

Operation and Maintenance Manual
Stormwater Management Systems

For

Fairways – Phase 2b Townhome
Block 335.01; Lot 5.04
Middle Township, Cape May County, New Jersey

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INTRODUCTION

The Fairways Major Site Plan Stormwater Management Measures have been designed in accordance with the Middle Township Land Development Ordinance. As part of the stormwater management requirements as stated in Section 218-73 of the Middle Township Land Ordinance, an Operation and Maintenance Manual is required for this project. The items listed in this manual will be the responsibility of the property owner unless otherwise noted. Certain inspection and design restoration procedures described within this manual may require the use of a professional engineer licensed in the State of New Jersey.

REQUIREMENTS

It will be the responsibility of the contractor to ensure proper maintenance during construction of the project site and until final certification of the stormwater facilities and acceptance by owner. At which time the HOA shall assume all responsibilities of the storm piping and inlets maintenance up to the drainage easement area of the lakes on the Golf Course.

To ensure the minimum twenty year performance guarantee routine inspection and maintenance will be performed. This preventative maintenance will include all repairs, replacements to stormwater structures; the removal of debris, sediment and organic matter; the restoration of any eroded areas; and any landscaping needs.

The removal of such material routinely throughout the year will result in the proposed basins, storm sewers and swales operating properly. This will result in the site draining in a fashion as it was designed. Improper maintenance may result in the increased occurrence of ponding and potentially flooding.

The inspection and maintenance measures outlined within this manual are designed to maintain the functionality of the proposed stormwater management facilities which include stormwater management basins and storm sewer and conveyance systems.

The following section of the manual will describe the required operation and maintenance procedures for the project as to be carried out by the respective parties.

COORDINATE LOCATIONS

Lakes: N 39° 23' 40", W 74° 37' 53"

STORMWATER MANAGEMENT BASIN

Effective basin performance requires regular and effective maintenance. All extended detention basin components expected to receive and/or trap debris and sediment must be inspected regularly. This shall include the porous asphalt areas for parking of vehicles, underground stone trench systems for roof runoff and the infiltration basins.

Maintenance Responsibility

The golf course owner shall be responsible for maintaining the lakes and stormwater management basins, vegetation and inlet/outlet structures associated with the structures. Maintenance work shall be completed by trained personnel.

Preventative Maintenance

Preventative maintenance shall be performed on a regular basis by properly trained personnel, and it is intended to keep the facility operational and attractive at all times. Preventative maintenance shall include:

1. Control of Nuisance Insects
To prevent the growth of mosquito habitat, inspection should include the removal of old cans, tires, un-drained depressions in wooded areas and hollow stumps, water control structures and pipe openings and anywhere else standing water can accumulate. Inspection should be conducted once a month during the spring and summer months.
2. Removal and Disposal of Trash and Debris
Immediately following any major storm event and at least once every month, all trash and debris shall be removed from the trash racks, spillway and impoundment areas and from all other stormwater structures.
3. Sediment Removal and Disposal
Accumulated sediment must be removed before it threatens the operation of the facility. Sediment volume should be monitored periodically and shall be removed, if necessary, at least once every three (3) months. Sediment shall be disposed of in accordance with State and County Soil Conservation District and New Jersey Department of Environmental Protection Standards.
4. Retaining Walls/Berms
Berms will require mowing, erosion control and prevention of animal burrows and tree growth. Inspection shall be conducted every three (3) months. Additionally, the retaining walls should be inspected to ensure stability and to remove any plant growth and to address any areas of erosion.
5. Grass Maintenance
An annual program of fertilizing and soil conditioning shall be provided to maintain healthy grass growth. Re-seeding shall be done as necessary. When planting and maintaining lawn areas, pesticides and fertilizers shall be applied

in accordance with the manufacturer’s specifications. Wherever possible the use of fertilizers and pesticides shall be eliminated; if required their use shall be minimized.

Once per month mow side slopes, stabilize eroded banks and repair any erosion. Grass cutting should be conducted as necessary; clipping shall be bagged and properly disposed.

6. Petroleum Spills

Every six (6) months the bottom of the stormwater management basins should be inspected for signs of petroleum contamination.

Inspection Schedule

ITEM	DESCRIPTION	MAINTENANCE INTERVAL
1.	Insect and Pest Control	Monthly (Spring/Summer)
2.	Removal of Trash and Debris	Monthly
3.	Sediment Removal	Every Three (3) Months
4.	Retaining Walls/Berm	Every Three (3) Months
5.	Grass Maintenance	Monthly
6.	Petroleum Spills	Every Six (6) Months

STORM SEWER AND CONVEYANCE SYSTEMS

The storm sewer and areas of vegetated conveyance must be inspected to ensure that excessive amount of erosion are not occurring in around the inlet and discharge locations. Regular inspection will be required to ensure that the structures continue to operate appropriately.

Maintenance Responsibility

The HOA shall be responsible for maintaining the storm sewer and conveyance systems up to the easement area. All other storm sewer and conveyance systems within the easement area will be maintained by the golf course. Maintenance work shall be completed by trained personnel.

