# STORMWATER MANAGEMENT SYSTEM OPERATIONS and MAINTENANCE MANUAL

for

## Victoria Gardens

**BLOCK: 4001 - LOT: 1, 2 & 3**
**Neptune Township, Monmouth County**
**New Jersey**

**PREPARED BY:**

**PROFESSIONAL DESIGN SERVICES, L.L.C.**
**1245 AIRPORT ROAD SUITE 1**
**LAKEWOOD, NJ 08701**
**732-363-0060**
***PDS Ref. No. 321644***

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APPENDICES

## I. PURPOSE

In accordance with the NJ Stormwater Management Rules, NJAC 7:8, this Stormwater Management System Maintenance Manual has been prepared to establish the protocol for the operation, maintenance, inspection and record-keeping for the constructed system. It will also provide schedules, estimated maintenance costs and provide information on the responsible party for the system.

Regular and thorough maintenance is critical to the successful long-term operation of the stormwater management system. Failure to perform proper maintenance can lead to diminished effectiveness, failure, and potential damages to persons or properties both on-site and downstream of the site. It can also lead to mosquito breeding, vermin and the potential for drowning. It is important to establish the proper protocol and for the responsible parties to follow said measures for the effective operation of the system.

## II. RESPONSIBLE PARTIES

All elements of the on-site systems will be owned, operated and maintained by:

Victoria Gardens Homeowners Association
Neptune NJ 08527

## III. STORMWATER MANAGEMENT SYSTEM OVERVIEW

As indicated on the Preliminary and Final Major Subdivision Development Plans as prepared by Professional Design Services, LLC, the stormwater management system is comprised of a system of inlets and underground pipe network, six (6) primary infiltration/detention basins, and spillway. These components will provide qualitative and quantitative control of increased run-off from the developed areas of the site. The roof leader collection systems will collect run-off from the building rooftops and direct it into the underground pipe network. The management system has been designed to effectively manage water quality by providing removal of total suspended solids (TSS), and to manage the peak rate of discharge and volume of discharge through infiltration and detention.

Stormwater run-off from the site and building is collected and conveyed to the

stormwater management basins. Run-off from low intensity storms will fully infiltrate and recharge the groundwater. More intense storms will flow through the outlet structure from basins 1-5 into the existing drainage system located north of the site. Basin 6 outlets into the freshwater wetland area at the rear of the site. If the water level continues to rise during a storm that exceeds the 100 year storm, it will eventually be directed downstream over the emergency spillway of each basin. .

## IV. INSPECTION AND MAINTENANCE OVERVIEW

Effective operation of the stormwater management system relies on proper maintenance of all components. Inspection Report Forms and Maintenance Activity Forms are included in the appendices of this manual for effective record-keeping. These forms are meant to be a guide for regular inspection and maintenance, and should not preclude proper response to any emergency conditions.

## V. SAFETY

Proper safety measures shall be adhered to at all times during execution of inspection and maintenance. Inspection and maintenance activities should only be conducted by personnel adequately trained in execution of same. Confined spaces should never be entered without proper equipment and trained personnel.

If toxic or flammable substances are potentially present, or discovered, personnel are advised to evacuate the area, and contact emergency services. Potentially dangerous substances shall be reported to the local Police Department for response by the Hazardous Materials Unit. The emergency contact number is 911.

Safety fencing is provided to reduce the risks of children or other pedestrians who may aspire to enter the facility. The infiltration/detention basin is not a play area and not suitable for small children. Fencing should be inspected on a regular basis, and repairs made immediately if needed. Gates for maintenance equipment and personnel should be locked at all times.

## VI. FIELD INSPECTION EQUIPMENT

Appropriate equipment shall be taken to the field for execution of any field inspections. Below is a list of equipment that may be necessary to perform the inspections of the on-site stormwater management facilities:

- Protective clothing and work boots
- Personal safety equipment (hard hat, gloves, vest, confined space entry equipment, etc.)
- Communications equipment (cell phone, walkie talkie, etc.)
- Operations and Maintenance Manual
- Inspection Report Forms
- Ladders and ropes
- Shovels and hand tools
- Pry bar for casting removal

## VII. INSPECTING STORMWATER MANAGEMENT FACILITIES

To maintain proper operation of the stormwater management system as designed, and in accordance with applicable regulations as outlined in local ordinances and the NJ Stormwater Management Rules, NJAC 7:8, requires regular inspection and maintenance. The following protocol should be utilized:

a. Inspection Procedures

All facilities and components should be inspected by adequately trained and knowledgeable personnel. Inspections should be conducted at least annually for detention basins and collections systems, and at least four times annually for infiltration and recharge system components. Inspections should be conducted on all components, immediately following rainfall events exceeding one inch cumulative rainfall. Structural components should be inspected for visible signs of cracking, subsidence, spalling, erosion, settlement or other signs of deterioration.

