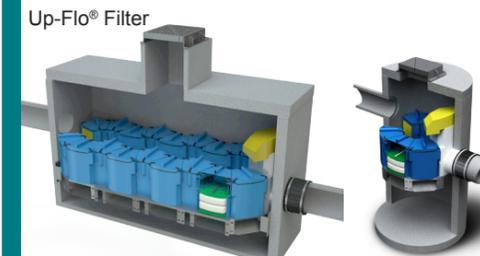
### WHY HYDRO?

Hydro International has been engineering stormwater treatment systems for over 30 years. We understand the mechanics of removing pollutants from stormwater and how to keep systems running at an optimal level.

### GET IT DONE RIGHT

Nobody knows our systems better than we do or understands what a system needs in order to function properly.

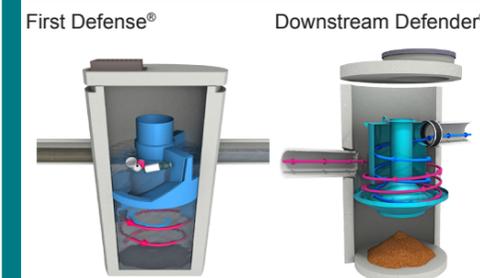
#### Hydro Filters



#### Catch Basins



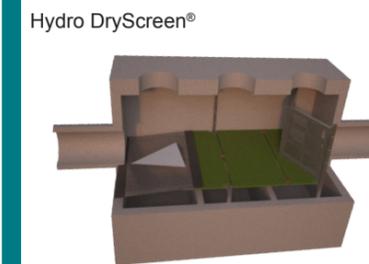
#### Hydro Separators



#### Storage Structures



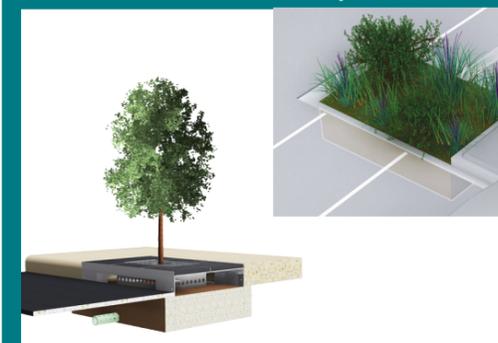
#### Hydro Baffle Boxes



#### Permeable Pavement



#### Biofilters & Bioretention Systems



#### Stormwater Ponds



VISIT [HYDRO-INT.COM/SERVICE](http://HYDRO-INT.COM/SERVICE) TO LEARN MORE

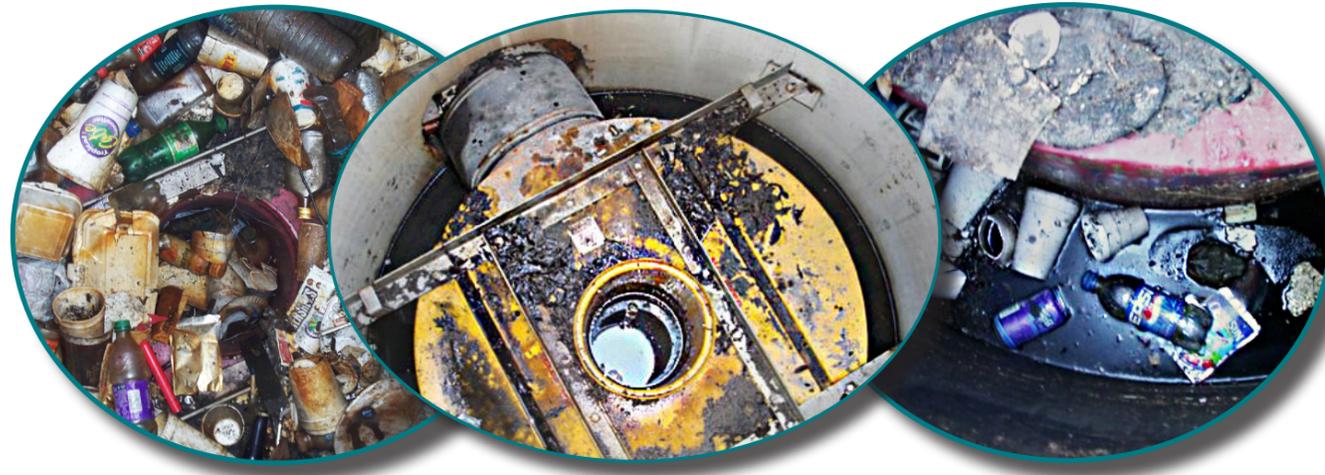
## Services

1

### Inspection

Regular system inspections, including an initial warranty inspection of assembly, are recommended to ensure that your system is performing at an appropriate treatment level. A visual examination of your BMP from a Hydro treatment and maintenance specialist will allow us to establish:

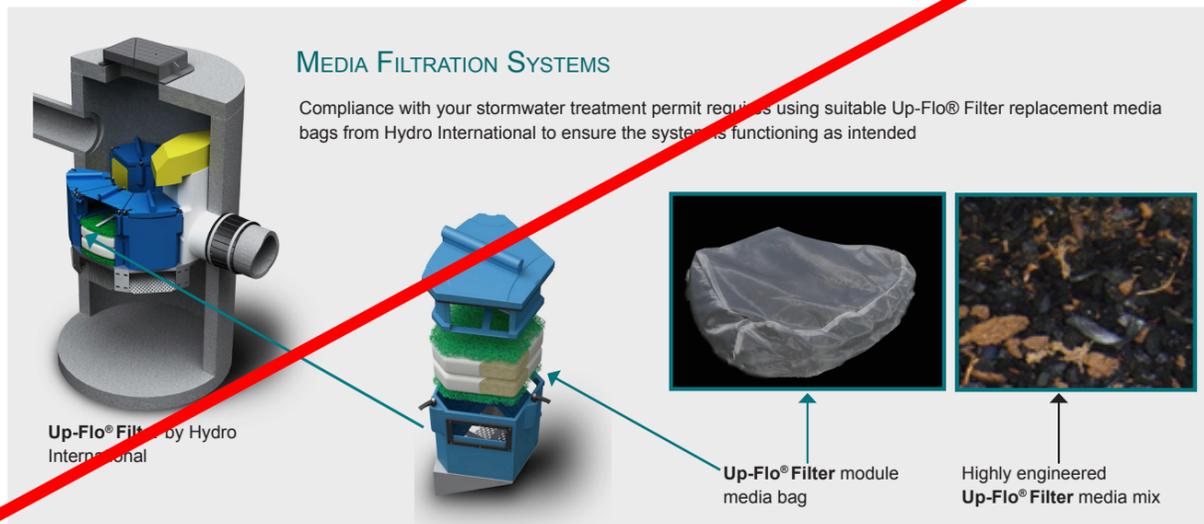
- **POLLUTANT ACCUMULATION:** The amount of debris and pollutants in your system will allow us to determine if your BMP is at capacity and calculate how frequently maintenance will be required
- **PROPER INSTALLATION:** A system that is not installed properly will not treat and function as intended
- **OPERATION EFFICIENCY:** Evaluation of device treatment performance
- **PRICING:** Your quote will be based on how much waste needs to be removed



2

### Replacement Up-Flo® Filter Media Packs

Filter systems with media function very much the way domestic drinking water filters work. As water passes through them they capture pollutants and require periodic replacement in order to function properly.



## Services

3

### Cleanout Services

Trash, sediment and polluted water is stored inside treatment systems until they are removed by our team with a vactor truck (see Fig. 1). Sometimes teams must physically enter the system chambers in order to prepare the system for maintenance and install any replacement parts. Services include are are not limited to:

- Solids removal
- Removal of liquid pollutants
- Replacement media installation (when applicable)



4

### Service Warranty

Make sure you're not paying for service that is covered under your warranty plan. Only Hydro International's service teams can identify tune-ups that should be on us, not you.



## WHY HYDRO?

### Better Tools, Better Results

Not all vactor trucks are created equal. Appropriate tools and suction power are needed to service stormwater systems appropriately.

