Tighe&Bond
Engineers | Environmental Specialists

H-1436015-04
June 30, 2020

Mark F. Langone
Highway Superintendent, Town of Hampden
Hampden Highway Department
589 Main Street
Hampden, MA 01036

Re: **Stormwater Pollution Prevention Plan for the Hampden Transfer Station**

Dear Mark,

Tighe & Bond is pleased to present two copies of the final Stormwater Pollution Prevention Plan (SWPPP) for the Town of Hampden Transfer Station and Recycling Center. This document provides an overview of the facility's operations, describes sources of potential pollutants, and presents measures to reduce or prevent potential pollution (Standard Operating Procedures or Control Measures), and associated schedules of implementation. To finalize the SWPPP, the following actions should be taken:

1. **Conduct employee training on the SWPPP**. Train Transfer Station and Highway Department employees who work in areas where materials or activities are exposed to stormwater (or who are responsible for provisions of the SWPPP) on the following:
    - An overview of the SWPPP
    - Spill prevention and response (including fueling, waste, and chemical spills)
    - General good housekeeping practices
    - Materials management practices
    - Inspection, reporting, and procedures to take actions to correct problems

    Fill out the Employee Training Log in Appendix D to document the training date(s), topics, and attendees.
2. **Begin conducting Quarterly Site Inspections**. Using the Quarterly Site Inspection Form provided in Appendix D, conduct four inspections each year. Inspect all areas exposed to stormwater and all stormwater control measures.
3. **Make copies available to relevant departments and employees.** Please keep one copy of this SWPPP available at the Highway Department office and one at the Transfer Station for immediate access by Transfer Station personnel.

Please let us know if you have any questions about the SWPPP or the steps presented herein. We look forward to continuing to assist you with your stormwater program.

Very truly yours,
TIGHE & BOND, INC.

Tracy J. Adamski, AICP
Vice President

Enclosures

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Town of Hampden, Massachusetts

Hampden Transfer Station Stormwater Pollution Prevention Plan (SWPPP)

Cross Road, Hampden, MA

NPDES Permit # MAR041009

June 2020

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SECTION 1

Section 1
Introduction and Background

The United States Environmental Protection Agency (EPA) nationally regulates the discharge of stormwater runoff that is transported into local water bodies through Municipal Separate Storm Sewer Systems (MS4s) that are located in Urbanized Areas (also known as "regulated areas"). The Town of Hampden is required to obtain coverage under a National Pollutant Discharge Elimination System (NPDES) permit for its stormwater discharges from the MS4 in its Urbanized Area.[1]

In Massachusetts, the EPA and the Massachusetts Department of Environmental Protection (MassDEP) jointly administer the municipal stormwater program, and Hampden is authorized to discharge stormwater under the 2016 NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems, known as the "2016 Small MS4 General Permit".[2] Under this permit, the Town has developed and implemented a Stormwater Management Program (SWMP) to reduce the contamination of stormwater runoff.[3]

According to the 2016 Small MS4 General Permit, the Town must develop and fully implement a site-specific Stormwater Pollution Prevention Plan (SWPPP) for Town-owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater within two years of the effective date of the permit. If facilities are located on the same property, one SWPPP may be developed for the entire property. Relevant sections of the 2016 Small MS4 General Permit are included in **Appendix A**.

This MS4 SWPPP should not be confused with the EPA regulatory definition of a SWPPP as it pertains to the NPDES Construction General Permit (CGP) or Multi-Sector General Permit (MSGP). However, if a facility has a previously developed SWPPP or a no exposure (NOE) certification under the MSGP or a different NPDES permit, a SWPPP does not need to be developed under the Small MS4 General Permit.

1.1 SWPPP Purpose and Scope

This SWPPP is a good housekeeping guidance document prepared for the Town of Hampden Transfer Station and Recycling Center located off Cross Road in Hampden, MA. The purpose of the SWPPP is to meet the following 2016 Small MS4 General Permit requirements to minimize pollution in stormwater runoff from the facility covered by the SWPPP:

- Create a pollution prevention team
- Identify pollutant sources
- Provide a set of best management practices (BMPs) for municipal operations and activities at the Town of Hampden Transfer Station

[1] https://www3.epa.gov/region1/npdes/stormwater/ma/ram/hampden.pdf

[2] https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/hampden-auth.pdf

[3] https://www.hampdenma.gov/stormwater-committee/links/town-hampden-stormwater-management-plan

In accordance with Section 2.3.7.b.ii.4 of the 2016 Small MS4 General Permit, these BMPs include:

- Minimizing or preventing exposure
- Good housekeeping
- Preventative maintenance
- Spill prevention and response
- Runoff management
- Employee training
- Maintenance of control measures
- Erosion and sediment control
- Preventing salt storage piles from impacting water resources

The BMPs in **Section 4** of this SWPPP were selected based on a review and inspection of the Town's Transfer Station. The BMPs are intended to provide straightforward and up-to-date procedures for personnel to follow while conducting day-to-day activities.

The SWPPP should be reviewed periodically and revised whenever Town operations and/or facility activities change, as described in **Section 7.2**.

1.2 Glossary of Terms

The following terms and definitions may be used to interpret and implement the SWPPP.

Activities: Practices that routinely occur at the Town of Hampden Transfer Station.

Best Management Practices (BMPs): An activity, procedure, restraint, or structural improvement that helps reduce the quantity or improve quality of stormwater runoff.

Catch Basin: An underground structure used to collect runoff from the surface and divert it to the stormwater drainage system.

Clean Water Act (CWA): (33 U.S.C. 1251 et seq.) Requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

Discharge: A release or flow from a conduit, sewer, drain, outfall, pump, stack, tank or treatment process, or any emission, intentional or unintentional, including but not limited to, flow resulting from spilling, leaking, seeping, pumping, pouring, emitting, emptying, depositing, dumping, releasing, injecting, escaping, leaching, or infiltration whether direct or indirect.

Illicit Discharge: Any direct or indirect discharge to the stormwater drainage system that is not composed entirely of stormwater, except as exempted in Section 7 of the Town's *Stormwater Management Bylaw* (Chapter XIV of the General Bylaws of the Town of Hampden.[4] The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or resulting from firefighting activities exempted per the bylaw.

[4] https://www.hampdenma.gov/sites/hampdenma/files/uploads/gbl_18-05-14_indexed.pdf

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances owned or operated by the Town designed or used for collecting or conveying stormwater, including any road with a drainage system. Street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or manmade or altered drainage channel, reservoir, and other drainage structure that together comprise the stormwater drainage system.

National Pollutant Discharge Elimination System (NPDES) Permit: A permit issued by the EPA, or jointly with the Commonwealth of Massachusetts that authorizes the discharge of pollutants to waters of the United States.

Nonpoint Source Pollution: Pollution from many diffuse sources caused by rainfall or snowmelt moving over and/or through the ground. As runoff moves, it picks up and carries natural and human-made pollutants, depositing them into water resource areas.

Non-Stormwater Discharge: Any discharge to the storm drain not comprised entirely of stormwater.

Oil/Water Separator: A receptacle designed to separate petroleum-based oil and grease from water. Also called a trap or interceptor.

Outfall: A point source where an MS4 discharges to a water body, wetland, or land surface. Culverts connection segments of the same stream and open conveyances connecting two MS4s are not considered outfalls. EPA regulations define "outfall" at 40 CFR 122.26(b)(9).

Point Source: Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged. EPA regulations define "point source" at 40 CFR 122.2.

Pollutant: Any element or property of sewage, or of agricultural, industrial, manufacturing, or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sanitary sewer system or waters of the US or Commonwealth. Pollutants shall include:

(1) Paints, varnishes, and solvents

(2) Oil and other automotive fluids

(3) Non-hazardous liquids and solid wastes and yard wastes

(4) Refuse, rubbish, garbage, litter or other discarded or abandoned objects, ordnances, accumulations and floatables

(5) Pesticides, herbicides and fertilizers

(6) Hazardous materials and wastes; sewage, fecal coliform and pathogens

(7) Dissolved and particulate metals

(8) Animal wastes

(9) Rock; sand; salt; soils

(10) Construction wastes and residues

(11) Noxious or offensive matter of any kind

Pollution Prevention: Practices and actions that reduce or eliminate the generation, or release, of pollutants.

Resource Area: Any area protected under, including without limitation, the Massachusetts Wetlands Protection Act (MAWPA), Massachusetts Rivers Protection Act, or Town of Hampden Wetlands Protection Bylaws.

Runoff: Water originating from rainfall, melted snow, or irrigation water, which is not absorbed into the ground. Instead, it flows over the land into streams, other surface water bodies, or stormwater management structures.

Run-on: Off-site stormwater surface flow or other surface flows which enters a site.

Sedimentation: The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain, that collect in reservoirs, rivers, and harbors, destroying fish nesting areas and clouding the water, thus preventing sunlight from reaching aquatic plants. Farming, mining, and building activities without proper implementation of BMPs will expose sediment materials to stormwater, allowing them to be washed off the land after rainfall.

Stormwater: Runoff from precipitation or snowmelt.

Toxic or Hazardous Material or Waste: Any material which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential hazard to human health, safety, welfare, or to the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under MGL Ch 21C and 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000. This type of waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA or MassDEP lists. Hazardous waste is regulated under the EPA's Resource Conservation and Recovery Act (RCRA) laws and regulations.

Waters of the Commonwealth: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater.

1.3 Maintenance and Availability of Plan

A complete master copy of this SWPPP is maintained at the Highway Department at 589 Main Street in Hampden, MA. A second copy of the SWPPP will be kept at the Transfer Station off of Cross Road in Hampden, MA for immediate access by Transfer Station personnel. The SWPPP shall be made available to the Regional Administrator of the EPA, or his/her designee, if so required. This Plan is not required to be submitted to the EPA or to MassDEP unless requested.

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SECTION 2

Section 2
Pollution Prevention Team

Under Section 2.3.7.b.ii.1 of the 2016 Small MS4 General Permit, the Town shall:

"*Identify the staff on the team, by name and title. If the position is unstaffed, the title of the position should be included and the SWPPP updated when the position is filled. The role of the team is to develop, implement, maintain, and revise, as necessary, the SWPPP for the facility.*"

The Pollution Prevention Team for the Town of Hampden Transfer Station and their associated roles and responsibilities are summarized in **Table 2-1** below:

Table 2-1
Town of Hampden Transfer Station Pollution Prevention Team

Primary SWPPP Coordinator	
Staff Name and Title	Mark Langone Highway Superintendent
Contact Information	(413) 566-8842 Highway@HampdenMA.gov
Responsibilities	**Primary Coordinator:** In charge of implementation of the SWPPP. Responsibilities include oversight of good housekeeping and pollution prevention, coordination of employee training, record keeping and reporting, oversight of facility inspections, and plan revisions.
Inspector / Emergency Contact	
Staff Name and Title	Town of Hampden Board of Health
Contact Information	(413) 566-2151 (ext. 102)
Responsibilities	**Emergency Contact:** Contacted in the event of a spill or release of a pollutant. Responsibilities include evaluating emergency situations and ensuring proper spill response procedures are being followed (refer to **Section 4.6** for additional information on spill response procedures). The Emergency Contact will be notified in the event of a spill or release of a pollutant or hazardous waste in a location potentially exposed to stormwater runoff that cannot be easily remedied by the spill response procedure (see **Section 4.6**) or where the situation is potentially dangerous for staff. **SWPPP Inspector**. Responsibilities include conducting the required facility inspections as described in **Section 6**.
SWPPP Implementation	
Staff Name and Title	Transfer Station Employees
Contact Information	(413) 566-2151
Responsibilities	**SWPPP Implementation:** Responsible for implementing BMPs and SOPs recommended in the SWPPP. All employees will be required to participate in the employee training program and to report stormwater management issues and concerns to the Primary SWPPP Coordinator.

