

OPERATIONS AND MAINTENACE MANUAL

FOR


**SYNNERGY, LLC
SWEET BRIAR AVENUE
LOT 27, BLOCK 1581**

IN

**TOWNSHIP OF HAMILTON
MERCER COUNTY, NEW JERSEY**

BY

**TRENTON ENGINEERING CO., INC.
2193 SPRUCE STREET
EWING, NEW JERSEY
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JOSEPH MESTER, PE, PLS #19462
PROJECT ENGINEER

Maintenance of Stormwater Management Measures

Research and experience have demonstrated that regular and thorough maintenance is necessary for stormwater management measures to perform effectively and reliably. They have also demonstrated that failure to perform such maintenance can lead to diminished performance, deterioration, and failure, in addition to a range of health and safety problems including mosquito breeding, vermin, and the potential for drowning. The potential for such problems to develop is accentuated by many of the very features and characteristics that allow stormwater management measures to do their job, including standing or slowing moving water, dense vegetation, forebays, trash racks, dams, and the need to continually function in all types of weather. As implied by their name, stormwater management measures are also expected to become the repositories for sediment, nutrients, trash, debris, and other pollutants targeted by the NJDEP Stormwater Management Rules. For this reason, stormwater management measures require regular inspection and cleaning, sediment and debris removal, and periodic replacement.

In recognition of these needs and potential problems, the NJDEP Stormwater Management Rules require that a maintenance plan be developed for all stormwater management measures incorporated into the design of a major development. This maintenance plan must contain specific preventative and corrective maintenance tasks, schedules, cost estimates, and the name, address, and telephone number of the person or persons responsible for the measures' maintenance. In accordance with the Rules, Chapter 8 of "The New Jersey Stormwater Best Management Practices Manual" has been developed to provide guidelines for the development of such maintenance plans.

Maintenance Plan Contents

According to the NJDEP Stormwater Management Rules, all maintenance plans for stormwater management measures must include the following:

1. The name, address, and telephone number of the person or persons responsible for the preventative and corrective maintenance of the stormwater management measure.

The responsible person is Steven Durst, 23 Oakwood Drive, Medford, N.J. 08055
Phone = (215) 669-7020, Fax = (856)506-8673, E-mail = stevendurst@mail.com.

2. Specific preventative and corrective maintenance tasks such as removal of sediment, trash, and debris; mowing, pruning, and restoration of vegetation; restoration of eroded areas; elimination of mosquito breeding habitats; control of aquatic vegetation; and repair or replacement of damaged or deteriorated components.

The entire project consists of two 2) grass covered surfaces beneath the proposed solar panel rows surrounded by a twelve (12) foot wide stone maintenance drive. Normal mowing and maintenance of the grass surface will be performed on a regular two to three week schedule set up with a landscape maintenance professional. During these visits, trash, debris and sediment or snow removal will be performed on an as needed basis. Since the project is surrounded by the remaining wooded areas, necessary leaf removal shall be performed at least once a year during the fall season. Eroded areas or repair of the stone drives, concrete headwalls or outlet pipes will be addressed as soon as possible, upon discovery. Maintenance of the solar panels themselves will be by Synnergy, LLC under their company guidelines and specifications. After seventy-two (72) hours, any standing water, within any of the four (4) detention basins will be immediately pumped out and mosquito control measures implemented.

3. A schedule of regular inspections and tasks.
A yearly inspection of the headwalls emergency spillways and outlet pipes shall be performed.

4. Cost estimates of maintenance tasks, including sediment, trash, and debris removal.
The applicant shall obtain a yearly cost estimate for the normal maintenance on the site from a landscape professional. An estimate of the cost is \$10,000.00 per year..

5. Detailed logs of all preventative and corrective maintenance performed at the stormwater management measure, including all maintenance-related work orders.
The owner shall keep a log of any preventative or corrective maintenance performed at the site including costs and duration of maintenance procedures.

In addition, as described in the NJDEP Stormwater Management Facility Maintenance Manual, the following items should also be included in the maintenance plan:

1. Maintenance equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. Sources of specialized, proprietary, and nonstandard equipment, tools, and supplies should also be provided.

There should be no specialized equipment necessary to make repairs to any of the structures beyond a backhoe, dump trucks and normal concrete construction equipment.

2. Recommended corrective responses to various emergency conditions that may be encountered at the stormwater management measure.

If there is an emergency, the normal calling 911 measures should be employed to get fire or rescue response.

3. Maintenance, repair, and replacement instructions for specialized, proprietary, and

nonstandard measure components, including manufacturers' product instructions and user manuals.

There should be no specialized measures necessary to maintain the stormwater aspect of the site. Synnergy, LLC shall maintain their own equipment. The contact information in item (1) above shall be used.

4. Procedures and equipment required to protect the safety of inspection and Maintenance personnel.

Synnergy, LLC shall be present whenever inspections or maintenance is required. The contact information in item (1) above shall be used.

5. Approved disposal and recycling sites and procedures for sediment, trash, debris, and other material removed from the measure during maintenance operations.

The normal township sites for disposal of trash and debris shall be used. If unavailable, Synnergy, LLC shall provide locations that can be used.

Maintenance Plan Considerations

In addition to the plan contents described above, the enclosed maintenance plan shall address the following important aspects of stormwater management measure maintenance.

