

Stormwater Operations and Maintenance Control Plan

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Warehouse Distribution Facility 27 Cross Street Plainville, MA

Prepared for



200 Barr Harbor Drive, Suite 250
Conshohocken, PA 19428

Prepared By

BEALS · ASSOCIATES INC.

2 PARK PLAZA, SUITE 200, BOSTON, MA 02116
PHONE: 617-242-1120



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A.1 Introduction

Development projects such as the proposed distribution warehouse on Cross Street are typically constructed with complex stormwater management systems to maintain compliance with a variety of regulations and standards. These systems are often constructed as multi-faceted systems that feature a combination of treatment and conveyance devices, often resulting in a variety of configurations within a single development project. The introduction of new impervious surfaces, landscaped areas (both soft scape and hard scape) and new buildings can impact the receiving waterbodies in many ways. Control and treatment of the resulting runoff from these surfaces is of paramount importance to improving and maintaining the quality of the Commonwealth's waterbodies.

Source control and the installation of wet ponds, infiltration galleries, green infrastructure and water quality units, often combined with pretreatment measures or followed by vegetated buffer strips and other best management practices, can significantly reduce the non-point pollution discharge from the developed area. The stormwater management system can protect and enhance the stormwater runoff water quality through the removal of sediments and pollutants, and source control significantly reduces the amount of pollutants entering the system. Preventative maintenance of the system will include a comprehensive source reduction program of regular vacuuming and litter removal, prohibitions on the use of pesticides and maintenance of designated waste and recycling areas.

This long-term Stormwater Management System Operations and Maintenance (O&M) Manual, filed with the Town of Plainville, shall be implemented at warehouse distribution facility development site located on Cross Street to ensure that the stormwater management system functions as designed. The Owner possesses the primary responsibility for overseeing and implementing the O&M plan and assigning a property manager who will be responsible for the proper operation and maintenance of the stormwater structures. In case of the transfer of property ownership, future property owners shall be notified of the presence of the stormwater management system and the requirements for proper implementation of the O&M plan.

It is the intent of this document to provide guidance and detail for the long-term inspection and maintenance requirements of the project site to ensure the overall stormwater management system functions as intended for the life of the system. This manual provides basic criteria and schedules for inspection and trigger points for required maintenance. Included in this manual is an overall site plan which identifies the locations of the key components of the stormwater management system and a log for tracking the inspections and maintenance.

A.2 Program Administration

A reliable administrative structure must be established to assure implementation of the maintenance programs described in the foregoing section. Key factors that must be considered in establishing a responsive administrative structure include:

1. Administrative body must be responsible for long-term operation and maintenance of the facilities.
2. Administrative body must have the financial resources to accomplish the inspection and maintenance program over the life of the facility.
3. The administrative body must have a responsible administrator to manage the inspection and maintenance programs.
4. The administrative body must have the staff to accomplish the inspection and maintenance programs, or must have authority to contract for the required services.
5. The administrative body must have a management information system sufficient to file, retain, and retrieve all inspection and maintenance records associated with the inspection and maintenance programs.

If any of the above criteria cannot be met by the entity assigned inspection and maintenance responsibilities, it is likely that the system will fail to meet its water quality objectives at some point during its life. While each of the above criteria may be met by a variety of formats, it is critical to clearly establish the assigned administrative body in a responsible and sustainable manner.

A.3 Responsibility

The purpose of the Stormwater Operations and Maintenance Manual is to ensure the inspection of the system, removal of accumulated sediments, oils and debris, and implementation of corrective action and record keeping activities. The ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided below:

Responsibility for Operation and Maintenance

Name: Warehouse Distribution Facility
Address: 27 Cross Street
City, State: Plainville, Massachusetts
Contact: Fred Ferraro
Telephone: 610.729.0838
Email: ferrarof@realcrg.com

Signature

A.4 Documentation

An Inspection and Maintenance Record Log and Schedule shall be kept by the Owner or Property Manager summarizing inspections, maintenance, repairs and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Inspection and Maintenance Logs shall be kept on file at the property management office.