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SECTION 3

Section 3
Facility Description

Under Section 2.3.7.b.ii.2 of the 2016 Small MS4 General Permit, the facility description shall:

"… include a map of the facility and a description of the activities that occur at the facility. The map shall show the location of the stormwater outfalls, receiving waters, and any structural controls. Identify all activities that occur at the facility and the potential pollutants associated with each activity including the location of any floor drains."

3.1 Maps of the Facility

The following figures in **Appendix B** show the location of the Highway Facility and activities that occur on-site and are described in this section:

- Figure 1: Site Location Map
- Figure 2: Priority Resource Map
- Figure 3: Aerial Photograph
- Figure 4: Aerial Photograph with Site Visit Notes
- Figure 5: Massachusetts Year 2016 Integrated List of Waters – Hampden, MA

Figure 3.1. Hampden Transfer Station entrance off Cross Road.

Figure 4 includes information based on a site visit conducted on November 7, 2019 and shows the location of:

- **Structural Controls**: A stone-lined perimeter swale is located along the north and west edges of the hilled former landfill site.
- **Site Features**: The site includes sheds, stockpile and storage areas, roll-offs and dumpsters.

A tributary to the Scantic River is located on the eastern portion of the property, and Massachusetts Department of Environmental Protection (MassDEP) mapped wetlands are located at the southwest corner of the property. A priority resource map (**Figure 2**) and an impaired waters map (**Figure 5**) are included in **Appendix B**. The entire site is located within the Connecticut River Watershed. See **Section 3.4** for more information

3.2 Facility Description

The Hampden Transfer Station is located at the site of the former landfill located off Cross Road in Hampden, Massachusetts, in a residential area of Town zoned as Residential R-6. The former landfill property occupies approximately 46.11 acres of land across three parcels, 19-085-000, 19-086-000, and 19-087-000, as shown in **Figure 3.2**.

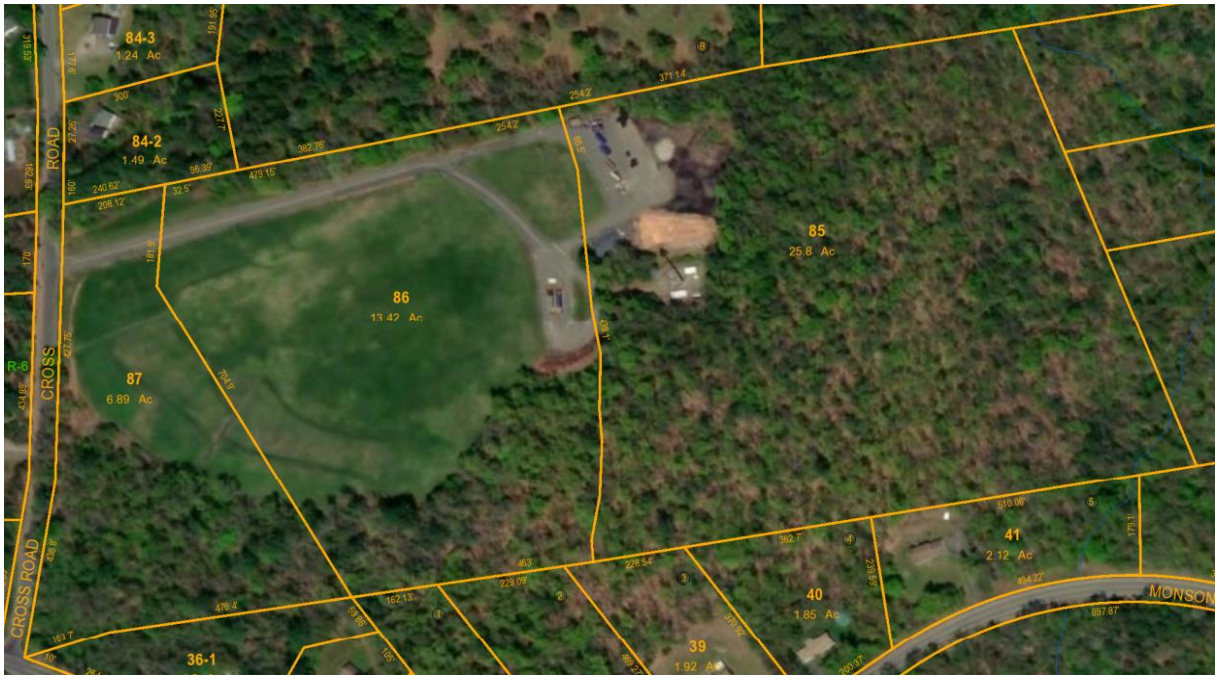

Figure 3.2. Hampden Transfer Station and Recycling Center parcels (from Hampden's online GIS: https://www.axisgis.com/hampdenma/).

The Transfer Station is open for household trash disposal and recycling by Hampden residents with transfer station stickers on Tuesday afternoons and Saturdays.[5] A gate at the entrance to the site is locked when the facility is closed to ensure that wastes that are not accepted at the facility (e.g., hazardous waste, cathode ray tubes, construction debris, bulky items, and propane tanks) are not disposed of on-site. There is a cell tower located near the top of the former landfill that is owned and operated by SBA Towers.

The parcels have mapped Massachusetts Natural Heritage & Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife and NHESP Priority Habitats of Rare Species per the 14th edition of the Natural Heritage Atlas.[6] The cleared areas on-site are surrounded by woodland, with MassDEP mapped wetlands northeast of the site feeding a tributary to the Scantic River, and MassDEP mapped wetlands at the southwest corner of the site per MassGIS.

Appendix B of this SWPPP includes a general location map (**Figure 1**), a priority resources amp (**Figure** 2), an aerial photograph (**Figure 3**), a site plan (**Figure 4**) of the facility, and a map of the Massachusetts Year 2016 Integrated List of Waters in Hampden (**Figure 5**).

The parcel has several small structures on site for use as a check in station and collection shed, and seven roll-off containers for collection and storage of waste as follows:

- One (1) metal waste roll-off container
- One (1) bulky waste (cardboard) roll-off container

[5] https://www.hampdenma.gov/sites/hampdenma/files/uploads/transfer_station_info_0.pdf

[6] https://www.mass.gov/service-details/regulatory-maps-priority-estimated-habitats

- One (1) mixed paper roll-off container
- Two (2) glass, plastic and can (i.e., recyclables) roll-off container
- Two (2) solid waste (i.e., bagged trash) compactors

Materials are stored in the roll-off containers, and in uncovered stockpiles for mulch / compost, gravel, firewood for pick-up by Town residents, wood not suitable for use as firewood, loam, and stone.

The transfer station is a capped former landfill and is therefore a hill, with the trash and recycling operations occurring at the top of the former landfill and elevations ranging from approximately 344 to 374 feet, sloping downhill toward Cross Road. Approximately 9% of the property is covered with impervious surface. The other portion of the property is wooded. Surface drainage is collected by a perimeter swale that is located around the circumference of the closed landfill and discharges to a stone rip-rap channel at the southwest corner of the property.

3.3 Facility Activities and Potential Pollutants

Table 3-1 lists all of the current activities that occur at the Town of Hampden Transfer Station with the potential to impact stormwater runoff and the pollutants associated with each activity. The facility has no point source discharges located on the site.

Table 3-1
Facility Activities and Potential Pollutants

Activity	Potential Pollutants
Stockpiled material storage and loading	Sediment
Solid waste management	Pathogens, nutrients, metals, sediments, gross pollutants (e.g., trash)
Visitor parking	Oil and grease, heavy metals, salt, sediment, temperature, gross pollutants

The following activities are assumed to not occur on-site and are therefore not addressed in this SWPPP.

- There is no on-site vehicle maintenance or washing.
- No vehicles or equipment are stored on-site except the roll-off containers.
- The Transfer Station does not accept hazardous materials or petroleum products, and does not store salt on-site.

3.4 Potential Impact on Water Quality

The Town must be continuously mindful that activities conducted at the Town of Hampden Transfer Station have the potential to impact water quality.

The impacts of the potential stormwater pollutants listed in **Table 3-1** on water quality are described in **Table 3-2**.[7]

Table 3-2
Stormwater Pollutant Impacts on Water Quality

	**Sediment** Sediment is a common component of stormwater, and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.
	**Heavy Metals** Metals, including lead, zinc, cadmium, copper, chromium, and nickel, are commonly found in stormwater. Many artificial surfaces in urban environments (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.
	**Oil and Grease (Hydrocarbons)** Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants, and waste oil disposal.
	**Gross Pollutants (Trash, Debris, and Floatables)** Gross Pollutants may include heavy metals, pesticides, and bacteria in stormwater. Typically resulting from an urban environment, industrial sites and construction sites, trash and floatables may create an aesthetic "eye sore" in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in streams, lakes and estuaries sometimes causing fish kills.
	**Bacteria and Viruses** Bacteria and viruses are common contaminates of stormwater. For separate storm drain systems, sources of these contaminants include animal excrement and septic system malfunctions. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.

[7] Text included in this table is based on Table 1-1: Pollutant Impacts on Water Quality from the California Stormwater Quality Association Stormwater BMP Handbook for New Development and Redevelopment. URL: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook

Table 3-2
Stormwater Pollutant Impacts on Water Quality

	**Nutrients** Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes, and are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.
	**Organics** Organics may be found in stormwater at low concentrations. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.
	**Pesticides, Herbicides, Fungicides, Rodenticides, and Insecticides** Pesticides have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. As pesticide use has increased, so have concerns about adverse effects on the environment and human health. Accumulation of these compounds in simple aquatic organisms, such as plankton, provides an avenue for biomagnification through the food web, potentially resulting in elevated levels of toxins in organisms that feed on them.

The facility is located within the Scantic River subwatershed of the Connecticut River, but is not directly proximate to and does not directly discharge to the Scantic River. The *Massachusetts Year 2016 Integrated List of Waters* report[8] lists the Scantic River (MA34-30) as a Category 5 water impaired by *Escherichia coli* (*E. coli*) and requiring development of a Total Maximum Daily Load (TMDL).

Section 4 includes recommended BMPs intended to address the potential pollutants associated with the activities conducted at the Town of Hampden Transfer Station.

[8] https://www.mass.gov/doc/final-massachusetts-year-2016-integrated-list-of-waters/download

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SECTION 4

Section 4
Best Management Practices

Under Section 2.3.7.b.ii.4 of the 2016 Small MS4 General Permit, the SWPPP shall include the following BMPs. Permit language for each management practice is included in *italicized* text.

Minimize or Prevent Exposure: The permittee shall to the extent practicable either locate materials and activities inside or protect them with storm-resistant coverings in order to prevent exposure to rain, snow, snowmelt and runoff (although significant enlargement of impervious surface area is not recommended). Materials do not need to be enclosed or covered if stormwater runoff from affected areas will not be discharged directly or indirectly to receiving waters or to the MS4 or if discharges are authorized under another NPDES permit.

Good Housekeeping: The permittee shall keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals. Ensure that trash containers are closed when not in use, keep storage areas well swept and free from leaking or damaged containers; and store leaking vehicles needing repair indoors.

Preventative Maintenance: The permittee shall regularly inspect, test, maintain, and repair all equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater to receiving waters. Inspections shall occur at a minimum once per quarter.

Erosion and Sediment Control: The permittee shall use structural and non-structural control measures at the facility to stabilize and contain runoff from exposed areas and to minimize or eliminate onsite erosion and sedimentation. Efforts to achieve this may include the use of flow velocity dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion.

Management of Runoff: The permittee shall manage stormwater runoff from the facility to prevent or reduce the discharge of pollutants. This may include management practices which divert runoff from areas that are potential sources of pollutants, contain runoff in such areas, or reuse, infiltrate or treat stormwater to reduce the discharge of pollutants.

This section describes how these management practices will be implemented (as applicable) for each activity conducted at the Town of Hampden Transfer Station. Three other required management practices, Spill Prevention and Response, Employee Training, and Maintenance of Control Measures, are applicable site-wide and are addressed in **Sections 4.7**, **4.8**, and **5**.