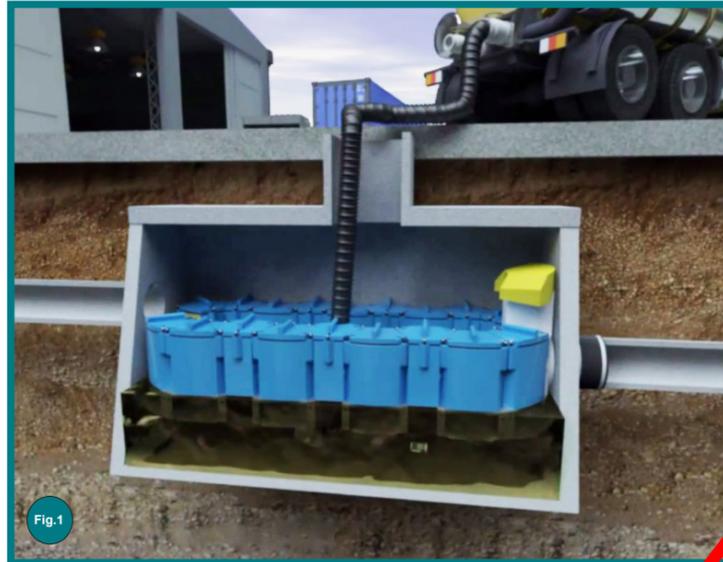


Companies who don't specialize in stormwater treatment won't have the tools to properly clean systems or install new parts.

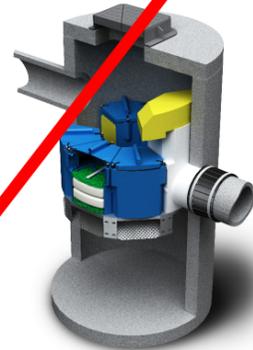
## MEDIA FILTRATION SYSTEMS

### Up-Flo® Filter

Hydro International offers a variety of stormwater treatment Best Management Practices (BMPs) designed to remove trash, sediment and pollutants from the stormwater running off of your site. In order to keep these systems performing at an optimal level, they require periodic cleanout and replacement parts (where necessary). This document will provide you with a brief overview of Hydro International's BMP types, how to identify them and what is involved in their maintenance and cleanout.



HOW DO YOU KNOW IF YOU HAVE AN UP-FLO® FILTER ON YOUR SITE?



#### WHAT TO LOOK FOR:

- Multi-colored gray or blue filter modules with yellow, blue or white internal components
- Comprised of individual module units that can be configured into a vault (Fig. 1) or a rounded manhole (Fig. 4).
- Your Hydro International manhole lid

#### MULTI-COLOR UNITS



Filter systems with media (Fig. 3) function very much the way domestic drinking water filters work. As water passes through them they capture pollutants and require periodic replacement in order to function properly.

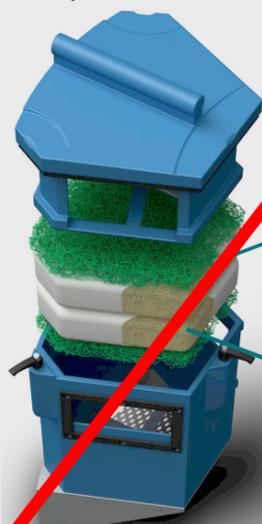
Looking down into a rounded manhole configuration



Compliance with your stormwater treatment permit requires using suitable Up-Flo® Filter replacement media bags from Hydro International to ensure the system is functioning as intended (Fig. 2)

#### REPLACEMENT PARTS

Up-Flo® Filter module



Up-Flo® Filter media bag



Up-Flo® Filter media mix (found inside of bag)



## SEDIMENT & TRASH SEPARATING SYSTEMS

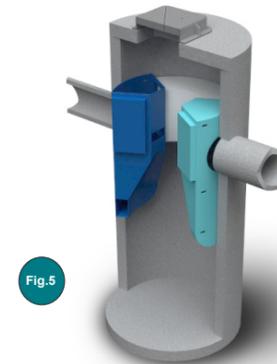
### First Defense® & Downstream Defender® Stormwater Separators

The Downstream Defender and First Defense units are designed to remove trash and sediment from stormwater. They are cleaned out using a vactor truck. No spare parts are required as part of typical maintenance.