Preventative Maintenance

Preventative maintenance shall be performed on a regular basis by properly trained personnel, and it is intended to keep the facility operational and attractive at all times. Preventative maintenance shall include:

1. Structural Integrity of Concrete Systems

The structural integrity of the concrete inlets, reinforced concrete pipe, headwalls and concrete flumes should be inspected every three (3) months for cracking and/or settling.

2. Sediment Removal and Disposal

Accumulated sediment must be removed before it threatens the operation of the facility. Sediment volume should be monitored periodically and shall be removed, if necessary, at least once every three (3) months. Sediment shall be disposed of in accordance with State and County Soil Conservation District and New Jersey Department of Environmental Protection Standards.

3. Vegetation Inspection

Proposed vegetation should be inspected every six (6) months. Inspection should include the inspection of the land cover, trees and shrubs. This should include provisions for the replacement of dead or dying vegetation and re-establishment of soil stabilization vegetation in areas experiencing excessive amounts of soil erosion.

Inspection Schedule

ITEM	DESCRIPTION	MAINTENANCE INTERVAL
1.	Structural Integrity of Concrete Systems	Every Three (3) Months
2.	Sediment Removal and Disposal	Every Three (3) Months
3.	Vegetative Inspection	Every Six (6) Months

ASPHALT POROUS PAVING AREAS

The surface course of all pervious paving systems must be inspected for cracking, subsidence, spalling, deterioration, erosion, and the growth of unwanted vegetation at least once a year. Remedial measures must be taken as soon as practical. Care must be taken when removing snow from the pervious paving surface courses. Pervious paving surface courses can be damaged by snow plows or loader buckets that are set too low to the ground. This is particularly true at permeable paver systems where differential settlement of pavers has occurred. Sand, grit, or cinders should not be used on pervious paving surface courses for snow or ice control.

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

B. Porous Paving Systems

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

STONE TRENCH RECHARGE AREAS

Any stone trench recharge area should be inspected at least four times annually as well as after every storm exceeding 1 inch of rainfall. The water level in the test well should be the primary means of measuring infiltration rates and drain times. Pumping stored runoff from an impaired or failed dry well can also be accomplished through the test well. Therefore, adequate inspection and maintenance access to the test well must be provided.

Disposal of debris, trash, sediment, and other waste material removed from a stone trench recharge area should be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

Corrective Maintenance

Corrective maintenance shall be performed as soon as possible after a situation requiring attention is reported. Corrective maintenance includes filling of animal burrows, re-establishment of embankments where erosion or settlement has occurred, repair of damage resulting from vandalism or natural causes, removal of debris and sediment which impairs the operation of the facility and correction of any defects which could jeopardize the safety or operation of the facility.

Maintenance Inspection

An inspection of the facility shall be performed at least every three (3) months and after every major storm event (storms over 1 inch of rainfall) to determine the effectiveness of maintenance work and the condition of the facility. This shall be completed to ensure that all retained stormwater runoff has infiltrated within 72 hours. In the event complete infiltration does not occur, the bottom of the basins may be raked or tilled to break up clogged material. In addition, an inspection shall be made whenever a severe storm warning is issued to determine the readiness of the facility.

Records

Checklists and logs shall be used by maintenance personnel and inspectors working on the basins. These shall be utilized each time maintenance or inspection is performed, and shall be filed with the property owner. These records may be used to determine the effectiveness of the existing maintenance and inspection schedule, and provide a guide to revising the schedules as necessary. Records shall be retained for a minimum of five years.

MANUAL REVIEW AND UPDATE

This manual shall be reviewed on an annual basis to ensure the prescribed maintenance and inspections schedule is properly described, schedule and implemented. This report must be updated and submitted to the Township of Middle on an annual basis.

COST ESTIMATE

General Maintenance including debris removal from stormwater facilities:

$$5.0 \text{ MH/WK} \times \$25/\text{MH} \times 26 \text{ WK/YR} = \$3250/\text{YR}$$

Monthly Mowing of Basin Area:

$$10.0 \text{ MH/Month} \times \$25/\text{MH} \times 12 \text{ Month} = \$3000/\text{YR}$$

Vegetation/Grass Maintenance:

$$\$3000 \times (50\%) = \$1500/\text{YR}$$

Miscellaneous Repairs:

$$\$3000 \times (50\%) = \$1500/\text{YR}$$

Annual Maintenance Costs Estimated at \$9250/YR

Equipment required to complete the prescribed maintenance and inspection schedule include simple landscaping tools and equipment, including, but not limited to:

1. Shovels, rakes, etc;
2. Backhoe, dozer;
3. Pipe jetting equipment, if necessary; and
4. Lawn mowers.

**These costs are based upon anticipated values and times, actual times and costs may vary.

INSPECTION AND MAINTENANCE FINANCING

Final methods for financing for the cost of the inspection and maintenance associated with the stormwater management facilities will be agreed upon at time of final approval.