b. Inspection Report

For each inspection conducted, the Inspection Report Form shall be completed. Multiple forms shall be utilized if required. All requisite information shall be completed. The condition of all items should be recorded using the following descriptive codes:

ND= no deficiencies noted

M= monitor for potential future issues

R= Routine maintenance required

IR= Immediate repair necessary

c. Inspection Summary

Record the overall condition and any additional comments. Note the specifics of any repairs of signs of deterioration, clogging, etc. Record any item of relevance not included in the checklist items above.

d. Overall Facility Rating

Record the overall condition of the system, using the following system:

E= excellent condition, no corrective work required

VG= very good condition with no signs of deterioration, routine maintenance may be required

G= good condition, still operating appropriately, some routine maintenance may be required in the next 30 days, or before the next significant storm event

F= fair, several routine maintenance items required immediately, danger of failure is possible if maintenance or corrective work is not performed immediately

U=unacceptable condition, immediate corrective work required to restore facilities so they can function as intended. Failure of components has occurred or may be imminent.

## VIII. MAINTAINING STORMWATER MANAGEMENT FACILITIES

All components of the Stormwater Management System must be properly maintained so they function as intended to provide water quality, water quantity and peak rate of discharge controls. Routine maintenance can serve to avoid more costly rehabilitative items, and extend the useful life of all facility components. The Maintenance Activity Form shall be utilized to document maintenance work which has been performed. Maintenance can be divided into three broad categories, as follows:

a. Routine Maintenance Work

This category shall consist of work to be performed on a regular basis to keep all system

components functioning as intended. The majority of this work consists of regular grass mowing, weed removal, trash and debris removal and leaf removal.

b. Repair Work

This category of work items relates to isolated or small-scale maintenance needed to address functional problems. This work can generally be completed by an individual or small crew using hand tools.

c. Rehabilitation Work

This category is related to larger-scale items that greatly affect overall system operation. This work may require review and preparation of plans by a licensed engineer, and may require regulatory reviews and/or approvals. This work may require completion of surveys, and may also necessitate the services of a qualified contractor. Should this category of work be required, the design engineer should be contacted:

Professional Design Services, LLC
1245 Airport Road, Unit 1
Lakewood, NJ 08701
(732) 363-0060

## IX. PREVENTATIVE MEASURES TO REDUCE MAINTENANCE COSTS

The constructed stormwater management system relies on a multiple step process to remove TSS from the collected run-off and to control the volume and peak rate of discharge. Debris and pollutants that enter the system are the most common causes of reduced efficiency or failure. Conformance to the maintenance program will reduce operating and future repair costs, and is beneficial to the land or facility owner, and in the interests of public safety. Some preventative measures that should be completed include the following:

- Educate the site manager about the function of the system, and how their actions can affect water quality
- Keep properties, streets, gutters and parking lots free of trash, debris, grass clippings, etc.
- Do not dispose of anything into the stormwater management system or inlets. It is only intended to handle runoff water

- Plan lawn care to minimize the use of lawn chemicals
- Clean out upstream components of the system
- Re-vegetate disturbed or bare areas on site to maintain vegetative stabilization
- Do not store materials outdoors, such as mulch and landscaping supplies, unless properly protected from run-off

## X. CORRECTIVE RESPONSE TO EMERGENCY CONDITIONS

The parties responsible for maintenance of the system should be well-prepared to respond to emergencies that may arise. The parties should have trained personnel on staff or available for immediate response, and should have access to necessary equipment to respond to potential emergency conditions.

Emergency Response

If an emergency condition develops related to the stormwater management system that could jeopardize persons or property, immediate actions should be taken. In the case of any emergency, dial 911 immediately. Some potential emergency conditions requiring immediate attention include the following:

- Vehicular or Pedestrian Entry- If this is observed, call 911 immediately. Be prepared to give the exact location and description of the event. Flow of water in a detention basin can be concentrated and very strong, especially in the vicinity of an outlet or overflow structure. Only trained personnel should enter a full detention basin in an attempt to perform a rescue operation.
- Hazardous Waste Spill- Dial 911 and advise the dispatcher of the nature and location of the event. Follow their directions. Maintain adequate distance from the site of the spill. Any hazardous spill entering the facility can potentially flow downstream and affect other properties as well.
- Flooding- If a detention basin appears to be approaching a condition of flooding, breach or overtopping, dial 911. Do not attempt to unclog the blockage, as it is dangerous and should only be performed by trained personnel. Follow directions of the emergency responders.

