

Stormwater Management Operation and Maintenance Manual

For

MPB Realty, LLC

Proposed Popeyes Restaurant & Sonic Restaurant

**470 Eagle Rock Avenue (CR 611)
Block 153, Lot 38
Township of West Orange
Essex County, NJ**

Prepared By:



**DYNAMIC
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- Maintenance Work Order & Checklist
- Maintenance Log
- Inspection Log

PROJECT DETAILS

I. Introduction and Description of Facilities:

The purpose of this report is to provide guidelines and information regarding the required maintenance for the proposed stormwater management facilities to be constructed in association with the development of Block 153, Lot 38 located in the Township of West Orange, in Essex County, New Jersey. The Applicant proposes to develop the lot with a 2,525 SF Popeyes fast-food restaurant with a drive-thru and a 1,484 SF Sonic restaurant with a drive-thru. Additional site amenities including, parking, landscaping, lighting, stormwater management facilities, utilities and other site amenities as shown on the accompanying Site Plan drawings. The proposed stormwater management system includes the construction of inlets and underground conveyance pipes.

The stormwater management facilities will contribute toward the collection and conveyance of runoff generated by the proposed development. Every stormwater management system, whether at grade or below grade, requires that basic periodic maintenance be performed in order to maintain the proper functioning and operation of the system. This report will outline these procedures, further discuss responsibilities and highlight those responsible for performing said maintenance.

The proposed stormwater management facility has been designed to accept stormwater runoff from most of the paved parking areas, drive aisles, and surrounding landscaped and open space areas. These facilities will require periodic inspections and maintenance. The following information can be considered a guideline for the continued maintenance including suggested inspection scheduling as well as performance objectives.

II. Project Contacts:

The applicant is responsible to maintain a detailed log of all preventative and corrective maintenance actions for the constructed stormwater facilities incorporated into the design, including record of all inspections and copies of all maintenance-related work orders.

The applicant is also responsible for maintenance to evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and deed as needed. The applicant shall retain a copy of this report onsite should a public entity request this report or documentation of said maintenance in the future.

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As previously mentioned, this manual, including any future revisions, must be recorded upon the deed of record of the property.

III. Proposed Best Management Practices:

A. Routine Inspection and maintenance of Stormwater Management Facilities

All stormwater management facilities have been designed to control stormwater and reduce flooding and degradation of water quality. Without proper routine inspection and maintenance, the system may lose some or all of its capability to function to its 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 twice each year. In addition to the regular scheduled inspections, inspections shall also occur after any major storm events. Major storm events are defined as storm events exceeding 1" of rainfall. The primary purpose of these inspections is to ascertain the operational condition and safeties of the facilities, particularly the condition of embankments, outlet structure, rip rap 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 this facility 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:

a) 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. Such components include the stormwater conveyance network (piping & inlet).

These stormwater management components shall be visually inspected for the accumulation of excessive sediment as well as damage in the form of cracking, erosion and rutting. Sediment build up within the stormwater conveyance network shall be removed with the use of flushing. Sediment laden water is to be captured with the use of a pipe plug, or approved equal, prior to the storage bed and simultaneously pumped out with the use of pump with sediment bag. Sediment should be disposed of in accordance with all applicable local, state and federal regulations.

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

b) 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, is removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

2. Corrective Maintenance Procedures:

a) Removal of Debris and Sediment:

Sediment, debris and trash which threaten the discharge capacity of the system should be removed immediately with the use of light weight equipment to avoid soil compaction and properly disposed. As noted previously, it is recommended that all water be evacuated from the system with a pump before any significant amount of sediment, settled debris or trash is removed from the system. 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 inlet structures, roadways and walls 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) Snow and Ice Removal:

Accumulations of snow and ice can threaten the functioning of the inlets. 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.

3. Aesthetic Maintenance Procedures

a) Graffiti Removal:

The timely removal of graffiti will restore the aesthetic quality of the facilities. 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 shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3-inches (at least once a month during the growing season). 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 15th and June 15th and between September 15th and December 1st, only if adequate water is provided.

The shrubs and vegetation 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 proposed trees 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. In this case, it should be replanted in the spring.

Replacement trees should be planted at the same size and condition as specified on the landscape plans. If it is necessary to make a substitution of species or size, it 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. Excessive growth of weeds can be controlled mechanically as discussed in the previous section.

