



MAP 16F, PARCEL 3430
35 FOREST RIDGE RD
CONCORD, MA

***STORMWATER
MANAGEMENT REPORT***
OPERATION AND MAINTENANCE



July 16, 2020

PREPARED FOR:

MINUTEMAN ARC FOR HUMAN SERVICES INC
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MBC JOB NUMBER: 2796

NO.	DATE	REVISION	BY
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STORMWATER MANAGEMENT REPORT – OPERATION & MAINTENANCE
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OPERATION AND MAINTENANCE

INTRODUCTION

This section addresses the issue of operation and maintenance for the proposed Stormwater Management System. If this section is separated from the remainder of this Stormwater Management Report (SMR), the SMR is hereby incorporated by reference, a copy of which will be in the records of the Concord Engineering Division as well as other locations. The title of the final SMR is:

“MINUTE MAN ARC”
STORMWATER MANAGEMENT REPORT
May 8, 2020
Prepared For:
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The maintenance standards presented herein are based on Mass DEP “The Stormwater Handbook”, as previously referenced, *the Federal and State Clean Water Acts, the Wetlands Protection Act, the Coastal Zone Act, a portion of the National Pollutant Discharge Elimination System Program and the Concord Site Plan Regulations* with various reports and guidance associated therewith.

These maintenance and operations procedures are intended as general guidelines, however additional procedures shall be developed if necessary, as the systems are completed and operated over a period of time. As with all stormwater facilities, the conditions change or the management of them can be simplified as the operation personnel become more familiar with them. The most effective maintenance and operations can be customized to the specific facility as the system develops and situations merit.

DESIGN PARAMETERS OF EROSION CONTROL AND MANAGEMENT

The US EPA has mandated that all land disturbance of greater than 1 acre at any one time seek a NPDES permit through the preparation of a Storm Water Pollution Protection Plan (SWPPP) to control the erosion potential and transfer of erodible soils off properties. The goal of a SWPPP is to provide suitable quantity and quality control measures for runoff, during and after construction, from a developed property, meeting the standards of the EPA and the Massachusetts Stormwater Management Policy. Ideally, the plan should be simplistic in design, cost effective to construct, and

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reasonable to maintain. The design should blend into the natural features and site resources and take full advantage of existing environmental mechanisms to accomplish mitigation.

Generally, storm water management systems are considered an element of the framework of an overall water resource system for a particular watershed. The designer first evaluates the impacts from a regional perspective, then narrows the focus to the specific site. As the designer determines the components of the specific site drainage system, various related factors, both regionally and locally are considered, evaluated, incorporated, and detailed into the engineering design.

Stormwater management combines a distinct range of interrelated variables to compose a unified program of action. These are divided into five categories:

- Design Issues: storm frequencies and intensities, soils, vegetation, groundwater, peak flows, quality treatment, life/safety
- Regional Issues: climate, watershed/ sub-basin relationship, environmental sensitivity to receiving waters
- Local Issues: adjacent land use, material specifications and availability, access and construction feasibility
- Costs: project costs, storm water management costs, cost/benefit analysis, land availability and value
- Maintenance: owner/manager of system, responsible entity, expertise, equipment handler, inspection, protection, monitoring

Using these parameters as a guide, the designer evaluates the site conditions, developing a drainage concept and performs hydrologic and design calculations to prepare the basis for the plan. The design concept is supported by the engineering hydraulic and routing calculations, the plan details and the material specifications of the drainage system components. A key component of a good design is an understanding of the requirements of maintenance, especially since many of these systems will be maintained by the owner.

OPERATION AND MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

Proper maintenance is essential to ensure that the performance of the system meets the design expectation. A system that is not maintained may fail and could lead to financial loss, damage to surrounding infrastructure or environmentally sensitive areas and increasing the liability of the property owners.

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Personnel and Education

Personnel make the difference between a Stormwater Management System that performs as designed throughout its lifetime or one that fails due to lack of attention. *Education* provides the personnel with the skills needed to effectively maintain a Stormwater Management System. *Record Keeping* allows the personnel to track the maintenance and the System’s performance so as to determine when major maintenance tasks are required.