Access

All stormwater management measures' components are readily accessible for inspection and maintenance. There are two (2) access driveways leading from Sweetbriar Avenue into each portion of the site. The two twelve (12) foot wide stone maintenance drives provide easy access to any portion of the site needing maintenance. Within the site, there are ten (10) foot wide maintenance lanes between each double row of solar panels.

Therefore, it is easy to maintain the grass areas and remove any debris, trash or sediment accumulation. The ten (10) foot wide outlet pipe easements are to be kept clear from new growth of trees, shrubs, and underbrush as necessary to maintain access to the stormwater management outlet pipes and rip rap. The limits of inspection, maintenance easements and rights-of-ways are specified on the stormwater management maintenance plans and any necessary notes are included. The maximum eight and one third (8.33) percent slope within the detention basins will allow easy access for all maintenance and inspection and control of mosquito breeding.

Training of Maintenance Personnel

Maintenance training begins with a basic description of the purpose and function of the overall stormwater management measure and its major components. In addition to the grass-bottomed detention basins, the only components of stormwater measure are the emergency spillways, headwalls and six (6) inch diameter outlet pipes. There is no special training necessary to maintain these components.

Aesthetics

The impacts of the aesthetics of the stormwater management measures on the surrounding community should also be included in the stormwater management measure. The entire project is surrounded by the trees and brush formed over many years of growth. The entire project is hardly discernable from Sweetbriar Avenue or the surrounding community.

Required Maintenance Plan Procedures

The applicant/owner of this project agrees to comply with all of the requirements listed below.

Once the maintenance plan is completed, the NJDEP Stormwater Management Rules

require that the following procedures be followed:

1. Copies of the maintenance plan must be provided to the owner and operator of the stormwater management measure. Copies must also be submitted to all reviewing agencies as part of each agency's approval process. In addition, a copy should be provided to the local mosquito control or extermination commission upon request.
2. The title and date of the maintenance plan and the name, address, and telephone number of the person with stormwater management measure maintenance responsibility as specified in the plan must be recorded on the deed of the property on which the measure is located. Any change in this information due, for example to a change in property ownership, must also be recorded on the deed.
3. The person with maintenance responsibility must evaluate the maintenance plan for effectiveness at least annually and revise as necessary.
4. A detailed, written log of all preventative and corrective maintenance performed at the stormwater management measure must be kept, including a record of all inspections and copies of maintenance-related work orders.
5. The person with maintenance responsibility must retain and, upon request, make available the maintenance plan and associated logs and other records for review by a public entity with administrative, health, environmental, or safety authority over the site.

Retrofit of Existing Stormwater Management Measures

The applicant/owner of this project agrees to comply with any circumstance or order which justifies the future retrofit of this stormwater management facility and all of the requirements listed below.

Retrofitting can be defined as expanding, modifying, or otherwise upgrading existing stormwater management measures. As such, retrofitting stormwater management measures can reduce some of the adverse groundwater recharge and stormwater quantity and quality impacts caused by existing land developments. In many instances, existing stormwater management measures can be dramatically improved, and downstream water bodies protected, through effective retrofitting.

Smaller storm events that are typically responsible for the majority of stormwater quality and streambank erosion problems may not have been addressed. Therefore, retrofitting such facilities to also control these smaller storm events can begin to address these problems. Another important benefit of retrofitting stormwater management facilities is the opportunity to correct site nuisances, maintenance problems, and aesthetic concerns. Retrofitting also allows a community to keep pace with new stormwater management regulations or objectives. It can help a community address a particular stormwater quantity or quality problem that has developed as a result of deficiencies in its existing or past stormwater regulations or a problem that has been identified through a regional plan or TMDL. Addressing such problems through the construction of new stormwater management measures at future land developments may be impractical or even impossible, leaving retrofitting as the only effective technique. In addition to such basic considerations as need and cost, three important factors must be considered when evaluating retrofit possibilities: health and safety, effectiveness, and maintenance. All three should be thoroughly reviewed before undertaking a stormwater management measure retrofit to help justify the cost and effort and ensure the retrofitted measure's long-term success.

Health and Safety

A retrofit must not increase health and safety risks in any way. For example, the storage volume in an existing detention basin presently used for stormwater quantity control must not be reduced to provide new stormwater quality enhancement without ensuring that the lost quantity storage will not adversely increase peak basin outflows and cause downstream flooding or erosion. Similarly, an existing, well-functioning detention basin must not be converted to a constructed stormwater wetland for enhanced stormwater quality control if the potential for mosquito breeding will increase significantly without adequate additional control measures.

Effectiveness

In many retrofit situations, it may not be possible to upgrade the stormwater management measure to meet all current groundwater recharge and stormwater quality and quantity standards. This means that relative performance improvements for a range of retrofits must be evaluated to determine which one represents the optimum combination of effectiveness, viability, and cost. As a result, the final retrofit selected for an existing stormwater measure will have to be based on its relative rather than absolute effectiveness. In such relative determinations, both the costs and benefits of the evaluated retrofits become more influential factors than when an absolute performance standard is used.

Maintenance

It should be expected that if a retrofit will increase a stormwater management measure's pollutant removal capability, it will also increase the rate and total volume of sediment, trash, debris, and other stormwater pollution that will accumulate in the measure. In

addition, the chemical or biological composition of this sediment may be of significantly lower quality, and potentially either hazardous or toxic,