- Maintenance Program and Budget

The Owner, Property Manager and maintenance staff shall conduct the Operation and Maintenance program set forth in this document. The Owner or Property Manager will ensure that inspections and record keeping are timely and accurate and that cleaning and maintenance are performed in accordance with the recommended frequency for each stormwater component. Inspection and Maintenance Log Forms (provided herein) shall include the date and amount of the last significant storm event in excess of on (1) inch of rain in a 24-hour period, physical conditions of structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure. The estimated annual cost of the Maintenance Program is \$5,000 to \$7,500.

A list of the individual inspection/maintenance elements is provided in the table of contents. The guidelines are proposed for initial use with adjustments made as appropriate based upon specific project experience.

A.5 Project Overview

Key permits issued (or applied for) on the project include:

- Site Plan Review
- Intensity of Use Special Permit
- Groundwater Protection District Special Permit
- Earth Removal Special Permit
- Community Water Resource Special Permit
- Environmental Health Permit (Stormwater Management)
- Water and Sewer Connection Permit
- Building Permit

The permit applications for the project include the design information for the stormwater system.

A copy of the permits and Stormwater Management Report should be appended to this manual as Appendix B. The Owner/Operator of the stormwater management system should review these permits for a general description and background of the project, as well as any specific permit conditions or requirements of the project.

The applicant has retained Beals Associates, Inc. for civil engineering for the proposed site design. Beals Associates, Inc. has prepared the design for the stormwater management facilities for this project and may be contacted at:

Beals Associates, Inc.
2 Park Plaza, Suite 200
Boston, Massachusetts 02116
(617) 242.1120

It is recommended any particular questions on the design intent or similar issues be directed to the designer of the system.

The applicable plans/design documents which apply to the project are:

1. Civil Site Plans/Permit Applications
2. The Erosion Control/Sedimentation Control Plan for the project.
3. The Stormwater Management Plan for the project.
4. O&M Stormwater Maintenance Plan for the project.

A copy of these documents should be retained with the manual.

B.0 Standard Inspection and Maintenance Descriptions

The following narratives describe the inspection/maintenance provisions for the Stormwater Management area. These O&M procedures will complement scheduled sweeping of the pavement areas anticipated to occur at least twice per year.

B.1 Routine Maintenance Tasks

Routine maintenance of lawns, gardens, and other landscaped areas shall occur as necessary to maintain the property in a neat and orderly fashion. Clippings and/or mulch shall not be washed into the drainage infrastructure.

Maintenance of the Stormwater Management System shall be in accordance with the Operations and Maintenance Checklist below.

Snow shall be removed from the site as soon as practical to avoid placement of snow in infiltration areas.

Good housekeeping – all areas should be kept free of trash and debris. Any storage of materials and waste products shall be inside or under cover. Fertilizers, herbicides and pesticides, if stored on site, shall be stored properly contained and under cover. Storage of salt or deicing chemicals, if any, shall be on impervious area, covered and protected from runoff.

B.1.1 Catch Basins and Manholes

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Once 50% of the sump volume is filled, the catch basin may not be able to retain additional sediment.

Inspect or clean deep sumps at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year 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. Clamshell buckets are typically used to remove sediment; however, vacuum trucks are preferable as they remove more trapped sediment than clamshells. Vacuuming is also a speedier process and is less likely to damage the hood within the deep sump catch basin.

Always consider the safety of the staff cleaning deep sump catch basins.

Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous and a police detail may be necessary to safeguard workers.

Although catch basin debris often contains oil and hazardous material such as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP; however, some landfills may require testing before they are accepted.

B.1.2 Parking Lot Sweeping

One effective nonstructural source control is street and parking lot sweeping. Many municipalities and some private entities (e.g., commercial shopping areas or office parks) have street sweeping programs. Although intended to provide important nonpoint source pollution control, many street sweeping programs are not effective at capturing the peak sediment loads.

There are three factors in particular that can have a major influence on the effectiveness of a street sweeping program: access, the type of sweeper, and the frequency of sweeping.