Maintenance of the structural components of the stormwater management facility will be the responsibility of the master property owner. Maintenance should be performed as outlined below in items 1-10. In addition to the town, the owner should have a copy of this report with a copy of the grading design plan. Full comprehension of these documents will educate the owner and allow them to properly maintain the stormwater management system.

The owner should be aware of the Stormwater Management Facilities’ intended purpose of removing contaminants from the stormwater runoff flow from the site. The result is the collection, removal and storage of the contaminants within the facility components. These potentially consist of trash/debris, oils, sediment and soluble/insoluble materials. In most situations, these can be handled, stored and disposed of with minimal safety requirements, in that the health hazards are non-existent or minimal with the concentrations involved. However, the Owner shall be aware of the risk and/or the possibility of potential dangers. An example would be in the system was inundated with an excessive concentration due to an accidental spill.

Record Keeping

Record Keeping – It is recommended that a record log be kept of measured sediment levels at regular (annual) maintenance and after each major storm event. Sediment accumulation should be measured at the retention basin and logged in the record. Sediment should be removed annually, or when the sediment buildup has met the threshold outlined below. These activities should be logged as well.

Forms for recording the inspections and maintenance are included at the end of this section. The SWPPP will identify the party(ies) responsible for operations and maintenance, both temporarily and permanently.

Construction Erosion Control Process

Note: The “Operator” is the responsible party as defined by the US EPA in the NPDES regulations and is responsible for all site construction. The Operator may be the contractor or another party assigned during as part of the SWPPP.

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Construction / Implementation

Stormwater management during construction should be considered as part of the construction operation of the whole site. A successful stormwater management system uses the various erosion control processes and components to work in tandem and in parallel to achieve the results of minimizing soil transport and protecting off-site areas from sediment conveyance. The Operator shall recognize and develop erosion control strategies to minimize soil erosion in the first instance, then to control its transport, and finally to capture any silt or sediment prior to discharge off site. The Operator shall consider all of the following as part of the site excavation and erosion control strategy.

Minimize Disturbed Soil:

The contractor shall limit the disturbed areas to only those portions necessary for construction to proceed. The disturbance shall be limited to those times of year that will allow successful stabilization. Creation of work zones and phases are encouraged.

Source Controls: Stabilize Exposed Soil:

The contractor shall develop a construction plan for all areas that are exposed to soil erosion. These strategies could include maintaining tight soil compaction especially in proposed paved or impervious areas. Keeping all slightly sloped exposed gravel or subgrade areas compacted, especially prior to anticipated rain events, will serve to minimize the rilling and scouring of the soil and thus minimize soil transport. Other areas can be temporary loamed and seeded, especially areas intended to be grassed in the final plan. Common sense solutions to source control often yields the best erosion controls.

Prevent Runoff from Offsite Areas from Flowing Across Disturbed Areas

The contractor shall divert flow from offsite drainage areas away from disturbed areas by utilizing earth dikes, interceptor swales or other acceptable methods to ensure erosion of disturbed areas is minimized.

Slow Down Runoff Travelling Across the Site

The contractor shall utilize check dams, gradient terraces, sod, geotextiles or other acceptable methods where necessary in areas of steep slopes to ensure that erosion of unstable areas are minimized and to maximize soil infiltration.

Remove Sediment from Onsite Runoff Before it Leaves the Site

The contractor shall utilize temporary sediment basins for large (greater than ten acres) areas of disturbed soil to allow settling time for suspended solids. The location of temporary basins are

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shown on the construction plan set where necessary. All forms of erosion control are shown on the design plans and are to be located by survey to ensure appropriate placement of controls.

Meet or Exceed Local / State Requirements for Erosion Control.

The Contractor shall meet or exceed all additional Local and State requirements for erosion control and will ensure that all performance standards are met. Any changes required by the permitting authority shall be made within 7 days of the notification or an individual application should be submitted. The permittee shall update the plan as necessary to reflect any changes onsite, which may affect the potential for discharges of pollutants from the site.