4.1 Stockpiled Material Storage and Loading

Stockpile management procedures and practices are designed to reduce or eliminate stormwater pollution from stockpiles of bulk materials. When stored unprotected outdoors, sand piles and material stockpiles are exposed to precipitation. When the resulting eroded material enters the stormwater system, the sediment can quickly fill the sumps of catch basins, rendering the drainage system ineffective. This section excludes salt storage, as no salt is currently stored at the Transfer Station.

4.1.1 Facility Description

Bulk materials are stockpiled in several locations at the Town of Hampden Transfer Station. Leaves and grass clippings are stockpiled along the southern boundary of the site behind the entrance bunker, gravel and logs for firewood and associated mulch are stockpiled between the cell tower and the main transfer area, and loam, stone, and logs not suitable for use as firewood are stockpiled along the eastern boundary of the Transfer Station (as shown in **Figures 4.1 and 4.2**).

Figure 4.1: Leaves and grass clippings (left) and gravel (right) stockpiles.

Figure 4.2: Firewood and mulch (left) and non-firewood, stone, and loam stockpiles.

Drainage from these areas flows as sheet flow to the wooded areas on-site.

4.1.2 Suggested Best Management Practices

General Practices

- Locate stockpiles a minimum of 50 feet away from concentrated flows of stormwater, drainage courses, and inlets.
- Implement wind erosion control practices as appropriate on all stockpiled material.
- Place bagged materials on pallets and under cover, not directly on the ground.
- Refer to the MassDEP guidance document for Reuse & Disposal of Street Sweepings and Management of Catch Basin Cleanings, included in **Appendix C**.

Minimize or Prevent Exposure

- Cover and contain the stockpiles of raw materials. The covers must be in place at all times when work with the stockpiles is not occurring (applicable to small stockpiles only).Non-active stockpiles can be stabilized by seeding or mulching if they are to remain exposed for more than two weeks or can be covered with impermeable sheeting to protect the material from rainwater.
- Sediment barriers should be placed around the perimeter of the storage site to prevent any runoff carrying sand from entering surface waters. If the weather becomes dry and windy, regular light watering of the stockpile and surrounding area will provide effective dust control.
- See Erosion and Sediment Control for additional information.

Good Housekeeping

- Sweep paved storage areas regularly for collection and disposal of loose solid materials. Do not hose down the area to a storm drain or conveyance ditch.
- Clean nearby catch basins as necessary, at least annually.

Preventative Maintenance

- Frequently inspect and verify that BMPs are in place and functioning properly.
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.

Erosion and Sediment Control

- If the stockpiles are so large that they cannot feasibly be covered and contained, implement erosion control practices at the perimeter of the Town of Hampden Transfer Station and at any catch basins to prevent erosion of the stockpiled materials off site.
- Ensuring that the storage area is regularly swept and kept clean is an important good housekeeping practice.

Management of Runoff

- Protect all stockpiles from stormwater run-on using a temporary perimeter sediment barrier such as berms, dikes, fiber rolls, silt fences, sandbags, or gravel bags.

4.2 Visitor Parking

Parking lots can contribute substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff.

4.2.1 Facility Description

There is not a dedicated parking area for visitors at the Town of Hampden Transfer Station. Rather, traffic is guided through the site in a one-way pattern with short-term parking on paved areas in front of the various solid material stockpiles and roll-off containers (**Figure 4.3**).

Figure 4.3: Arrows showing direction of traffic flow at the Transfer Station.

4.2.2 Suggested Best Management Practices

General Practices

- Keep the driving/parking area clean and free of trash and debris.

Minimize or Prevent Exposure

- Not applicable for this area.

Good Housekeeping

- Sweep parking areas annually at a minimum.

Erosion and Sediment Control

- Sediment control will be achieved through routine sweeping in the parking area.
- Additional Erosion and Sediment Controls will be necessary for major repairs, repaving, and/or re-grading the parking area.

Management of Runoff

- Consider allowing sheet runoff to flow into vegetated strip and swales or an infiltration area.

4.3 Solid Waste Management

Solid waste production and storage locations can contaminate stormwater runoff with pathogens such as bacteria and viruses, nutrients such as phosphorus and nitrogen, metals, and sediment. Solid waste may be classified as both hazardous and non-hazardous. At the Town of Hampden Transfer Station, hazardous materials are not accepted for collection, and are therefore not exposed to precipitation.

4.3.1 Facility Description

At the Town of Hampden Transfer Station, there are eight roll-off containers for collection of trash and recycling materials. Two roll-off containers are located behind the entrance booth and six are located in the main collection area at the top of the hill (**Figure 4.4**).

Figure 4.4: Roll-off containers for trash and recycling collection at the Transfer Station.

4.3.2 Suggested Best Management Practices

General Practices

- Keep waste collection areas clean, especially those located near wetland resource areas.
- Solid waste containers should be located as far away from wetland resource areas as practicable.

Minimize or Prevent Exposure

- Secure solid waste containers. Containers must be closed tightly when not in use.
- Ensure that only appropriate solid wastes are added to the solid waste containers. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be disposed of in solid waste containers.
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- All staff shall be properly trained in correct solid waste management practices, including waste disposal and spill prevention and response. All employees shall also be knowledgeable of the potential hazards associated with solid waste handling and storage.
- Each waste storage location shall be properly labeled, and all significant sources of pollution shall be kept in a secure, covered, and contained area.
- Schedule regular waste collection to prevent the containers from overfilling.

Preventative Maintenance

- Inspect solid waste containers for structural damage or leaks regularly. Repair or replace damaged containers as necessary.
- Repair or replace any leaking or defective containers and replace labels as necessary.
- Maintain caps and/or covers on containers.

Erosion and Sediment Control

- Sediment control will be achieved through routine sweeping in the parking area and a regular waste collection schedule.

Management of Runoff

- See Minimize or Prevent Exposure for more information.

4.4 Spill Prevention and Response

Under Section 2.3.7.b.ii.4.d of the 2016 Small MS4 General Permit:

"Spill Prevention and Response: The permittee shall minimize the potential for leaks, spills, and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur. At a minimum, the permittee shall have procedures that include:

- *Preventive measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling.*

- *Response procedures that include notification of appropriate facility personnel, emergency agencies, and regulatory agencies, and procedures for stopping, containing, and cleaning up leaks, spills and other releases. Measures for cleaning up hazardous material spills or leaks shall be consistent with applicable Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR section 264 and 40 CFR section 265. Employees who may cause, detect, or respond to a spill or leak shall be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of the Pollution Prevention Team; and*
- *Contact information for individuals and agencies that shall be notified in the event of a leak, spill, or other release. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under 40 CFR section 110, 40 CFR section 117, or 40 CFR section 302, occurs during a 24-hour period, the permittee shall notify the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR section 110, 40 CFR section 117, and 40 CFR section 302 as soon as the permittee has knowledge of the discharge. State or local requirements may necessitate reporting spills or discharges to local emergency, public health or drinking water supply agencies, and owners of public drinking water supplies. Contact information shall be in locations that are readily accessible and available."*

Currently, no fueling of equipment or vehicles is performed on-site, and there is no collection or storage of hazardous materials or petroleum-based products. However, there is the potential for spills or leaks of hydraulic fluid from the compactor hoses, from stored materials, or from visitor vehicles.

Spills and leaks together are one of the largest industrial sources of storm water pollutants, and in most cases are avoidable. Establishing standard operating procedures such as safety and proper employee training can reduce these accidental releases. Avoiding spills and leaks is preferable to cleaning after they occur, not only from an environmental standpoint, but also because spills and leaks cause increased operating costs and lower productivity.

The following is a list of some additional activities or alterations that may be implemented to reduce the potential of spills or impacts of storm water quality. The Pollution Prevention Team should consider the following items in developing their final procedures:

- Adopt effective housekeeping practices
- Perform regular visual inspections to identify signs of wear on tanks, drums, containers, storage shelves, and to identify sloppy housekeeping
- Use tight sealing lids on all fluid containers
- Perform preventative maintenance equipment
- Use clay or synthetic absorbents to confine or contain any liquid chemical spills
- Use filling procedures for drums and other equipment that minimize spills
- Use material transfer procedures that reduce the probability of leaks or spills
- Assign specific individuals as members of a trained spill response team

Standard spill response procedures for liquid chemicals include the following:

- Small Spills (<1 Gallon): Wipe using rags or other readily available absorbent material. Cleanup materials are segregated and disposed of as hazardous or non-hazardous waste, depending on the nature of the spill.
- Medium Spills (1 to <10 Gallons, In-House Report): These spills would be immediately contained and cleaned up using absorbent material such as kitty litter or Speedi-Dri. The used material should then be swept up and disposed of properly.
- Large Spills (≥10 Gallons, Reportable Spill): In case of a large spill operations are shut down and a designated contractor is called. Operations would not start up again until it was deemed safe to do so by the commanding officer in charge of the spill.

Spills must be reported to MassDEP for all spills of materials listed in 310 CMR 40.1600 above their corresponding reportable quantity. Federal reporting requirements may also be applicable as referenced in the EPA regulation 40 CFR 122.41(l)(6).

4.5 Employee Training

Requirements for annual employee training on implementation of the SWPPP is described in Section 2.3.7.b.ii.4.h of the 2016 Small MS4 General Permit:

"The permittee shall regularly train employees who work in areas where materials or activities are exposed to stormwater, or who are responsible for implementing activities identified in the SWPPP (e.g., inspectors, maintenance personnel), including all members of the Pollution Prevention Team. Training shall cover both the specific components and scope of the SWPPP and the control measures required under this part, including spill response, good housekeeping, material management practices, any best management practice operation and maintenance, etc. EPA recommends annual training. The permittee shall document the following information for each training:

- *The training date, title and training duration;*
- *List of municipal attendees;*
- *Subjects covered during training"*

The Hampden Highway Department is responsible for stormwater management training for Transfer Station employees. Employee training will be conducted upon hiring and on an annual basis thereafter to inform personnel responsible for implementing the activities described in this Plan, or otherwise responsible for stormwater management, of the components and goals of this Plan. Personnel will be trained in the proper operation and maintenance of equipment as well as in procedures to follow during an emergency. The purpose of the training is to ensure that discharges are prevented, and spill response procedures are reviewed.

Training will consist of classroom and/or hands-on sessions and will be arranged by the Primary SWPPP Coordinator. At a minimum, annual training will cover applicable stormwater regulations, stormwater pollution prevention concepts, the goals of this SWPPP, and structural controls and nonstructural controls (BMPs), including spill prevention and response, inspection, reporting, and general good housekeeping practices.

The SWPPP training can be periodically combined with other required training topics, such as the Illicit Discharge Detection and Elimination (IDDE) training. Documentation of training, including dates held, topics covered, and a list of attendees, shall be retained on-site. An example training record is included in **Appendix D**.

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SECTION 5

Section 5
Stormwater Controls

As described in Section 2.3.7.b.ii.3 of the 2016 Small MS4 General Permit, the Town is required to implement and maintain stormwater controls at the SWPPP facility:

"The permittee shall select, design, install, and implement the control measures detailed in paragraph iv below to prevent or reduce the discharge of pollutants from the permittee owned facility.

The selection, design, installation, and implementation of the control measures shall be in accordance with good engineering practices and manufacturer's specifications. The permittee shall also take all reasonable steps to control or address the quality of discharges from the site that may not originate at the facility.

If the discharge from the facility is to a water quality limited water and the facility has the potential to discharge the pollutant identified as causing the water quality limitation, the permittee shall identify the control measures that will be used to address this pollutant at the facility so that the discharge does not cause or contribute to a violation of a water quality standard."

Also, under Section 2.3.7.b.ii.4.i of the 2016 Small MS4 General Permit:

"Maintenance of Control Measures: The permittee shall maintain all control measures, required by this permit in effective operating condition. The permittee shall keep documentation onsite that describes procedures and a regular schedule for preventative maintenance of all control measures and discussions of back-up practices in place should a runoff event occur while a control measure is off-line. Nonstructural control measures shall also be diligently maintained (e.g., spill response supplies available, personnel trained)."

