Pollution Prevention
&
Stormwater Quality Management

159 Boston Post Road
East Lyme, Connecticut

Introduction

For the purposes of this report, pollution prevention is defined as the use of materials, processes or practices that reduce or eliminate the creation of stormwater runoff pollutants or wastes at the source, Best Management Practices (BMPs) are structural and managerial techniques that are recognized to be the current, most effective means to prevent and/or reduce pollution from stormwater runoff. Generally, there are two reasons to implement BMPs from a surface and ground water quality standpoint: I) to protect the existing level of water quality from future degradation; and, 2) to correct existing water quality problems.

This report discusses both structural and housekeeping practices to be implemented as a part of the stormwater pollution prevention strategy. These practices are intended to minimize and/or improve stormwater runoff quality. The emerging philosophy of stormwater management emphasizes controlling stormwater where it falls and incorporates both structural and non-structural (vegetative) measures to detain and "treat" the water. Specific needs regarding quantity and quality of stormwater runoff addressed for this project include:

- Minimization of any increase in the current peak amounts of runoff; Minimization of any increase in the velocity of runoff;

- Provisions for improving water quality to the highest degree possible with currently available infiltration as well as water quality system & technology.

Through proper housekeeping techniques addressing management and maintenance of roof runoff, litter control, landscaped areas, driveways, parking lot & sidewalk sweeping/vacuuming, de-icing chemical use & storage, handling & stock piling snow, stormwater treatment facilities.

2. Structural BMPs

Selection and design of stormwater management practices for this site involved the estimation of flow volumes, peak discharges and detention storage requirements. Stormwater management facilities, infiltration units, were designed to fully treat runoff from a 10year, 24-hour storm.

Research has shown that smaller precipitation events between 0.5 to 1.5 inches of rainfall (not runoff) are responsible for about 75% of runoff pollutant discharges; larger rainfall amounts (i.e., a 10-year storm event) associated with drainage design and are responsible for only small portions of annual pollutant discharges (Pitt, 1994). This research concludes that treating the initial amount of runoff is effective not because of the first flush, but because the first 1.0 inch of runoff from all storms accounts for almost all of the total annual runoff from most land uses.

2.1 **Driveways, Parking and Sidewalks**

All impervious surfaces, i.e., driveways, parking lots, sidewalks, will be inspected regularly and maintained via vacuum sweeping on a monthly and/or as needed basis to limit potential entry of sediment laden pollutants into the stormwater conveyance system.

2.2 **Parking Lot Dry Well and Stone Infiltration Trench**

The stormwater runoff from the parking lot will be collected in a stone infiltration device, catch basin and dry well to infiltrate into the soil and surge runoff to appropriate areas. The dry well and stone infiltration device will be installed to limit potential residual pollutants, i.e., sediment, oils, from discharging offsite.

3. **Pollution Prevention BMPs**

Coupled with the structural BMPs, the following housekeeping practices will be incorporated into the site management plan and adopted by a landscape management firm retained by owners/operators of 159 Boston Post Road East Lyme, Connecticut.

3.1 **Fertilizers/Pesticides**

Storage of fertilizers, pesticides, and petroleum products on-site are prohibited.

3.2 **Roof Runoff Management**

Roof runoff components consist of roof gutters, downspouts, and other appmtenances. Leaders from the building will empty stormwater into the dry well. The following items will be part or the maintenance program for roof runoff management:

- Clean leaves and debris from gutters semi-annually (fall & spring);

- Keep downspouts clear;

- Repair damage or replace damaged gutters or downspouts as soon as practicable after damage occurs (e.g. bending due to ice build-up or strong winds);

- Clear any surface blockage from catch basins grate and stone infiltration trench as needed.

- Properly maintain associated facilities (e.g., stone filtration trench, dry well, etc.)

3.3 **Litter Control**

Removal of litter from the grounds on a routine basis will reduce the likelihood of it becoming a pollution problem. Studies have found that phosphorus levels were reduced by 30 to 40% when street gutters were kept free of leaves and lawn clippings. This indicates a substantial benefit by controlling these materials. There are two categories of litter control programs, source reduction, and, removal. Source reduction programs can include litter containers conveniently placed and emptied frequently to prevent overflow, and the promotion of recycling. Litter removal programs include refuse and leaf pick-up, and, street cleaning.

3.4 **Driveways, Parking Lot and Sidewalk Sweeping/Vacuuming**

Sweeping/vacuuming involves the removal of grit, debris, and trash from the impervious surfaces such as driveways, parking lots, and sidewalks. Parking lots are normally swept with either a mechanical broom sweeper, a vacuum sweeper or combined broom/vacuum sweeper. Specific pollutants generally reduced by parking lot sweeping include sediment, nutrients and oxygen demanding substances.

All impervious surfaces at the site will be swept or vacuumed at least once per year and/or on an "as needed" basis throughout the year. This practice can minimize sediment accumulation and reduce total solids and heavy metals content in runoff up to 50%. The actual effectiveness of the program will vary with pollutant build-up (e. g. sand used for de-icing) and storm events.