Effective sweeping requires access to the areas to be swept. Parked cars impede street sweeping. Studies have shown that up to 95% of the solids on a paved surface accumulate within 40 inches of the curb, regardless of land use. It is essential that applicants or those responsible for stormwater maintenance have the ability to impose parking regulations to facilitate proper sweeping, particularly in densely populated or heavily traveled areas, so that sweepers can get as close to curbs as possible.

A good street sweeping program requires an efficient sweeper. There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter. Each has a different ability to remove TSS.

Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement. Although most of the sweepers currently in use in Massachusetts are mechanical sweepers, they are not effective at removing TSS (from 0% to 20% removal). Mechanical sweepers are especially ineffective at picking up fine particles ("fines") (less than 100 microns).

Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed. Regenerative air sweepers may blow fines off the vacuumed portion of the roadway or parking lot, where they contaminate stormwater when it rains.

Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression. Research indicates vacuum sweepers are highly effective in removing TSS. Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

The frequency of sweeping is a major factor in determining efficiency. Unlike other stormwater treatment practices that function whenever it rains, street sweeping only picks up street dirt when streets and parking lots are actually swept. TSS removal efficiency is determined based on annual loading rates. If a road were swept only once a year with a sweeper that is 100% efficient, it would remove only a small fraction of the annual TSS load.

Street dirt accumulates on roads and parking lots and runs off in response to precipitation. The average interval between precipitation events in Massachusetts is approximately 3 days. Therefore, the hypothetical maximum effectiveness for street dirt removal requires sweeping at least once every 3 days, with a street sweeper with 100% efficiency at removing solids on paved surfaces before they become suspended. Modeling studies by Claytor (1999) in the Pacific Northwest suggest that optimum pollutant removal occurs when surfaces are swept every two weeks.

B.1.3 Water Quality Units

Much like the catch basins, regular maintenance of the water quality units is essential. The maintenance of these units begins immediately at post-construction prior to putting the unit into service. During the first year of operation, the units should be inspected quarterly in order to determine the rate of accumulation of sediment and oils. In subsequent years, the units can be inspected at a frequency determined by the accumulation rate of sediment and oils, but in no cases should the inspection frequency exceed six months.

Cleaning of the units is to be done at the manufacturer's recommendations. The unit should also be cleaned immediately in the event of a spill.

B.1.5 infiltration Basins

Infiltration Basins are prone to clogging and failure if proper maintenance is not conducted and it is imperative to develop and implement aggressive maintenance plans and schedules. Installing and maintaining adequate pretreatment BMPs upstream of the Infiltration Basin will significantly reduce the maintenance requirements upon completion of construction.

Inspection and maintenance of Infiltration Basins begins with the inspection and maintenance of the pretreatment systems. This should be done no less than twice per year and after every major storm event (generally 2 or more inches of rainfall in a 24-hour period.)

Upon completion of construction and placement of the basin into use, it should be inspected after every significant rainfall (over ½ inch in a 24-hour period) for the first six to eight months to ensure proper stabilization and function of the system. It should be noted how long water cists in the basin after the storm has ended. If stormwater remains for more than 72 hours, the infiltrative capacity may have been reduced. If the ponding is due to clogging, immediately address the reasons for the clogging, such as upland sediment erosion, excessive compaction of soils or low spots.

General inspections of the Infiltration Basin should occur twice per year, removing trash and debris from the facility. Grass and landscaping shall be kept trim along the top and side slopes of the basin, and the bottom surface of the basin should be inspected for variations from the original design. The use of deep tilling rakes is encouraged to break up sediment clogged surfaces.

Remove sediment from the basin as necessary but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as not to compact the underlying soil.

B.1.6 Flared Ends

Flared ends should be inspected annually to ensure that no debris or sediment is obstructing the flared end. Debris should be immediately cleaned out, and sediment should be removed upon accumulation.

B.2 Winter Maintenance

Ensure structures are not blocked by ice, snow, debris or trash during winter months. This project site does not feature snow storage areas. Snow is to be removed from the site as it accumulates.

B.3 Fertilizer Selection

It is not currently known if fertilizer will be used. If fertilizer is used it should be to enhance the ground cover of the facility, yet not result in adverse water quality impacts. The following guidelines are recommended.