5.1 Operations and Maintenance

The Hampden Highway Department shall maintain all structural and non-structural control measures in effective operating condition. Non-structural control measures shall be diligently maintained (e.g., spill response supplies available, personnel trained).

There are no catch basins on-site. The perimeter swale (**Figure 4.5**) discharges to a rip-rap channel to a wooded area as shown on **Figure 4** in **Appendix B**.

Figure 4.5: Perimeter swale, looking northeast from entrance road to Transfer Station.

The drainage system and stormwater BMPs should be inspected according to **Section 6** and maintained as follows:

- Avoid disposing of snow in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- Additional information about selecting a location and best practices for snow removal and stockpiling are in MassDEP's Snow Disposal Guidance included in **Appendix C**.
- The drainage system and stormwater BMPs on-site, including the perimeter swale, must be maintained according to the Massachusetts Stormwater Handbook, Volume 2. Excerpts are provided in **Appendix C**.

It may be necessary in the future for the Town to make additional site improvements and implement structural controls beyond the BMPs described in **Section 4**. For example, to further limit the migration of sediment and stockpiled materials into the catch basins on site, the Town may consider covering the stockpiles or grading runoff from the site toward a structural BMP to treat runoff.

Records for all maintenance activities may be kept in **Appendix D** of this plan or electronically.

5.2 Site Inspections

As described in **Section 6**, the Town will perform regular site inspections to monitor compliance with this SWPPP. If the following conditions are observed, corrective measures must be taken.

- Migration of materials (sediment, bulk materials, debris) and visible pollutants (oil sheen) to the surrounding wetlands
- Erosion or other damage to vegetated areas around the site perimeter

If these conditions are recurring, it may be necessary for the Town to make additional site improvements and install or improve structural controls at the Town of Hampden Transfer Station.

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SECTION 6

Section 6
Inspections

Inspections of SWPPP facilities are required per Section 2.3.7.b.iii of the 2016 Small MS4 General Permit:

"Inspect all areas that are exposed to stormwater and all stormwater control measures. Inspections shall be conducted at least once each calendar quarter. More frequent inspections may be required if significant activities are exposed to stormwater. Inspections shall be performed when the facility is in operation. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring."

The Town is required to conduct quarterly facility inspections, as described in this section and in the 2016 Small MS4 General Permit. Mark Langone, the Hampden Highway Superintendent, will be responsible for conducting all site inspections and preparing the necessary documentation.

6.1 Routine Facility Inspections

Inspect all areas that are exposed to stormwater and all stormwater control measures. Inspections shall be conducted at least quarterly (i.e., once each calendar quarter) and may follow the following schedule to coincide with the Fiscal Year and Permit Year:

- Q1: July through September
- Q2: October through December
- Q3: January through March
- Q4: April through June

Figure 6.1. Perimeter swale, looking south. Cross Road is visible on the right.

As described in Section 2.3.7.b.iii.1 of the 2016 Small MS4 General Permit, the facility must be in operation during all inspections, and **at least one of the quarterly inspections must occur while a stormwater discharge is actively occurring**.

The following information must be documented for each routine facility inspection:

- The inspection date and time
- The name of the inspector
- Weather information and a description of any discharge occurring at the time of the inspection
- Identification of any previously unidentified discharges from the site
- Any control measures needing maintenance or repair
- Any failed control measures that need replacement
- Any SWPPP changes required as a result of the inspection.

Quarterly inspections should be documented using the Quarterly Inspection Form included in **Appendix D**.

6.2 Corrective Actions

If during the inspections, or any other event or observation, the SWPPP Inspector identifies control measures that need repair or are not operating effectively, the Hampden Board of Health is required to repair or replace them before the next anticipated storm event if possible, or as soon as practicable following that storm event. In the interim, back-up measures must be put in place to ensure that the quality of the stormwater discharge is not diminished. There is no grace period for making repairs to any control measures.

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SECTION 7

Section 7
Record Keeping and Reporting

7.1 SWPPP Records

Per Section 2.3.7.b.iv of the 2016 Small MS4 General Permit, the Town must keep a written record (either hard copy or electronic) of all activities associated with the development and implementation of the SWPPP. These activities include, but are not limited to, maintenance, inspections, and training. The Town shall maintain all records associated with the development and implementation of the SWPPP for a period of at least five years. These records shall be made available to State or Federal inspectors and the general public upon request.

As outlined in **Section 6**, the findings of all site inspections must be included in the annual reports submitted to the EPA in accordance with Section 2.3.7.b.iii of the 2016 Small MS4 General Permit.

7.2 SWPPP Revisions

The Town may update or revise the SWPPP as needed. Changes that may trigger revision include, but are not limited to, the following:

- Physical changes to the facility that expose any potential pollutant, which is not presently exposed, to groundwater
- Presence of a new authorized non-stormwater discharge at the facility
- Addition of an activity not previously addressed in this SWPPP, which introduces a new potential pollutant

If it is necessary to modify or update the SWPPP, the Highway Department should follow this procedure to formalize the changes:

- Keep a log with a description of the modification, the date, and the name and signature of the person making it
- Re-sign and date the certification statement in Section 8 of this SWPPP

A SWPPP revision log and additional certification statements are located in **Appendix D**.

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SECTION 8

Section 8
SWPPP Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name: Robert T. Markel Title: Town Adm.

Signature: Robert T. Markel Date: 9.1.2020

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APPENDIX A

United States Environmental Protection Agency (EPA)
National Pollutant Discharge Elimination System (NPDES)

GENERAL PERMITS FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS IN MASSACHUSETTS

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act (CWA), as amended (33 U.S.C. §1251 *et seq.*), and the Massachusetts Clean Waters Act, as amended (M.G.L. Chap.21 §§ 26-53), any operator of a small municipal separate storm sewer system whose system:

- Is located in the areas described in part 1.1;
- Is eligible for coverage under part 1.2 and part 1.9; and
- Submits a complete and accurate Notice of Intent in accordance with part 1.7 of this permit and EPA issues a written authorization

is authorized to discharge in accordance with the conditions and the requirements set forth herein.

The following appendices are also included as part of these permits:
Appendix A – Definitions, Abbreviations, and Acronyms;
Appendix B – Standard permit conditions applicable to all authorized discharges;
Appendix C – Endangered Species Act Eligibility Guidance;
Appendix D – National Historic Preservation Act Eligibility Guidance;
Appendix E – Information required for the Notice of Intent (NOI);
Appendix F – Requirements for MA Small MS4s Subject to Approved TMDLs;
Appendix G – Impaired Waters Monitoring Parameter Requirements;
Appendix H – Requirements related to discharges to certain water quality limited waterbodies;

These permits become effective on **July 1, 2017**.

These permits and the authorization to discharge expire at midnight, **June 30, 2022**.

Signed this 4th day of April 2016

Ken Moraff, Director
Office of Ecosystem Protection
United States Environmental Protection Agency
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Signed this 4th day of April 2016

Douglas E. Fine
Assistant Commissioner for Water Resources
Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

The assessment should indicate if the practices are allowed in the MS4 jurisdiction and under what circumstances are they allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The permittee shall report in each annual report on its findings and progress towards making the practices allowable.(Information available at: http://www.epa.gov/region1/npdes/stormwater/assets/pdf/AddressingBarrier2LID.pdf and http://www.mapc.org/resources/low-impact-dev-toolkit/local-codes-lid)

d. Four (4) years from the effective date of this permit, the permittee shall identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area. Properties and infrastructure for consideration shall include those with the potential for reduction of on-site impervious area (IA) as well as those that could provide reduction of off-site IA. At a minimum, the permittee shall consider municipal properties with significant impervious cover (including parking lots, buildings, and maintenance yards) that could be modified or retrofitted. MS4 infrastructure to be considered includes existing street right-of-ways, outfalls and conventional stormwater conveyances and controls (including swales and detention practices) that could be readily modified or retrofitted to provide reduction in frequency, volume or pollutant loads of such discharges through reduction of impervious cover.

In determining the potential for modifying or retrofitting particular properties, the permittee shall consider factors such as access for maintenance purposes; subsurface geology; depth to water table; proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems; and opportunities for public use and education. In determining its priority ranking, the permittee shall consider factors such as schedules for planned capital improvements to storm and sanitary sewer infrastructure and paving projects; current storm sewer level of service; and control of discharges to water quality limited waters, first or second order streams, public swimming beaches, drinking water supply sources and shellfish growing areas.

Beginning with the fifth year annual report and in each subsequent annual report, the permittee shall identify additional permittee owned sites and infrastructure that could be retrofitted such that the permittee maintains a minimum of 5 sites in their inventory, until such a time as when the permittee has less than 5 sites remaining. In addition, the permittee shall report on all properties that have been modified or retrofitted with BMPs to mitigate IA that were inventoried in accordance with this part. The permittee may also include in its annual report non-MS4 owned property that has been modified or retrofitted with BMPs to mitigate IA.

2.3.7. Good House Keeping and Pollution Prevention for Permittee Owned Operations

Objective: The permittee shall implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.

a. Operations and Maintenance Programs

i. Within two (2) years from the effective date of the permit, the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for the municipal activities listed below in part 2.3.7.a.ii. These written procedures shall be included as part of the SWMP.

waters. These materials should be managed in compliance with current MassDEP policies:

- For catch basins cleanings: http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html
- For street sweepings: http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf.

5. The permittee shall establish and implement procedures for winter road maintenance including the use and storage of salt and sand; minimize the use of sodium chloride and other salts, and evaluate opportunities for use of alternative materials; and ensure that snow disposal activities do not result in disposal of snow into waters of the United States. For purposes of this MS4 Permit, salt shall mean any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

6. The permittee shall establish and implement inspection and maintenance frequencies and procedures for all stormwater treatment structures such as water quality swales, retention/detention basins, infiltration structures, proprietary treatment devices or other similar structures. All permittee-owned stormwater treatment structures (excluding catch basins) shall be inspected annually at a minimum.

iv. The permittee shall report in the annual report on the status of the inventory required by this part and any subsequent updates; the status of the O&M programs for the permittee-owned facilities and activities in part 2.3.7.a.ii; and the maintenance activities associated with each.

v. The permittee shall keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance activities, inspections and training required by part 2.3.7.a. The permittee shall maintain, consistent with part 4.2.a, all records associated with maintenance and inspection activities required by part 2.3.7.a.

b. Stormwater Pollution Prevention Plan (SWPPP)

The permittee shall develop and fully implement a SWPPP for each of the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater as determined by the permittee. If facilities are located at the same property, the permittee may develop one SWPPP for the entire property. The SWPPP is a separate and different document from the SWMP required in part 1.10. A SWPPP does not need to be developed for a facility if the permittee has either developed a SWPPP or received a no exposure certification for the discharge under the Multi-Sector General Permit or the discharge is authorized under another NPDES permit.

i. No later than two (2) years from the effective date of the permit, the permittee shall develop and implement a written (hardcopy or electronic) SWPPP for the facilities described above. The SWPPP shall be signed in accordance with the signatory requirements of Appendix B – Subparagraph 11.

ii. The SWPPP shall contain the following elements:

1. Pollution Prevention Team
   Identify the staff on the team, by name and title. If the position is unstaffed, the title of the position should be included and the SWPPP updated when the position is filled. The role of the team is to develop, implement, maintain, and revise, as necessary, the SWPPP for the facility.

2. Description of the facility and identification of potential pollutant sources
   The SWPPP shall include a map of the facility and a description of the activities that occur at the facility. The map shall show the location of the stormwater outfalls, receiving waters, and any structural controls. Identify all activities that occur at the facility and the potential pollutants associated with each activity including the location of any floor drains. These may be included as part of the inventory required by part 2.3.7.a.