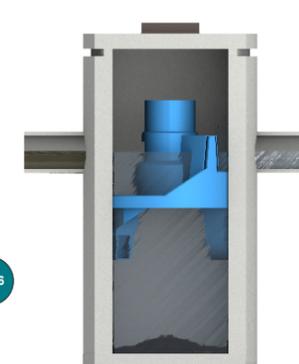
HOW DO YOU KNOW IF YOU HAVE A FIRST DEFENSE OR DOWNSTREAM DEFENDER ON YOUR SITE?

#### WHAT TO LOOK FOR:

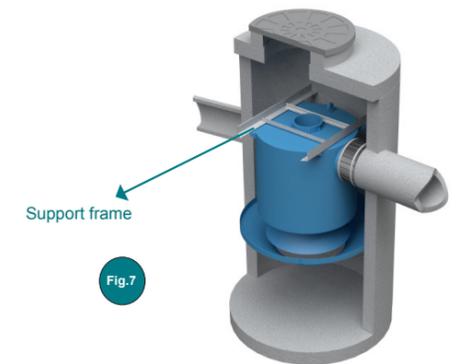
First Defense®



First Defense® High Capacity



Downstream Defender®



- Multi-colored blue/white units
- Open internal components (see Fig.5 & Fig.11)

#### MULTI-COLOR UNITS



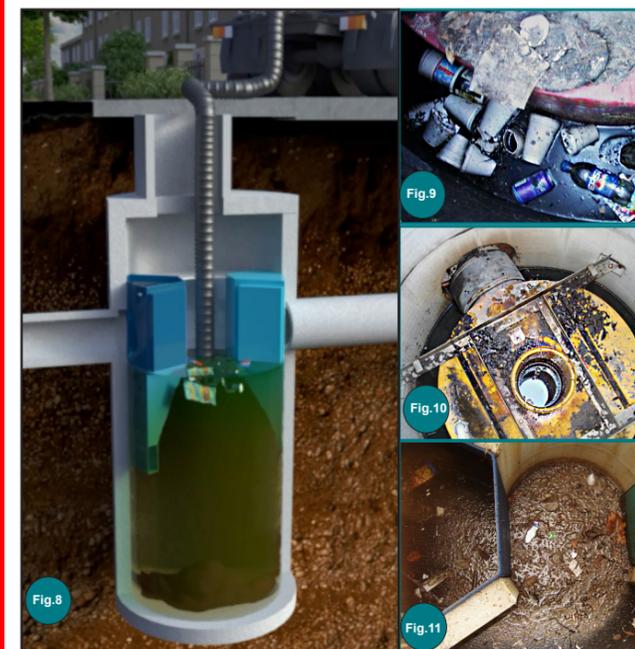
- Solid colored units
- Closed top with a half wall separator (see Fig.6)

#### SOLID COLOR UNITS



- Solid colored units
- Closed top with metal support frame (see Fig.7 & Fig. 9 &10)

#### SOLID COLOR UNITS



LOOK FOR A HYDRO INTERNATIONAL MANHOLE LID ON YOUR SITE



DOES YOUR SYSTEM NEED A CLEANOUT?  
CALL FOR AN ESTIMATE AT 1-888-382-7808

Do it Right the First Time

LEARN MORE AT [HYDRO-INT.COM/SERVICE](http://HYDRO-INT.COM/SERVICE)



CALL 1 (888) 382-7808 TO SCHEDULE AN INSPECTION

## Stormwater BMP System Services

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Inspection & Maintenance Services