Inspection and Maintenance Plan

1. Contractor shall use the blank inspection forms found within this Report or use alternative equivalent written inspection reports.
2. Inspections shall be logged on forms and reports and shall be completed by the Operator every 14 days and within 24 hours after a rainfall event over 0.25”.
3. Proper record keeping for inspection and maintenance should be kept within the Storm Water Pollution Plan box installed on site. Blank inspection forms are included herein.
4. The inspector of pollution prevention measures should fully understand these Operation and Maintenance Requirements, the Storm-Water Pollution Prevention Plan, and NPDES permit with emphasis on erosion controls, spill prevention and cleanup, and inspection and maintenance.
5. The Operator shall instruct the Contractor to remove all sediment or debris whenever the volume is equal to 50% of the design capacity. This is imperative. All maintenance activity including silt removal, cutting of vegetation (mechanically or manually), and all other maintenance activities during the construction period shall be included in the Maintenance Logs / Reports.
6. The Operator is responsible to ensure the reliability of all measures of maintenance and erosion control measures including silt fence, mitigation swales, sedimentation pond, stabilized construction entrance and loam and seeding.
7. Maintenance of construction activities shall be performed in accordance with this Operation and Maintenance Plan and the Storm Water Pollution Prevention Plan. In general, maintenance should be performed on the specified intervals, or whenever the controls require maintenance for proper operation. If any conflicts exist, the Storm Water Pollution Prevention Plan shall be used.

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Construction Operation and Maintenance schedule

The Operation and Maintenance (O&M) schedule during the construction phase is the responsibility of the **developer and/or site contractor**. The outline below shall be adhered to as closely as possible to ensure the proper construction and function of the drainage system.

1. Prior to construction, haybales and/or silt fence shall be installed per the approved plans. The erosion control barrier shall be inspected prior to a large storm event to ensure that it will function as required and following a storm to inspect for damage to the erosion control. Any damage or improper installation that is noticed prior to or following a storm event shall be promptly replaced or repaired in a satisfactory manner so as to prevent sediment from bypassing the silt fence barrier.
2. A stone construction entrance shall be installed at the entrance to the development and shall be 50' long and 24' wide. The entrance shall be cleared and once cleared, filter fabric shall be placed over the area which is to be overtopped by crushed stone to a depth of 6". The stone size shall be 1 ½" with smaller stones only used to fill the leftover voids. Should the stone become clogged with sediment, it shall be replaced. The construction entrance shall be constructed with a temporary berm at the entrance to prevent flow of runoff onto the existing roadway.
3. The limit of clearing shown on the approved plan shall be adhered to as closely as possible. It shall be the contractor's responsibility to determine the level of safety of standing trees.
4. In this construction operation and maintenance schedule, an area is considered stable if base course gravels have been installed in areas to be paved, a minimum of 85% vegetated growth has been established, a minimum of three inches of non-erosive material such as stone or rip-rap has been installed, or erosion control blankets have been properly installed.
5. All areas shall be stabilized within 45 days of initial disturbance.
6. Temporary and permanent seeding specifications shall be obtained by the contractor by a qualified person/company and shall consult with the town's wetland expert prior to planting to ensure no adverse effects to the site.
7. In conjunction with construction, all drainage structures, including swales and infiltration basins, shall be constructed and stabilized as soon as possible and prior to directing runoff to them. Methods of stabilization include, but are not limited to, hydro seed, loam and seed, straw mulch, erosion control blanket, etc.
8. Silt sacks shall be installed in each catch basin and shall be inspected once per week and after every storm event of 0.5" or greater. Devices with sediment buildup shall have the sediment

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disposed of in accordance with all local, state, and federal regulations and have the silt sack cleaned or replaced.