3. Identification of stormwater controls
   The permittee shall select, design, install, and implement the control measures detailed in paragraph iv below to prevent or reduce the discharge of pollutants from the permittee owned facility.

   The selection, design, installation, and implementation of the control measures shall be in accordance with good engineering practices and manufacturer's specifications. The permittee shall also take all reasonable steps to control or address the quality of discharges from the site that may not originate at the facility.

   If the discharge from the facility is to a water quality limited water and the facility has the potential to discharge the pollutant identified as causing the water quality limitation, the permittee shall identify the control measures that will be used to address this pollutant at the facility so that the discharge does not cause or contribute to a violation of a water quality standard.

4. The SWPPP shall include the following management practices:
   a) Minimize or Prevent Exposure: The permittee shall to the extent practicable either locate materials and activities inside, or protect them with storm-resistant coverings in order to prevent exposure to rain, snow, snowmelt and runoff (although significant enlargement of impervious surface area is not recommended). Materials do not need to be enclosed or covered if stormwater runoff from affected areas will not be discharged directly or indirectly to surface waters or to the MS4 or if discharges are authorized under another NPDES permit.

   b) Good Housekeeping: The permittee shall keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals. Ensure that trash containers are closed when not in use, keep storage areas well swept and free from leaking or damaged containers; and store leaking vehicles needing repair indoors.

   c) Preventative Maintenance: The permittee shall regularly inspect, test, maintain, and repair all equipment and systems to avoid situations that

may result in leaks, spills, and other releases of pollutants in stormwater to receiving waters. Inspections shall occur at a minimum once per quarter.

d) Spill Prevention and Response: The permittee shall minimize the potential for leaks, spills, and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur. At a minimum, the permittee shall have procedures that include:

- Preventive measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling.
- Response procedures that include notification of appropriate facility personnel, emergency agencies, and regulatory agencies, and procedures for stopping, containing, and cleaning up leaks, spills and other releases. Measures for cleaning up hazardous material spills or leaks shall be consistent with applicable Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR section 264 and 40 CFR section 265. Employees who may cause, detect, or respond to a spill or leak shall be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of the Pollution Prevention Team; and
- Contact information for individuals and agencies that shall be notified in the event of a leak, spill, or other release. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under 40 CFR section 110, 40 CFR section 117, or 40 CFR section 302, occurs during a 24-hour period, the permittee shall notify the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR section 110, 40 CFR section 117, and 40 CFR section 302 as soon as the permittee has knowledge of the discharge. State or local requirements may necessitate reporting spills or discharges to local emergency, public health or drinking water supply agencies, and owners of public drinking water supplies. Contact information shall be in locations that are readily accessible and available.

e) Erosion and Sediment Control: The permittee shall use structural and non-structural control measures at the facility to stabilize and contain runoff from exposed areas and to minimize or eliminate onsite erosion and sedimentation. Efforts to achieve this may include the use of flow velocity dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion.

f) Management of Runoff: The permittee shall manage stormwater runoff from the facility to prevent or reduce the discharge of pollutants. This may include management practices which divert runoff from areas that

are potential sources of pollutants, contain runoff in such areas, or reuse, infiltrate or treat stormwater to reduce the discharge of pollutants.

g) Salt Storage Piles or Piles Containing Salt: For storage piles of salt or piles containing salt used for deicing or other purposes (including maintenance of paved surfaces) for which the discharge during precipitation events discharges to the permittee's MS4, any other storm sewer system, or to a Water of the US, the permittee shall prevent exposure of the storage pile to precipitation by enclosing or covering the storage piles. Such piles shall be enclosed or covered within two (2) years of the permit effective date. The permittee shall implement appropriate measures (e.g., good housekeeping, diversions, containment) to minimize exposure resulting from adding to or removing materials from the pile. The permittee is encouraged to store piles in such a manner as not to impact surface water resources, ground water resources, recharge areas, and wells.

h) Employee Training: The permittee shall regularly train employees who work in areas where materials or activities are exposed to stormwater, or who are responsible for implementing activities identified in the SWPPP (e.g., inspectors, maintenance personnel), including all members of the Pollution Prevention Team. Training shall cover both the specific components and scope of the SWPPP and the control measures required under this part, including spill response, good housekeeping, material management practices, any best management practice operation and maintenance, etc. EPA recommends annual training.

The permittee shall document the following information for each training:

- The training date, title and training duration;
- List of municipal attendees;
- Subjects covered during training

i) Maintenance of Control Measures: The permittee shall maintain all control measures, required by this permit in effective operating condition. The permittee shall keep documentation onsite that describes procedures and a regular schedule for preventative maintenance of all control measures and discussions of back-up practices in place should a runoff event occur while a control measure is off-line. Nonstructural control measures shall also be diligently maintained (e.g., spill response supplies available, personnel trained).

iii. The permittee shall conduct the following inspections:

1. Site Inspections: Inspect all areas that are exposed to stormwater and all stormwater control measures. Inspections shall be conducted at least once each calendar quarter. More frequent inspections may be required if significant activities are exposed to stormwater. Inspections shall be performed when the facility is in operation. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

The permittee shall document the following information for each facility inspection:

- The inspection date and time;
- The name of the inspector;
- Weather information and a description of any discharge occurring at the time of the inspection;
- Identification of any previously unidentified discharges from the site;
- Any control measures needing maintenance or repair;
- Any failed control measures that need replacement.
- Any SWPPP changes required as a result of the inspection.

If during the inspections, or any other time, the permittee identifies control measures that need repair or are not operating effectively, the permittee shall repair or replace them before the next anticipated storm event if possible, or as soon as practicable following that storm event. In the interim, the permittee shall have back-up measures in place.

The permittee shall report the findings from the Site Inspections in the annual report.

iv. The permittee must keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance, inspections, and training required by part 2.3.7.b.The permittee shall maintain all records associated with the development and implementation of the SWPPP required by this part consistent with the requirements of part 4.2.

3.0. Additional Requirements for Discharges to Surface Drinking Water Supplies and Their Tributaries

a. Permittees which discharge to public surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries should consider these waters a priority in the implementation of the SWMP.

b. Permittees should provide pretreatment and spill control measures to stormwater discharges to public drinking water supply sources or their tributaries to the extent feasible.

c. Direct discharges to Class A waters should be avoided to the extent feasible.

4.0. Program Evaluation, Record Keeping, and Reporting

4.1. Program Evaluation

a. The permittee shall annually self-evaluate its compliance with the terms and conditions of this permit and submit each self-evaluation in the Annual Report. The permittee shall also maintain the annual evaluation documentation as part of the SWMP.

b. The permittee shall evaluate the appropriateness of the selected BMPs in achieving the objectives of each control measure and the defined measurable goals. Where a BMP is found to be ineffective the permittee shall change BMPs in accordance with the provisions below. In addition, permittees may augment or change BMPs at any time following the provisions below:

APPENDIX B

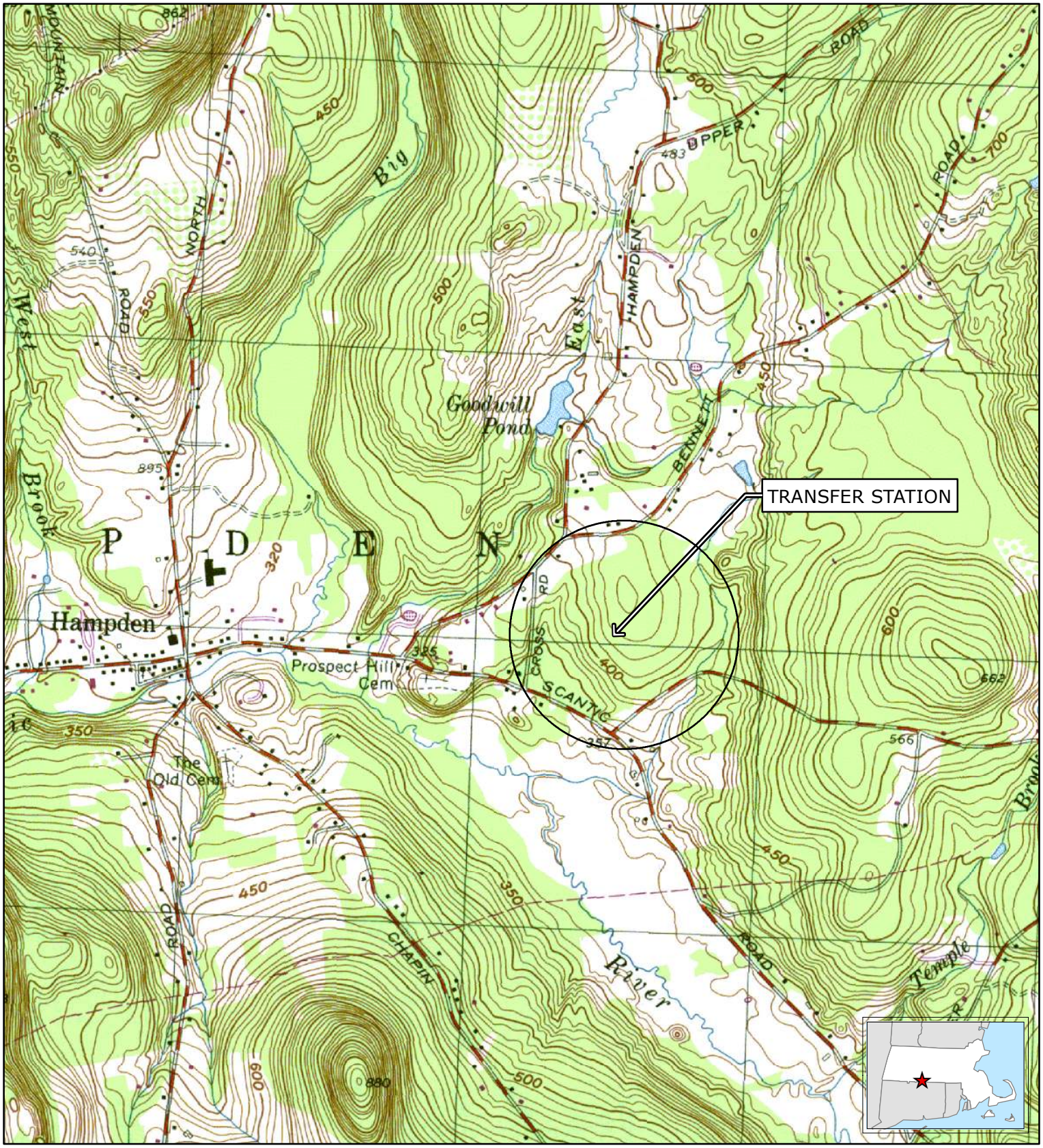

FIGURE 1
SITE LOCATION

Transfer Station SWPPP
Hampden, Massachusetts

Tighe&Bond
Engineers | Environmental Specialists

Based on USGS Topographic Map for hAMPDEN, MA Revised 1979
Circle indicates a quarter mile radius
Contour Interval Equals 10 ft