The recording of all maintenance work and inspections will 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 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. Summary of Maintenance Procedures:

Preventative Maintenance

- a) Removal and Disposal of Trash/Debris and Sediment
- b) Elimination of Potential Mosquito Breeding Habitat

Corrective Maintenance

- a) Removal of Debris and Sediment
- b) Structural Repairs
- c) Snow and Ice Removal

Aesthetic Maintenance

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

B. *Maintenance Equipment and Materials*

1. 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

2. Vegetative Maintenance Equipment

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

3. Transportation Equipment

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

4. Debris, Trash and Sediment Removal Equipment

- a) Loader
- b) Backhoe
- c) Grader
- d) Dredging Equipment
- e) Portable Pump for Dewatering

5. Miscellaneous Equipment

- a) Shovels
- b) Rakers
- c) Picks

- d) Wheel Barrows
- e) Painting Equipment
- f) Gloves

6. Materials

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

7. Parking Maintenance Equipment

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

C. Checklists and Logs

The 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 the results of all maintenance of the basin.
3. "Inspection Log" – a summary table for recording the results of all inspections of the basin.

D. Estimated Maintenance Costs and Tasks

The following is a summary of the required maintenance tasks and associated costs in written and tabular form:

- Inspections to be performed by a consulting engineer on a bi-annual basis. - **\$3,000.00.**

- Inspections for debris and sediment to be performed by the property owner and/or a maintenance designee on a monthly basis and/or after a storm event exceeding 1 inch of rainfall– **Minimal cost associated – Owner’s responsibility - \$500.00 per inspection.**
- Stormwater conveyance system for debris removal to be performed on an annual basis and/or as inspection routine dictates - **\$2,000.00 per inspection.**
- Surface debris removal including garbage and organic matter to be performed in conjunction with lawn and grounds maintenance, includes leave removal in the Fall and removal of excessive amounts of snow, if necessary, in the Winter. These tasks are encouraged as necessary to maintain safe operating conditions (twice a month from Spring through Winter recommended or on as needed basis) - **\$1,000.00.**

Maintenance Schedule Summary

Task Identification	Task Frequency	Task Estimated Cost
Inspection by licensed professional consulting engineer	Two (2) per year	\$3,000.00
Inspection by property owner and/or maintenance designee	Once (1) per month (or after a storm event exceeding 1 inch of rainfall)	\$500.00 per inspection
Debris removal from stormwater conveyance system (inlets, pipes, manholes)	Four (4) times per year (or after storm event exceeding 1 inch of rainfall)	\$2,000.00 per inspection
Surface debris removal (garbage & organic matter) including leaves in the Fall and snow in the Winter	Twice (2) per month (or on an as needed basis)	\$1,000.00

APPENDIX

MAINTENANCE WORK ORDER AND CHECKLIST

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

NAME OF FACILITY: _____
 LOCATION: _____ DATE: _____
 WEATHER: _____ WORK STARTED: _____
 MAINTENANCE PERFORMED BY: _____ WORK COMPLETED: _____

A. PREVENTATIVE MAINTENANCE			
WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRASS CUTTING			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. OTHERS			
2. GRASS MAINTENANCE			
A. FERTILIZING			
B. RE-SEEDING			
C. DE-THATCHING			
D. PEST CONTROL			
E. OTHERS			
3. VEGETATIVE COVER			
A. FERTILIZING			
B. PRUNING			
C. PEST CONTROL			
D. POISONOUS PLANTS			
E. OTHERS			
4. TRASH AND DEBRIS REMOVAL			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OUTLETS AND TRASH RACKS			
G. OTHERS			
5. SEDIMENT REMOVAL			
A. INLETS			
B. OUTLETS AND TRASH RACKS			
C. LOW FLOW CHANNELS			
D. BOTTOMS			
E. OTHERS			
6. PEST CONTROL			
A. GEESE			
B. MOSQUITO BREEDING			
C. RODENTS / RODENT HOLES			
D. OTHERS			
7. STRUCTURAL REPAIRS			
A. VALVES			
B. SLUICE GATES			
C. PUMPS			
D. FENCE GATES			
E. LOCKS			
F. ACCESS HATCHES			
G. OTHER:			
8. POND MAINTENANCE			
A. AERATION EQUIPMENT			
B. DEBRIS AND TRASH REMOVAL			
C. WEED REMOVAL			
D. OTHER:			
9. OTHER PREVENTIVE MAINTENANCE			
A. PARKING LOT SWEEPING			
B. EMPTYING TRASH RECEPTACLES			
C. PUMPS AND VALVES			
D. ELECTRICAL PANEL AND WIRING			
E. DEWATERING			
F. GRAFFITI REMOVAL			
E. OTHER:			

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

GENERAL NOTES AND REMARKS:

WORK ORDER PREPARED BY: _____

WORK COMPLETED BY: _____

MAINTENANCE LOG

MAINTENANCE LOG FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY: _____
LOCATION: _____

[illegible][illegible]

INSPECTION LOG

INSPECTION LOG FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY: _____
LOCATION: _____

[illegible][illegible]

[illegible][illegible][illegible]

A. EFFECTIVENESS OF EXIST. MAINT. PROGRAM									
B. DAM INSPECTIONS									
C. POTENTIAL MOSQUITO HABITATS									
D. MOSQUITOES									

- GENERAL NOTES AND REMARKS (REFER TO ITEM NUMBER IF APPLICABLE)