9. All paved areas shall be stabilized within 72 hours of achieving finished grade.
10. All areas of cuts and fills shall be seeded/loamed within 72 hours of achieving finished grade.
11. The smallest practical area shall be disturbed during construction, but in no case shall exceed 3 acres at any one time before disturbed areas are stabilized.
12. The drainage system shall be inspected weekly or after a storm event of 0.5” or greater over a 24-hour period during construction. Any sediment buildup in the structures shall be promptly removed using a vacuum removal process and all debris removed in accordance with all local, state, and federal regulations.
13. The drainage system shall be inspected weekly and after all rainfall events greater than 0.5” over a 24-hour period. Any erosion within the basin or swales shall be filled and re-stabilized in a manner to prevent future erosion. In addition, the outer portions of the basin shall be inspected in a similar manner.
14. **Standard Winter Notes:**
 - a) All proposed vegetated areas that do not exhibit a minimum of 85% vegetative growth by November 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
 - b) All ditches or swales which do not exhibit a minimum of 85% vegetative growth by November 15, or which are disturbed after November 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
 - c) After November 15, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of three inches of crushed gravel.
15. This schedule must be adhered to by the owner and/or contractor until construction is completed

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Post-Development Operation and Maintenance schedule

Upon completion of construction, this Operation and Maintenance schedule shall be adhered to by the owner and their agents, advisors, consultants, and contractors, or any future agent with associated responsibility. The outline below shall be adhered to as closely as possible to ensure the proper function of the drainage system.

1. The paved areas shall be swept annually, at a minimum. Sweeping shall be done after the final snow melt when sand or de-icer can be easily swept. Any collected debris shall be removed in accordance with all local, state, and federal regulations.
2. The catch basins shall be inspected at least twice per year, including one time after the final snowmelt of the season, and any obstructions shall be removed and disposed of in accordance with all local, state, and federal regulations.
3. No erosion control measures shall be removed until all contributing upslope areas are stabilized.
4. See section 9.3.7 for individual BMP procedures.

9.3.6 Temporary Erosion Controls

The following erosion controls, as locations shown on the plans or otherwise installed, shall be used to limit soil erosion and transport during all construction phases:

1. **Source Control:** The best and most effective method of retaining soil and prohibiting transport is to use methods and techniques to prohibit the lifting, suspending, or transport of soil. These techniques include compaction, mixing, adding soil amendments including stabilizers, and surface treatment such as mulch, straw, jute matting, mesh, geotextiles fabrics, covers, and others
2. **Silt Fence Barrier:** A silt fence is a temporary barrier of geotextile fabric (filter cloth) attached to supporting posts and entrenched into the soil that is used to intercept sediment laden runoff from small areas of disturbed soil. The expected life of a silt fence is generally limited to 6 months.
3. **Straw Bale Barrier:** A Straw Bale barrier is a temporary barrier constructed of carefully stacked straw bales secured into the ground by embedding by digging a shallow 4” trough for the straw bale and securing them into the ground with wooden or steel stakes. Behind the straw bales, a silt fence is installed as described in 1 above. The expected life of a straw bale / silt fence is generally limited to 6 months.

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4. Straw Bale/Silt Fence Barrier: Combination of 2 and 3 above. The straw bale is positioned on the high side.
5. Temporary Swale: Temporary swales are constructed channels with temporary vegetation for stabilization that intercept sediment-laden runoff and direct the flow to a secondary erosion control or into a natural drainage system. Swales can improve water quality by filtering and infiltrating the runoff. Installing stone check dams are quite easy to install and allows for sedimentation of the solids and easier cleaning.
6. Construction Site Entrance – Stone pads are used to limit the transport of sediment from the times on construction and other vehicles. These pads should be maintained regularly. The construction site entrance should be removed once pavement is installed.
7. Loam and Seed: Loam and seed establishes grasses on highly erodible soils or critically eroding areas. Loam and seed stabilizes the underlying soil, reduces damages from sediment, maintains or improves water quality and reduces stormwater runoff. On steeper slopes, jute matting, organic mesh, or other devices are used to retain the soil until a full lawn or slope is fully stabilized with mature grow in. Fertilizer and seed type and application rates are on the final drawings.