1:18,000
0 1,000 2,000
Feet

N

January 2020

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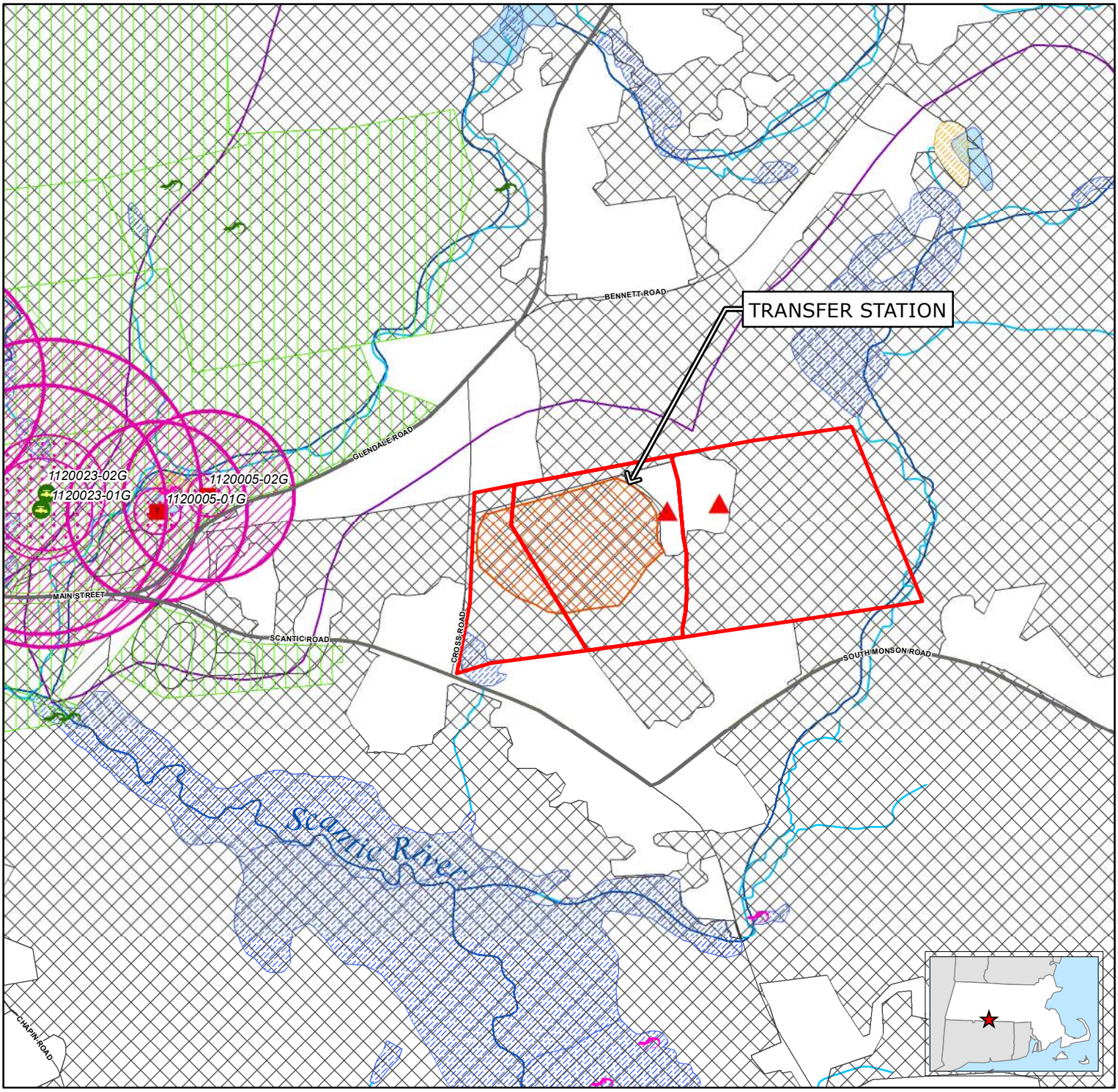

Legend

- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- Non-Landfill Solid Waste Sites
- Proposed Well
- Emergency Surface Water
- Community Public Water Supply - Surface Water
- Community Public Water Supply - Groundwater
- Non-Community Non-Transient Public Water Supply
- Non-Community Transient Public Water Supply
- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access
- Other Numbered Highway
- Major Road - Collector
- Minor Street or Road
- Aquaducts
- Hydrologic Connections
- Stream/Intermittent Stream
- Powerline
- Pipeline
- Track or Trail
- Trains
- Public Surface Water Supply Protection Area (Zone A)
- DEP Approved Wellhead Protection Area (Zone I)
- DEP Approved Wellhead Protection Area (Zone II)
- DEP Interim Wellhead Protection Area (IWPA)
- Protected and Recreational Open Space
- Solid Waste Landfill
- Area of Critical Environmental Concern (ACEC)
- NHESP Priority Habitats for Rare Species
- NHESP Estimated Habitats for Rare Wildlife
- EPA Designated Sole Source Aquifer
- Major Drainage Basin
- Sub Drainage Basin
- MassDEP Open Water
- MassDEP Inland Wetlands
- MassDEP Coastal Wetlands
- MassDEP Not Interpreted Wetlands
- Public Surface Water Supply (PSWS)
- Water Bodies
- Non-Potential Drinking Water Source Area - High Yield
- Non-Potential Drinking Water Source Area - Medium Yield
- Potentially Productive Medium Yield Aquifer
- Potentially Productive High Yield Aquifer
- County Boundary
- Town Boundary
- USGS Quadrangle Sheet Boundary
- Transfer Station

1:8,000

0 300 600

Feet

N

FIGURE 2
PRIORITY RESOURCES

Transfer Station SWPPP
Hampden, Massachusetts

Data source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology
Data valid as of January 2020.

January 2020

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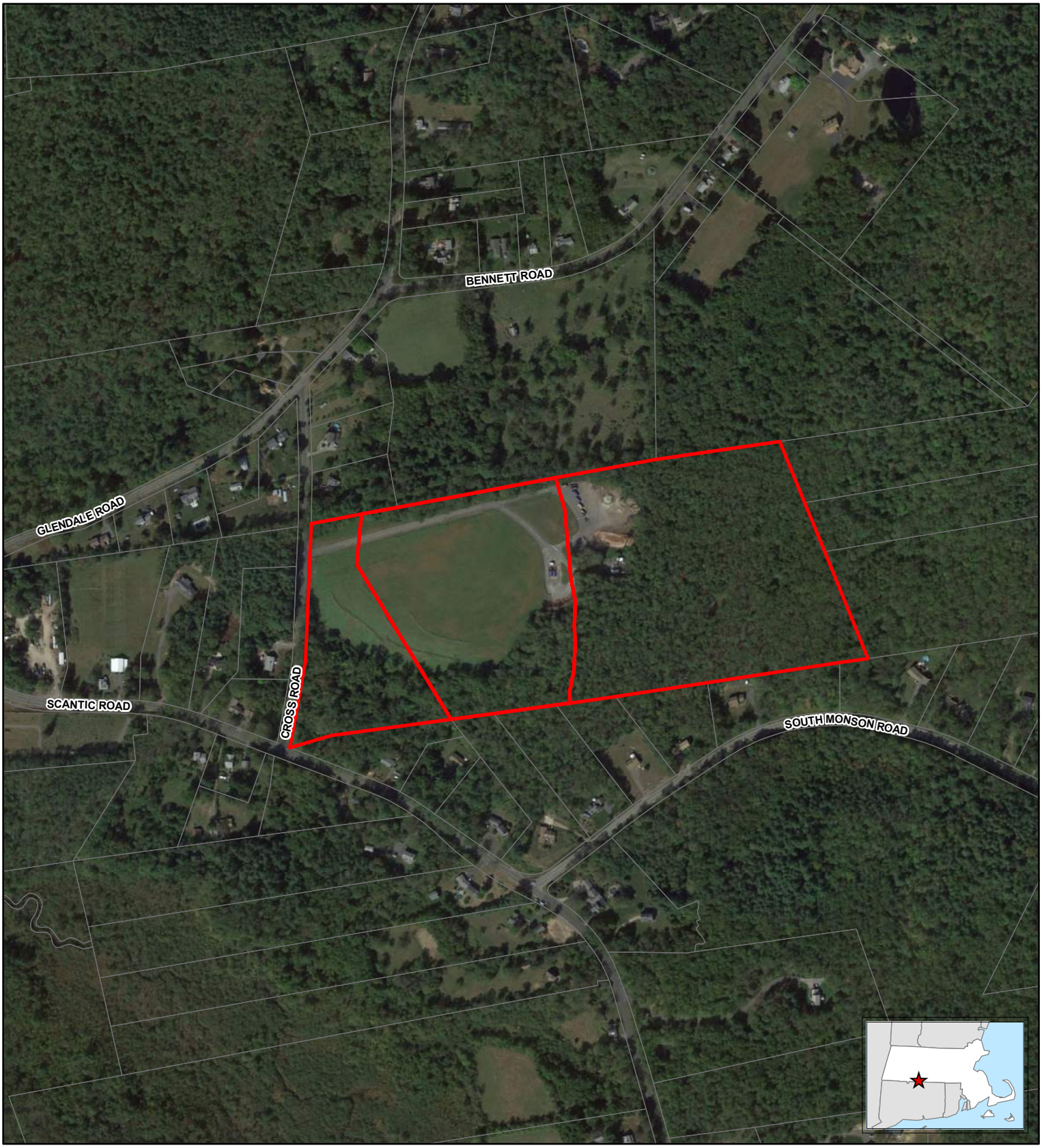

Legend

Transfer Station

Parcels

Tighe&Bond
Engineers | Environmental Specialists

1. Based on MassGIS Color Orthophotography (2013)
2. Data Source: Office of Geographic Information (MassGIS) Commonwealth of Massachusetts, MassIT Executive Office of Environmental Affairs. Data valid as of November 2019

1:6,000

0 200 400

Feet

N

FIGURE 3
AERIAL PHOTOGRAPH

Transfer Station SWPPP
Hampden, Massachusetts

January 2020

J:\H\H1436 Hampden\015 - MS4 Year 2 Compliance\Reports\SWPPPs\Transfer Station\Appendix B - Figures\GIS\Figure 3 - Aerial Photograph - MUNICIPAL ONLY.mxd [Exported By: KDippold, 1/16/2020, 4:45:34 PM]

H-1436

Legend

Transfer Station

Parcels

Tighe&Bond
Engineers | Environmental Specialists

1. Based on MassGIS Color Orthophotography (2013)
2. Data Source: Office of Geographic Information (MassGIS) Commonwealth of Massachusetts, MassIT Executive Office of Environmental Affairs. Data valid as of November 2019

1:3,686.54017

0 200 400

Feet

N

FIGURE 4
SITE PLAN

Transfer Station SWPPP
Hampden, Massachusetts

July 2020

\\tighebond.com\data\Data\Projects\H\H1436 Hampden\015 - MS4 Year 2 Compliance\Reports\SWPPPs\Transfer Station\Draft\Appendix B - Figures\GIS\Figure 4 - Site Plan.mxd [Exported By: KDippold, 7/22/2020, 9:39:03 AM]