The selection of fertilizer should be based upon site-specific requirements. Recommendations for the fertilizer will be made upon completion of the project and actual tests of the soil mix. The benefit of the use of a soil mix is the ability of the soil to absorb and store nutrients for subsequent plant growth better than a sandy loam.

It is recommended that the soil be resampled every three (3) years and the plan adjusted accordingly.

B.3.1 Fertilizer Storage

If used, it should be stored in a weatherproof area with containers protected from damage. Fertilizer from any damaged containers should be placed in appropriate weatherproof containers.

B.3.2 Fertilizer Application

Fertilizer should be applied with appropriate mechanical equipment properly calibrated to meet the recommended application rates of the soil tests and manufacturer. The Owner or its agents should instruct personnel on the use of equipment and the proper measurement of the fertilizer.

Personnel assigned to application should be instructed that over-application of fertilizer is averse to the landscaped areas and environment. Fertilizer should not be applied to steep slopes, saturated ground, during periods of precipitation, or immediately prior to major rain events.

STORMWATER OPERATIONS
AND MAINTENANCE MANUAL

Warehouse Distribution Facility
27 Cross Street, Plainville, Massachusetts

Appendix A

Stormwater Management System Site Plan

STORMWATER OPERATIONS
AND MAINTENANCE MANUAL

Warehouse Distribution Facility
27 Cross Street, Plainville, Massachusetts

Available under separate cover

STORMWATER OPERATIONS
AND MAINTENANCE MANUAL

Warehouse Distribution Facility
27 Cross Street, Plainville, Massachusetts

Appendix B

**Stormwater Management System
Maintenance Program Summary Checklist**

Stormwater Management System Maintenance Program Summary Checklist					
Item	Commentary	Frequency			
		Monthly	Quarterly	Semi- Annually	Annually
Catch Basins and Manholes	Inspect for sediment quarterly; inspect at tend of foliage and at end of snowmelt; remove upon accumulation		X		
Parking Lot Sweeping	Sweep to remove small debris and sediments; large debris should be removed by hand prior to sweeping actions.	X			
Water Quality Units	Inspect monthly for first six months; inspect for sediment accumulation quarterly of semi—annually thereafter; inspect immediately after spills		X	X	
Infiltration Basins	Inspect for accumulated sediment immediately after construction; inspect semi- annually thereafter			X	
Flared Ends	Inspect annually, remove debris, ensure clogging has not ocured				X

STORMWATER OPERATIONS
AND MAINTENANCE MANUAL

Warehouse Distribution Facility
27 Cross Street, Plainville, Massachusetts

Appendix C

**Stormwater Management System
Operation and Maintenance Forms**

**STORM WATER MANAGEMENT SYSTEM
OPERATIONS AND MAINTENANCE MANUAL
Parking Lot Sweeping**

Name of Inspector: _____ Title of Inspector: _____

Inspector's Signature: _____

Inspection Date	Satisfactory			Location	Maintenance Needed and Description	Implementation Date of Maintenance
	Yes	No	N/A			

**STORM WATER MANAGEMENT SYSTEM
OPERATIONS AND MAINTENANCE MANUAL
Water Quality Units**

Name of Inspector: _____ Title of Inspector: _____

Inspector's Signature: _____

Inspection Date	Satisfactory			Location	Maintenance Needed and Description	Implementation Date of Maintenance
	Yes	No	N/A			

**STORM WATER MANAGEMENT SYSTEM
OPERATIONS AND MAINTENANCE MANUAL
Infiltration Basins**

Name of Inspector: _____ Title of Inspector: _____

Inspector's Signature: _____

Inspection Date	Satisfactory			Location	Maintenance Needed and Description	Implementation Date of Maintenance
	Yes	No	N/A			

**STORM WATER MANAGEMENT SYSTEM
OPERATIONS AND MAINTENANCE MANUAL
Flared Ends**

Name of Inspector: _____ Title of Inspector: _____

Inspector's Signature: _____

Inspection Date	Satisfactory			Location	Maintenance Needed and Description	Implementation Date of Maintenance
	Yes	No	N/A			