**Stormwater Maintenance Solutions**

94 Hutchins Drive  
Portland, ME 04102  
1 (888) 382-7808  
[services@hydro-int.com](mailto:services@hydro-int.com)

***OPINION OF PROBABLE ANNUAL STORM WATER  
MANAGEMENT MAINTENANCE COST***

## Opinion of Probable Annual Storm Water Management Maintenance Cost

**Block 34001; Lots: 46.01, 56, 57, 77, 78 & 79**

**Township of Montgomery  
Somerset County, NJ**

**Date: 4/22/2022**

Item	Description	Rate	Unit	Total Units	Frequency Per Year	Item Total
1	Mowing	\$100.00	Acre	3.47	35	\$12,145.00
2	Landscape Maintenance	\$400.00	Acre	4.28	2	\$3,424.00
3	Landscape Maintenance materials	\$1,200.00	Acre	4.28	2	\$10,272.00
4	General Maintenance	\$400.00	L/S	2	2	\$1,600.00
5	Sand Layer Tilling	\$1,000.00	L/S	1	1	\$1,000.00
6	Sand Layer Replacement (every 5 years)	\$5,000.00	L/S	1	0.2	\$1,000.00
7	Sub-Surface Basin Deposit Removal	\$1,000.00	L/S	1	1	\$1,000.00
8	Preventive Maintenance	\$1,000.00	L/S	2	1	\$2,000.00
9	Corrective Maintenance (every 5 years)	\$4,000.00	L/S	2	0.2	\$1,600.00
10	Engineering Inspection	\$250.00	L/S	1	12	\$3,000.00
11	Trash/Sediment/Debris Removal	\$50.00	Day	1	35	\$1,750.00
12	Structural Stormwater Management	\$10,000.00	L/S	1	1	\$10,000.00
Estimated Annual SWM Maintenance Costs						\$48,791.00
Estimated Annual Insurance Costs						\$150.00
Total Estimated Annual SWM Maintenance Costs						\$48,941.00

***SAMPLE PICTURE OF PROPOSED BMP***



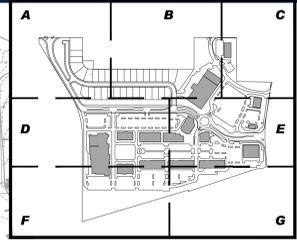
Sample Detention Basin

## ***DRAINAGE PLANS***



# GEORGETOWN-FRANKLIN TURNPIKE

(A.K.A. BLAIRENBURG-ROCKY HILL ROAD)  
(A.K.A. COUNTY ROUTE 519)  
(66' WIDE R.O.W.) (45 M.P.H.)



**BOHLER**  
SITE CIVIL AND CONSULTING ENGINEERING  
LAND SURVEYING  
PROGRAM MANAGEMENT  
CONSTRUCTION MANAGEMENT  
SUSTAINABLE DESIGN  
PERMITTING SERVICES  
TRANSPORTATION SERVICES

REV	DATE	COMMENT	DRAWN BY
1	11/04/2016	REV. PER TOWNSHIP COMMENTS	OT/AD
2	09/28/2017	REV. PER TOWNSHIP COMMENTS	LM
3	11/07/2017	REV. PER TOWNSHIP COMMENTS	ADKF
4	01/02/2018	REV. PER TOWNSHIP COMMENTS	BB
5	03/30/2018	REV. PER TOWNSHIP COMMENTS	ADAPR
6	09/18/2018	REV. PER CLIENT COMMENTS	GBAO
7	10/18/2018	REV. PER TOWNSHIP COMMENTS	BB
8	03/08/2019	REV. PER RESOLUTION COMPLIANCE	APR
9	05/13/2019	REV. PER TWA COMMENTS	APR
10	08/27/2019	REV. PER UPDATED TWA COMMENTS	APR
11	10/04/2019	REV. PER TWP & TWA COMMENTS	APR
12	10/21/2021	REV. PER CLIENT COMMENTS	ECW
13	04/29/2022	REV. PER CLIENT COMMENTS	DGR

**REVISIONS**

**811**  
Know what's below.  
Call before you dig.  
NEW JERSEY  
YOU MUST CALL 811 BEFORE ANY EXCAVATION  
WHETHER IT'S ON PRIVATE OR PUBLIC LAND.  
1-800-972-9800  
www.nj-call.org