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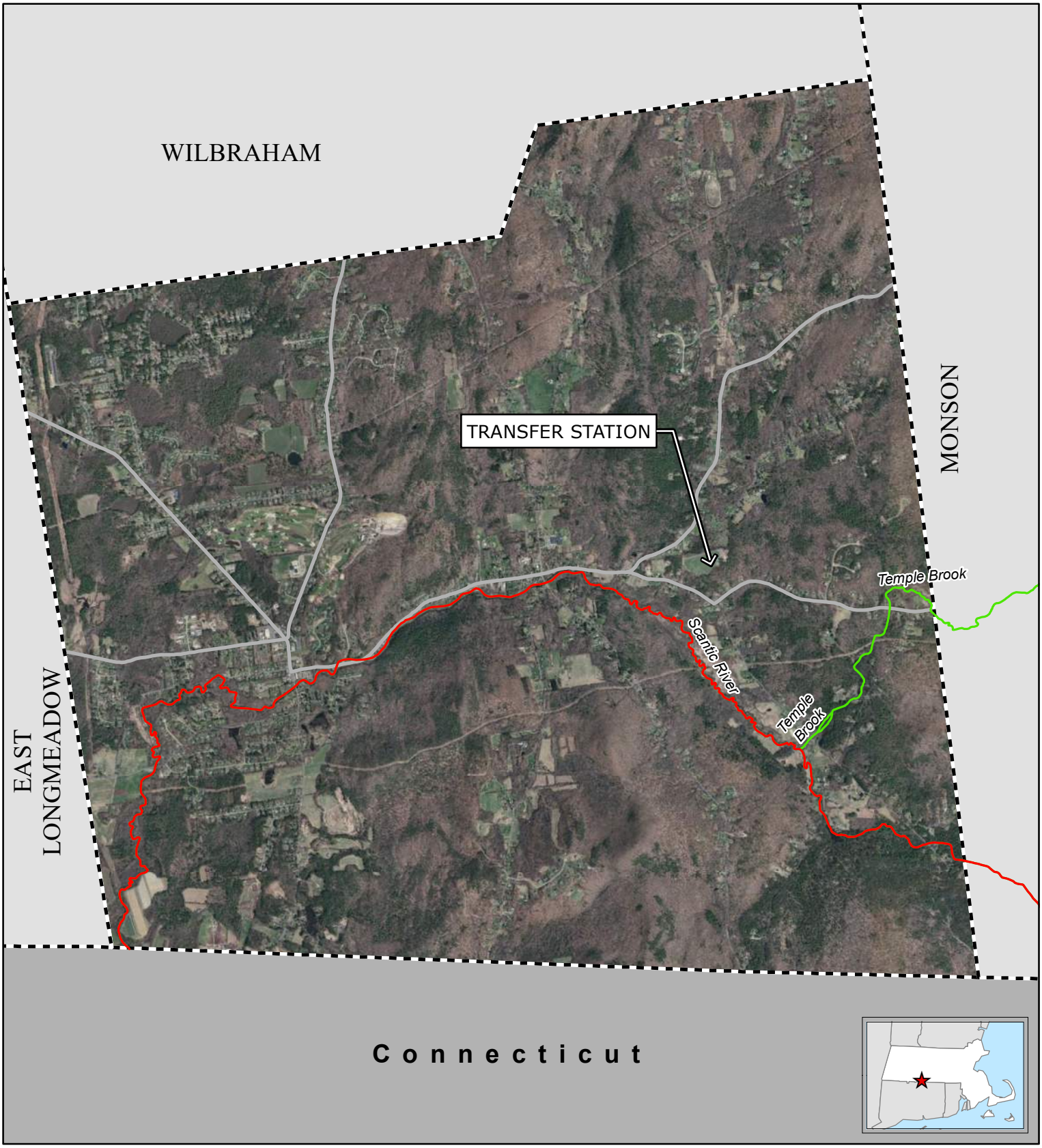

Legend

Water Body Segments - Rivers (arcs)
Category
- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

Water Body Segments - Lakes, Estuaries (polygons)
Category
- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

MassDOT Major Roads
Road Type
- Limited Access Highway
- Multi-lane Hwy, not limited access
- Other Numbered Highway
- Major Road, Collector
- Town Boundary
- Connecticut

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1. Based on MassGIS Color Orthophotography (2013)
2. Data Source: Office of Geographic Information (MassGIS) Commonwealth of Massachusetts, MassIT Executive Office of Environmental Affairs. Data valid as of November 2019
3. Integrated List Data based on Massachusetts Year 2016 Integrated List of Waters

0 1,500 3,000
Feet

N

1:45,000

FIGURE 5
INTEGRATED LIST OF WATERS

Transfer Station SWPPP
Hampden, Massachusetts

January 2020

APPENDIX C

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

REUSE AND DISPOSAL OF STREET SWEEPINGS

DEPARTMENT OF ENVIRONMENTAL PROTECTION

POLICY # BAW-18-001

(SUPERSEDES POLICY # BWP-94-092)

This Policy provides guidance to the regulated community about the Department of Environmental Protection's requirements, standards, and approvals for handling reuse or disposal of street sweepings. This Policy supersedes Department Policy BWP-94-092.

5/14/18
Date

Christine Kirby
Assistant Commissioner

POLICY #BAW-18-001
TABLE OF CONTENTS

1. Policy Statement and Scope

This Policy explains MassDEP requirements for managing Street Sweepings. Street Sweepings are "solid waste" subject to the Massachusetts solid waste regulations. The options for managing Street Sweepings are as follows.

- Use the Street Sweepings in accordance with the preapproved uses described in Section 4 of this policy.
- Use the Street Sweepings for a beneficial use not included in the list of preapproved uses after obtaining a permit from MassDEP under the provisions of the solid waste regulations, 310 CMR 19.060, Beneficial Use of Solid Wastes.
- Dispose of Street Sweepings at a permitted solid waste landfill.

2. Applicability

This policy applies to the reuse or disposal of Street Sweepings that are generated in the ordinary and customary cleaning of roadways and parking lots. This policy does not apply to catch basin cleanings or Street Sweepings mixed with catch basin cleanings or any other type of wastes. The disposal and reuse of catch basin cleanings is discussed in the "Management of Catch Basin Cleanings" Fact Sheet issued by the MassDEP (https://www.mass.gov/lists/massdep-solid-waste-policies-guidance-fact-sheets).

This policy does not apply to the material generated as the result of the clean-up of an oil or hazardous material spill. However, Street Sweepings that are generated in the ordinary and customary maintenance of roadways and parking lots are not exempt from the Hazardous Waste Regulations, 310 CMR 30.000, and must be handled as hazardous waste when they exhibit any of the characteristics of a hazardous waste. If there is no evidence of unusual contamination, MassDEP does not require Street Sweepings to be routinely tested, but, as is the case with any waste, the generator has the ultimate responsibility for determining whether the waste is a hazardous waste.

Although Street Sweepings are not considered soil, they may be managed under Policy #COMM-97-001, "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills", in accordance with Section 5.5 of this policy.

3. Definitions

This section contains definitions of the important terms used in this Policy.

Department or *MassDEP* means the Massachusetts Department of Environmental Protection.

Parking lots mean publicly or privately owned paved areas that provide access for the general public to park their car while patronizing retail or service businesses. Parking lots also include the paved areas used by the employees at office parks and businesses.

Private way means the strip of land over and under a privately owned, paved road or highway.

Public way means the strip of land over and under a publicly owned, paved road or highway and includes the publicly owned land adjacent to the road or highway.

Street Sweepings means materials consisting primarily of sand and soil generated during the routine cleaning of roadways or parking lots but may also contain some leaves and other miscellaneous solid wastes collected during street sweeping. Street Sweepings do not include the material generated during the clean-up of a spill or material from other structures associated with a roadway such as catch basins.

Urban center roads mean local roads in central commercial and retail business districts and industrial and manufacturing areas.

4. Handling

4.1 Collection of Street Sweepings

Although MassDEP does not regulate the collection of Street Sweepings, collection practices should be compatible with intended uses. Keeping sweepings from Urban Center Roads separate from sweepings from other areas will provide the generator of the Street Sweepings with the most options under this policy.

This policy does not cover sweepings known to be contaminated by spills, and such sweepings should be collected separately and kept segregated. Depending on the contamination and circumstances, the handling of contaminated sweepings may be governed by the Massachusetts Contingency Plan, 310 CMR 40.0000, the Massachusetts Hazardous Waste Regulations, 310 CMR 30.000, the Massachusetts Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 or the Massachusetts Solid Waste Management Facility Regulations, 310 CMR 19.000.

4.2 Storage

Street Sweepings shall be temporarily stored prior to use, only when the following conditions are satisfied:

- Storage must be:
    - at the site where the sweepings are generated (e.g. at a parking area that was swept);
    - at a location, such as a Department of Public Works (DPW) yard, that is under the control of the governmental entity doing the sweeping or has contracted for the sweeping; or,

  - at other locations with prior written approval from the appropriate MassDEP Regional Office.
- The Street Sweepings shall be protected from wind and rain to the extent necessary to prevent dust, erosion, and off-site migration;
- The Street Sweepings shall not be stored within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas;
- The Street Sweepings shall not be stored within 500 feet of a ground or surface drinking water supply;
- Storage of the Street Sweepings shall incorporate good management practice and result in no public nuisance; and
- Storage of the Street Sweepings must be temporary. Street Sweepings shall be used within one year of collection unless the MassDEP Regional Office where the Street Sweepings are stored grants a written extension. An extension may be granted when it is demonstrated that all storage conditions will continue to be satisfied and the stored Street Sweepings will be put to a specific identified use prior to the expiration of the extension period.

4.3 Preparation Prior to Use

Solid waste, such as paper, auto parts and other trash, shall be removed from all Street Sweepings prior to use. Solid waste screened from the Street Sweepings shall be disposed of at a permitted solid waste facility. Leaves, twigs and other organic matter should also be removed when good engineering practice indicates this is necessary to produce a material that is suitable for the intended use.

5. Approved Uses, Restrictions & Conditions-No Prior Approval Needed from MassDEP

This policy allows Street Sweepings to be used in several applications. An approval from MassDEP is not required when the restrictions and conditions are adhered to as identified in this policy. However, Street Sweepings shall not be used unless prior approval is obtained from the owner of the location where the sweepings are to be used.

5.1 Use at Landfills

Street Sweepings may be used for daily cover at permitted lined solid waste landfills and need no prior MassDEP approval if the Street Sweepings satisfy the requirements for daily cover material specified at 310 CMR 19.130(15). A list of active permitted solid waste landfills can be found on the MassDEP website.

5.2 Use as Fill in Public or Private Ways and Parking Lots

Street Sweepings may be used for fill in public and private ways and parking lots without prior approval from MassDEP only when the following additional restrictions and conditions are observed:

- The Street Sweepings have not been collected from Urban Center Roads (see definition);
- Any collection, storage, or preparation for use of the Street Sweepings shall be in accordance with Sections 4.1 and 4.2 of this policy.
- The Street sweepings have been screened to remove all debris and solid waste and all debris/solid waste screened from the sweepings shall be disposed at a permitted solid waste facility (see Section 8);
- The Street Sweepings are kept above the level of the groundwater;
- The Street Sweepings are not used in designated "No Salt Areas";

- The Street Sweepings are not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas;
- The Street Sweepings are not used within 500 feet of a ground or surface drinking water supply;
- In public ways the Street Sweepings are used under the paved road surface or, except in residential areas, as fill along the side of the road within the public way;
- In private roadways or in residential areas the Street Sweepings are used only under the paved road surface; and
- In parking lots the Street Sweepings are used only under the paved parking surface.

5.3 Use As an Additive to Restricted Use Compost

Street Sweepings may be used as an additive to compost without prior written approval from MassDEP only when the following additional restrictions and conditions are observed:

- The Street Sweepings have not been collected from Urban Center Roads (see definition);
- Any collection, storage, or preparation for use of the Street Sweepings shall be in accordance with Sections 4.1 and 4.2 of this policy.
- The Street Sweepings have been screened to remove all debris and solid waste and all debris and solid waste screened from the sweepings is disposed at a permitted solid waste facility (see Section 8);
- The compost is used only along public ways and parking lot areas;
- The compost is not used in residential areas;
- The compost is kept above the level of the groundwater;
- The compost is not used in designated "No Salt Areas";
- The compost is not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas; and
- The compost is not used within 500 feet of a ground or surface drinking water supply.

5.4 Reuse as Anti-Skid Material

Street Sweepings may be used as a component to anti-skid material (e.g. street sanding material) without prior written approval from MassDEP only when the following additional restrictions and conditions are observed:

- The Street Sweepings have not been collected from Urban Center Roads (see definition);
- Any collection, storage, or preparation for use of the Street Sweepings shall be in accordance with Sections 4.1 and 4.2 of this policy;
- The Street Sweepings have been screened to remove all debris and solid waste and all debris and solid waste screened from the Street Sweepings is disposed at a permitted solid waste facility (see Sections 8);
- The anti-skid material/Street Sweepings are not used in designated "No Salt Areas";
- The anti-skid material/Street Sweepings are not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas; and
- The anti-skid material/Street Sweepings are not used within 500 feet of a ground or surface drinking water supply.

The use of Street Sweepings as anti-skid material in accordance with this policy is not a determination of the efficacy of the material for this purpose. Proper engineering review should be done to ensure the material works as intended.

5.5 Reuse at Landfills Regulated Under MassDEP Policy #COMM-97-001

Street Sweepings may be reused at a permitted Massachusetts landfill and need no prior written MassDEP approval if the sweepings have been adequately characterized pursuant to the MassDEP Policy #COMM-97-001 and the Street Sweepings have been screened to remove debris and solid waste.