9.3.7 Permanent Best Management Practices

Operation and maintenance of the catch basins, infiltration systems, and associated drainage structures should occur as follows:

1. Catch Basins – Deep Sump– Inspect catch basins at least four times per year and at the end of the foliage and snow- removal seasons. Sediments must also be removed once per year, preferably in early May, or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. If handling runoff from land uses with higher potential pollutant loads or discharging runoff near or to a critical area, more frequent cleaning may be necessary.
2. Inlets – Pipe inlets and spillway structures should be inspected annually and after every major storm. Accumulated debris and sediment should be removed. If pipes are coated, the coating should be checked and repaired as necessary.
3. Outlets – Pipe outlets should be inspected annually and after every major storm. The condition of the pipes should then be noted and repairs made as necessary. If erosion is taking place, then measures should be taken to stabilize and protect the affected area of the outlet.
4. Loam and Seed: Loam and seed establishes grasses on highly erodible soils or critically eroding areas. Loam and seed stabilizes the underlying soil, reduces damages from

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sediment, maintains or improves water quality and reduces stormwater runoff. On steeper slopes, jute matting, organic mesh, or other devices are used to retain the soil until a full lawn or slope is fully stabilized with mature grow in. Fertilizer and seed type and application rates are on the final drawings.

5. Paved Areas: The paved areas shall be swept annually, at a minimum. Sweeping shall be done after the final snow melt when sand or de-icer can be easily swept. Any collected debris shall be removed in accordance with all local, state, and federal regulations.
6. Infiltration System: The system should be visually inspected four times annually. The overflow outlets should be inspected for signs of clogging and/or debris at least once per year. Any debris shall be disposed of in accordance with all local, state, and federal regulations. At least twice per year, inspection shall include checking the leaching catch basin for water retention and other signs of partial or full failure. If this condition is noticed, an analysis with a written report and photographs should immediately be performed and any repairs shall be made as soon as possible. Should sediment accumulations reach an average depth of greater than 12 inches, the sediment should be removed by flushing and vacuuming and properly disposed of.

Other Site Controls

1. Good house keeping - The contractor is necessary for maintaining accurate and complete records of the construction activities on site. The contractor must also ensure that chemicals, pesticides, and fertilizers are properly stored. Regular disposal of garbage, rubbish or sanitary waste disposal, and prompt cleanup of spills is necessary to minimize the potential for pollution.
2. Waste disposal, sanitary septic disposal, and materials management - The proper management should include storage of hazardous materials such as paints, oils, etc. These materials should be stored in the contractor's vehicle or placed on an impervious floor or surface, i.e. (Basement floor or concrete slab.)
3. Spills - All personnel involved with the construction activities have knowledge of whom to contact in the event of a spill that is a source of storm water contamination. The contractor shall ensure that appropriate measures are taken to prevent spills and respond in the event of a spill. In the event of a spill the contractor should take measures to reduce storm water contact stopping the source of the spill, contain the spill, and absorb the material as quickly as possible.
4. Sanitary portable toilets shall be utilized to avoid direct discharge.
5. Vehicle wash down – in appropriate locations over 100 feet from wetlands draining to a sediment basin

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9.3.8 Operation and Maintenance Generic Forms

See the following pages for the following forms:

- Best Management Practices – Summary of Inspections
- Grading and Stabilization Activities Log

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Best Management Practices
 Summary of Inspections

Project Site: _____
 Location: _____
 Phase or Limits: _____

Inspection Number	Date	Inspector	Item Inspected (see list @ right)	Condition/Remarks	Action to be Taken	Follow up Comments	List of Inspections
							A. Hay Bale/Silt Fence B. Sediment Ponds C. Site Cleaning, Grub D. Storm Drain Pipe & Conveyance E. BMP - Indicate type (mandatory) F. Stone Condition G. Velocity Dissipaters H. Structural Components I. Permanent Stabilization
Submittal Log							
	Date	Agency					

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Stormwater Pollution Prevention Plan (SWPPP)

Grading and Stabilization Activities Log

Date Grading Activity Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures Initiated

Use Additional Sheets if Necessary
 EPA SWPPP Template, Version 1.0