ISSUED FOR MUNICIPAL & AGENCY REVIEW & APPROVAL

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT NO.: JS210927  
DRAWN BY: OT/AD/CO  
CHECKED BY: LM  
DATE: 06/03/2016  
CAD L.D.: JS210927.02.DRIN-13A

PROJECT: **AMENDED PRELIMINARY / FINAL MAJOR SITE PLAN PHASE 1 & FINAL MAJOR SITE PLAN PHASE 2**

FOR

**PRINCETON PROMENADE, LLC**

PROPOSED RETAIL & RESIDENTIAL DEVELOPMENT

MAP: 61 | BLK: 34001 | LOTS: 46, 01, 55, 57, 77, 78 & 79  
TOWNSHIP OF MONTGOMERY  
SOMERSET COUNTY, NEW JERSEY

**BOHLER**  
BOHLER ENGINEERING LLC  
30 INDEPENDENCE BLVD., SUITE 200  
WARREN, NJ 07059  
PHONE: (908) 658-5300  
FAX: (908) 754-4401  
www.BohlerEngineering.com  
LICENSE: OF ARCHITECTURE: 00000000000000000000000000000000

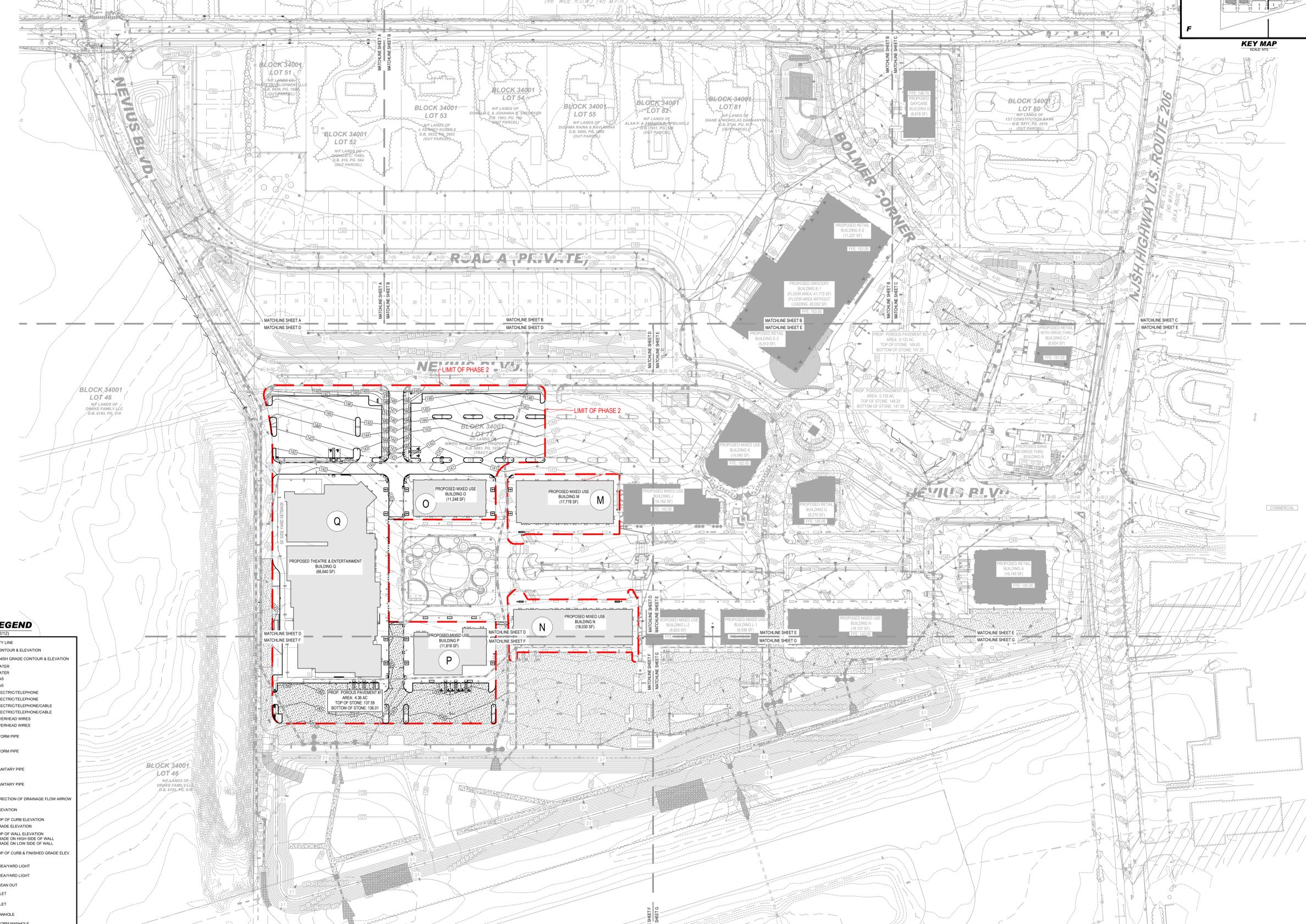
**B.A. BOHLER**

PROFESSIONAL ENGINEER:  
NEW JERSEY LICENSE No. 47421  
NEW YORK LICENSE No. 098514.1  
PENNSYLVANIA LICENSE No. 07206  
CONNECTICUT LICENSE No. 26039  
DELAWARE LICENSE No. 17111  
OHIO LICENSE No. 78977

SHEET TITLE:  
**OVERALL DRAINAGE PLAN (PHASE 2)**

SHEET NUMBER:  
**C-502**

REVISION 13 - 04/29/2022



**GRAPHIC LEGEND**  
(U010102 - 03/12/12)

	PROPERTY LINE
	EXIST. CONTOUR & ELEVATION
	PROP. FINISH GRADE CONTOUR & ELEVATION