3.5 **Catch Basin and Dry Well Cleaning**

Catch basin sumps should be inspected and cleaned at least twice a year to accomplish effective pollutant removal and protect water quality of the down gradient wetland . They are usually cleaned with a vacuum pump, however, if sediment volume is minimal, manual cleaning can be equally as effective. The resultant slurry of water, sediment and other detritus can be transpmied to an approved treatment plant or landfill for disposal. Proper cleaning helps to reduce the re-suspension of sediments during runoff.
It is important to keep maintenance records and clean-out schedules as paii of the catch basin and dry well maintenance process.

3.6 **Maintenance of Stone Filtration Trench**

The stone infiltration trench will be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the trench. For example, unstable soils or heavy winter sanding may cause high rates of filtering by the stone in the trench.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.
The visual inspection should ascertain that the system components are in proper working order and that there are no clogging or obstructions in the stone trench. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. It is a good practice to keep a record of each inspection. The observation well should be inspected as part of each inspection.

Cleaning

Cleaning of all the sites stormwater devices should be done during dry weather conditions when no flow is entering the device. For the drywell and catch basin, the use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and grate top and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment.
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the devices should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. Trash and debris can be netted out to separate it from the other pollutants.
Manhole and grate top covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the devices should be done in accordance with local regulations.

3.7 **Dumpster**

Area surrounding dumpsters shall be routinely inspected and litter picked up. Dumpster shall be emptied at intervals sufficient to assure that it does not overflow.

4 Cultural Practices For Landscape Areas

4.1 **Lawn Areas**

During the growing season, remove litter and debris before each weekly mowing.

Mowing height for the lawn areas should be maintained between 1.5 and 2.25 inches. Mowing height should be raised if dry weather conditions remain for extended periods of time. Whenever possible, grass clippings are to be returned (i.e., use of mulching mower).

4.2 **Planting Bed Areas**

Mulching-unload & spread Mulch should be unloaded and transported to the planting bed areas via wheel barrel and/or other non-motorized mechanism. A two inch depth should be spread evenly in early May or early September, following hand weeding and edging operations.

Leaf removal Leaf removal should be performed later April, July, and October. Leaves should be removed via hand raking and/or backpack leaf blower.

5. **Winter Sanding Operations**

5.1 **Stockpiling Sand.** Stockpiling of Sand on-site is prohibited.

5.2 **The use or storage on site of de-icing chemicals is prohibited**.

5.3 **Sanding Operations**.

For sanding operations, the prevention of over-application of sand is the primary means of reducing quantities of potential pollutants from reaching water resources.

Sanding applications can be reduced in several ways. The first is to prevent over-application. This can be accomplished by properly calibrating equipment and monitoring the need for sanding material. A second method is limiting application on low traffic and straight level areas.

Winter Maintenance

The use of chemicals for deicing, snow melting, and other related winter weather management should be minimized to the greatest extent possible. A mix of sand and calcium chloride is required. Sodium chloride shall not be used. Snow shall be shoveled and plowed from sidewalk and parking areas as soon as practical during and after winter storms. Sand accumulation shall be removed from the site at the end of the winter season or appropriate time when seasonal snow has melted. Alternative deicing methods must be submitted prior to use on site for review to the Town of East Lyme Engineering Department for approval.

General Guidelines for Inspection and Maintenance:

Regular maintenance is required to ensure the drywells and stone filtration trenches will function at maximum efficiency. For the first six months, the drywells should be inspected after large storms (rainstorms of 1" more) to ensure there is no standing water in the drywells after 48 - 72 hours. Thereafter, the guidelines provided in the following should be followed.

1. Inspect the parking lot at least annually for the deposition of sediment and debris that could be transported into the drywells stone infiltration trenches via stormwater. Continue the parking lot maintenance protocols, including at least twice-annual sweeping in the spring after snow melt and after leaf fall in autumn. Any conditions contributing to sedimentation, such as bare soil or areas of erosion, or the deposition of trash or debris should be addressed.

2. Inspect the catch basins and maintenance manholes at least annually, including connective piping. The catch basins and manholes should be maintained by including the removal of sediment and other debris as needed or as specified in the existing maintenance protocols.

3. Inspect the drywells at least annually, as well as after every storm exceeding 1 inch for the first year, including connective piping to the catch basins. It is recommended that accumulated pollutants (such as sediment, oils, leaves, litter, etc.) be removed from the drywells **prior to exceeding 50% design capacity** as recommended, in order to prevent the processed stone surrounding the drywells from becoming clogged, reducing the infiltration capacity and diminishing the effectiveness of the practice.

4. Evaluate the drain-down time of the drywells to ensure the maximum time of 72 hours is not being exceeded. If drain-down times are exceeding the maximum, drain the drywells via pumping and inspect the precast concrete drywell seepage slots and connecting piping for sediment and debris. If slow drainage persists, the system may need replacing.

5. Dispose of sediment, debris/trash, and any other waste material removed from the parking lot, manholes, catch basins and drywells at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

6. Inform contractors working on the property of the drywell locations, to prevent accidental damage to the system (e.g. inappropriate equipment storage, extra heavy parked vehicles, non-stormwater discharges).

7. Snow storage should not occur in the area of the infiltration drywells. Snow storage within the drainage area (parking lot) should be assessed for pre-treatment options, so as to minimize NPS pollutant loading into the stormwater practice.