Emergency Prevention

Commitment to proper and effective maintenance is the best defense to prevent the development of emergency conditions; however, they can still develop given the

combination of various circumstances. The following brief list can help lessen the likelihood of emergency conditions developing:

- Inspect and repair fencing and keep gates locked so small children do not enter the facility under any circumstance
- Keep outlet structure and spillways free and clear of debris
- Keep bottom of the basin free of debris and matter that will retard exfiltration
- Keep inlets and pipe network free and clear, repair any areas exhibiting signs of failure
- Tree pruning. Keep tree limbs from overhanging the facility. Prune dead branches of trees on site so they do not impact the system in the event of breakage during a storm event.

# APPENDICES

**Appendix A- Annual Stormwater Management System Maintenance Cost Estimate**

**Appendix B- Stormwater Management System Inspection Report Form**

**Appendix C- Stormwater Management System Maintenance Activity Form**

**Appendix E- Stormwater Maintenance Plan**

**Appendix F – Site Plans**

**Stormwater Management System**
**Annual Maintenance Cost Estimate**

| Item | Units | Frequency | Unit Price | Annual Cost |
|---|---|---|---|---|
| 1. Inspect basins, remove and dispose of silt and debris | 1 | 2 | $500 | $3,000 |
| 2. Inspect bottom soil layer after every storm event exceeding one inch of rainfall | 1 | 3 | $750 | $4,500 |
| 3. Inspect and maintain fence & basin access drive | 1 | 2 | $150 | $900 |
| 4. Deep till and re-grade soil bottom | 1 | 0.20 | $2500 | $500 |
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| | | | | |
| | | | | |
| TOTAL ESTIMATED ANNUAL COST | | | | $8,900 |
| | | | | |

# STORMWATER MANAGEMENT SYSTEM
# INSPECTION REPORT FORM

Date: _____

Development Name: _____

Address: _____ Inspector: _____

Weather: _____

Date of Last Rainfall: _____ Amount: _____ Inches

**Infiltration Basin #:** _____

**Reason for Inspection:** Routine Complaint After Significant Rainfall Event
(Circle One)

**INSPECTION SCORING:** For each facility inspection item, insert one of the following scores:
ND = No deficiencies identified R = Routine maintenance required
M = Monitor (potential for future problem) IR = Immediate repair necessary
N/A = Not applicable

**FEATURES**

**1.) Catch Basins**
____ Sediment/Debris Accumulation
____ Condition of Casting
____ Condition of Concrete Box
____ Condition of Pipe Penetrations
____ Other (Explain Below)

____
____
____
____

**2.) Storm Sewers**
____ Sediment/Debris Accumulation
____ Cracking of Pipe
____ Deformation
____ Asphalt Sediment Above
____ Other (Explain Below)

**3.) Basin Control Structure**
____ Sediment/Debris Accumulation
____ Condition of Casting
____ Condition of Concrete Box
____ Condition of Pipe Penetrations
____ Other (Explain Below)

**4.) Basin Inspection Ports**
____ Sediment/Debris Accumulation
____ Condition Port
____ Other (Explain Below)

____
____
____
____
____

Inspection Summary/Additional Comments:

**OVERALL FACILITY RATING (Circle One)**
E = Excellent F = Fair
VG = Very Good U = Unacceptable
G = Good

This inspection form shall be kept indefinitely and made available to the Twp of Neptune upon request.

# STORMWATER MANAGEMENT SYSTEM
# MAINTENANCE ACTIVITY FORM

Date: _____

Development Name: _____

Address: _____ Inspector: _____

Weather: _____

Date of Last Rainfall: _____ Amount: _____ Inches

**Infiltration Basin #:** _____

**Maintenance Category:** Routine Restoration Rehabilitation
(Circle All That Apply)

## MAINTENANCE ACTIVITIES PERFORMED

## ROUTINE WORK

____ Trash/Debris Removal
____ Accumulated Sediment Removal
____ Accumulated Sediment Jet-Vac
____
____

## Describe Restoration and Rehabilitation Work

Estimated Manhours: _____
Equipment/Material Used: _____

Comments: _____

This Maintenance Activity Form shall be kept indefinitely and made available to the Twp. Of Neptune upon request.