	EXIST. WATER
	PROP. WATER
	EXIST. GAS
	PROP. GAS
	EXIST. ELECTRO/TELEPHONE
	PROP. ELECTRO/TELEPHONE
	EXIST. ELECTRO/TELEPHONE/CABLE
	PROP. ELECTRO/TELEPHONE/CABLE
	EXIST. OVERHEAD WIRES
	PROP. OVERHEAD WIRES
	EXIST. STORM PIPE
	PROP. STORM PIPE
	EXIST. SANITARY PIPE
	PROP. SANITARY PIPE
	PROP. DIRECTION OF DRAINAGE FLOW ARROW
	EXIST. ELEVATION
	EXIST. TOP OF CURB ELEVATION
	EXIST. GRADE ELEVATION
	PROP. TOP OF WALL ELEVATION
	PROP. GRADE ON HIGH SIDE OF WALL
	PROP. GRADE ON LOW SIDE OF WALL
	PROP. TOP OF CURB & FINISHED GRADE ELEV.
	EXIST. AREA/YARD LIGHT
	PROP. AREA/YARD LIGHT
	EXIST. CLEAN OUT
	EXIST. INLET
	PROP. INLET
	EXIST. MANHOLE
	PROP. STORM MANHOLE
	PROP. SANITARY MANHOLE
	EXIST. HYDRANT
	PROP. HYDRANT
	EXIST. UTILITY VALVE
	PROP. UTILITY VALVE
	EXIST. UTILITY POLE
	PROP. UTILITY POLE
	EXIST. TRAFFIC SIGNAL
	PROP. TRAFFIC SIGNAL
	INFILTRATION TEST PIT LOCATION
	PREVIOUS TEST PIT LOCATION (2006)

**THIS PLAN TO BE UTILIZED FOR DRAINAGE PURPOSES ONLY**

**SEE GENERAL NOTES SHEET FOR ADDITIONAL INFORMATION**

**FOR ADDITIONAL PIPE CROSSING INFORMATION SEE SANITARY PROFILE SHEETS**



G:\2022\110927.DWG\DRAWINGS\PLAN SET\TOTAL SITE PLANS\110927.02.DRIN-13A-C-502.DWG

## ***UTILITY PLANS***