All screened debris and solid waste removed from Street Sweepings shall be disposed of at a permitted solid waste facility. Street Sweepings for use at the landfill may contain only incidental, randomly dispersed, de minimis quantities of ash and/or Solid Waste as defined in 310 CMR 16.000 and 310 CMR 19.000, which collectively shall comprise less than 1% by volume of the Street Sweeping materials, as determined by visual inspections. Any Street Sweeping materials approved and brought onto the landfill property for use at the landfill shall contain no more than 5% (by volume) of Asphalt Pavement, Brick, and Concrete ("ABC") material (as defined in 310 CMR 19.000), as determined by visual inspection. Any such material must measure less than 6 inches in any dimension.

Persons who wish to send Street Sweepings to a landfill must comply with MassDEP Policy #COMM-97-001 which requires sampling of the Street Sweepings to demonstrate that the Street Sweepings meet the standards listed in the Policy.

5.6 Use at Reclamation Soil Facilities Regulated Under MassDEP Policy # COMM-15-01

Street Sweepings may be used for fill at a permitted Reclamation Soil Facility (the Facility) and need no prior written MassDEP approval if the Street Sweepings have been adequately characterized pursuant to the Facility-specific Soil/Fill Management Plan and the Street Sweepings have been screened to remove debris and solid waste.

All screened debris and solid waste removed from Street Sweepings shall be disposed of at a permitted solid waste facility. Street Sweepings for use at the Facility may contain only incidental, randomly dispersed, de minimis quantities of ash and/or Solid Waste as defined in 310 CMR 16.000 and 310 CMR 19.000, which collectively shall comprise less than 1% by volume of the Street Sweeping materials, as determined by visual inspections. Any Street Sweeping materials approved and brought onto the property for use at the Facility shall contain no more than 5% (by volume) of ABC material, as determined by visual inspection. Any such material must measure less than 6 inches in any dimension.

Pursuant to Policy # COMM-15-01, persons who wish to send Street Sweepings to a Facility must sample and analyze the Street Sweepings as required by the Facility's Soil/Fill Management Plan and demonstrate that the Street Sweepings meets the Facility's acceptance criteria. Unless specifically addressed in a Facility's Soil/Fill Management Plan, a minimum sampling frequency of 1 sample per 100 cubic yards is required for characterization of Street Sweepings originating from Urban Center Roads. Street Sweepings originating from non-Urban Center Roads may be sampled at a minimum of 1 sample per 500 cubic yards. Regardless of its point of origin, if the total quantity of Street Sweepings is less than 100 cubic yards, a minimum of one composite sample is required for characterization of the material. A list of active permitted Reclamation Soil facilities may be found at https://www.mass.gov/soil-transport-re-use-and-disposal.

6. Approved Use, Restrictions & Conditions- Prior Approval Needed from MassDEP

This policy allows Street Sweepings to be used in several applications. Prior written approval from MassDEP is required when using the Street Sweepings as identified in this section of the policy. In addition, Street Sweepings shall not be used at a location until prior written approval is obtained from the owner of the location where the Street Sweepings are to be used.

6.1 Use as a Bulking Agent for Wastewater Sludge or Septage Disposal

Street Sweepings may be used as a bulking material for wastewater treatment plant sludge or septage when the mixed material will be disposed in a permitted lined or unlined sludge or septage landfill in compliance with MGL Chapter 21, Sections 26-53 and MGL Chapter 83 Sections 6 & 7 provided that the appropriate MassDEP Regional Office's Bureau of Water Resources has granted prior written approval.

7. Other Uses

Any use not approved in this policy requires a MassDEP permit under the Beneficial Use provisions of the Solid Waste Management Facility Regulations at 310 CMR 19.060. A "Beneficial Use Determination" (BUD) can be issued only after the submission of an application characterizing the waste and describing the proposed beneficial use.

8. Disposal

While the beneficial use of Street Sweepings is strongly encouraged, MassDEP does not prohibit the disposal of Street Sweepings. Street Sweepings may be disposed in permitted solid waste landfills without prior approval from the Department.

9. Record Keeping

Any entity using Street Sweeping for any use listed under sections 5.3 or 5.4 shall keep records for a period of three years of the source of the sweepings, the location of use and the amount of sweepings used.

10. Additional Information

For additional copies of this policy, permit application forms or other MassDEP documents, call any MassDEP Regional Office and ask for the Service Center or visit http://www.mass.gov/dep. The permit application numbers for Beneficial Use Determinations are BWP SW 39, 40, 41 and 42.

Copies of all Massachusetts regulations, including the solid waste regulations, are available at the MassDEP website and may also be purchased from the State House Bookstore at 617-727-2834. The solid waste regulations are:

- 310 CMR 16.000, Site Assignment Regulations for Solid Waste Facilities: and,
- 310 CMR 19.000, Solid Waste Management Facility Regulations.

If you have technical questions about the policy, please call any MassDEP Regional Office and ask to speak with a staff member in the solid waste program

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs
Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

Management of Catch Basin Cleanings

Catch basin cleanings - solid materials such as leaves, sand and twigs removed from storm water collection systems during cleaning operations - are typically classified as a solid waste by the Department of Environmental Protection (MassDEP). Catch basin cleanings must be handled and disposed in accordance with the agency's applicable regulations, policies and guidance.

Handling & Disposal

Except as explained below, catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste.

MassDEP does not routinely require storm water only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means. Contaminated catch basin cleanings must be evaluated in accordance with 310 CR 30.000: Hazardous Waste Regulations and handled as hazardous waste if appropriate.

Systems that collect storm water run-off into sanitary sewers are called "combined sewers." MassDEP may require cleanings from combined sewer catch basins to be tested before disposal.

Landfill Restrictions

The MassDEP 310 CMR 19.000: Solid Waste Management Facility Regulations (specifically see Section 19.130(7)) prohibit Massachusetts landfills from accepting materials that contain free draining liquids. When there is no free water in a truck used to transport catch basin cleanings, the agency will generally be satisfied that the material is sufficiently dry. Otherwise, the material will need to undergo a Paint Filter Liquids Test.

One way to remove liquids is to use a hydraulic lift truck during catch basin cleaning operations so that the material can be decanted at the site. After material from several catch basins along the same system is loaded, the truck may be elevated so that any free draining liquid is allowed to flow back into the drainage structure.

MassDEP may approve catch basin cleanings for use as grading and shaping material at landfills undergoing closure (see the agency's Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites for additional information). Catch basin cleanings may be used as daily cover or grading material at active landfills only with specific MassDEP approval of the proposed use.

Consult with the Solid Waste Section Chief in the appropriate MassDEP Regional Office for information about applying for an approval and/or a Beneficial Use Determination (see Section 19.060 for other uses, including non-landfill uses).

Mass.gov

OFFERED BY Massachusetts Department of Environmental Protection(/orgs/massachusetts-department-of-environmental-protection)

Snow Disposal Guidance

This guide will help communities and businesses dispose of plowed snow without harming the environment. The guide includes a link to an interactive map to locate snow disposal sites.

TABLE OF CONTENTS

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Overview

The Massachusetts Department of Environmental Protection's Snow Disposal Guidance offers information on the proper steps to take when locating sites for the disposal of snow. Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. Public safety is of the utmost importance. However, care must be taken to ensure that collected snow, which may be contaminated with road salt, sand, litter, and automotive pollutants such as oil, is disposed of in a manner that will minimize threats to nearby sensitive resource areas.

In order to avoid potential contamination to wetlands, water supplies, and waterbodies, MassDEP recommends that municipalities and businesses identify and map appropriate upland snow disposal locations. To assist municipalities and businesses in this planning effort, and to avoid use of snow disposal at sites which compromise wetlands resources or public water supplies, MassDEP has developed this snow disposal mapping tool:

Feedba

https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/(https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/)

If a community or business demonstrates that there is no remaining capacity at upland snow disposal locations, local conservation commissions are authorized to issue Emergency Certifications under the Massachusetts

Wetlands Protection Act for snow disposal in certain wetland resource areas. In such cases, Emergency Certifications can only be issued at the request of a public agency or by order of a public agency for the protection of the health or safety of citizens, and are limited to those activities necessary to abate the emergency.

In the event of a regional or statewide severe weather event, MassDEP may also issue a broader Emergency Declaration under the Wetlands Protect Act which allows greater flexibility in snow disposal practices. Details of this approval process are found below.

Key Actions

Snow Disposal Mapping Tool
(https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/)

KEY ORGANIZATIONS

MassDEP Regional Service Centers

Phone

Northeast (Wilmington): 978-694-3249(tel:9786943249)

Southeast (Lakeville): 508-946-2714(tel:5089462714)

Central (Worcester): 508-767-2722(tel:5087672722)

Western (Springfield): 413-755-2214(tel:4137552214)

Snow Disposal Guidance

Effective Date: December 12, 2018

Applicability: Applies to all federal, state, regional and local agencies, as well as to private businesses.

Supersedes: BRP Snow Disposal Guideline No. BRPG01-01 issued March 8, 2001, December 21, 2015, and all previous snow disposal guidance.

Approved by: Douglas Fine, Assistant Commissioner for Water Resources

PURPOSE: To provide guidelines to all government agencies and private businesses regarding snow disposal site selection, site preparation and maintenance, and emergency snow disposal options that are protective of wetlands, drinking water, and water bodies, and are acceptable to the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Water Resources.

APPLICABILITY: These Guidelines are issued by MassDEP's Bureau of Water Resources on behalf of all Bureau Programs (including Drinking Water Supply, Wetlands and Waterways, Wastewater Management, and Watershed Planning and Permitting). They apply to all State agencies, State authorities, municipal agencies and private businesses disposing of snow in the Commonwealth of Massachusetts.

INTRODUCTION

Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. While we are all aware of the threats to public safety caused by snow, collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment.

As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where they may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels. Sand washed into waterbodies can create sand bars or fill in wetlands and ponds, impacting aquatic life, causing flooding, and affecting our use of these resources.

There are several steps that communities can take to minimize the impacts of snow disposal on public health and the environment. These steps will help communities avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. Everything we do on the land has the potential to impact our water resources. Given the authority of local government over the use of the land, municipal officials and staff have a critically important role to play in protecting our water resources.

The purpose of these guidelines is to help State agencies, State authorities, municipalities and businesses select, prepare, and maintain appropriate snow disposal sites before the snow begins to accumulate through the winter. Following these guidelines and obtaining the necessary approvals may also help municipalities in cases when seeking reimbursement for snow disposal costs from the Federal Emergency Management Agency is possible.

RECOMMENDED GUIDELINES

These snow disposal guidelines address: (1) site selection; (2) site preparation and maintenance; and (3) emergency snow disposal.

1. SITE SELECTION

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas or upland locations on impervious surfaces that have functioning and maintained storm water management systems away from water resources and drinking water wells. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris which can be removed in the springtime. The following areas should be avoided:

- Avoid importing snow from outside a Zone II or Interim Wellhead Protection Area (IWPA) of a public water supply well or within 75 feet of a private well, where road salt may contaminate water supplies. Only snow

from within the Zone II or IWPA should be disposed of within this resource area so as not to increase the potential for pollution of water supplies.

- Avoid dumping of snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater.
- Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater, and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

Recommended Site Selection Procedures

It is important that the municipal Department of Public Works or Highway Department, Conservation Commission, and Board of Health work together to select appropriate snow disposal sites. The following steps should be taken:

1. Estimate how much snow disposal capacity may be needed for the season so that an adequate number of disposal sites can be selected and prepared.
2. Identify sites that could potentially be used for snow disposal, such as municipal open space (e.g., parking lots or parks).
3. Sites located in upland locations that are not likely to impact sensitive environmental resources should be selected first.
4. If more storage space is still needed, prioritize the sites with the least environmental impact (using the site selection criteria, and local or MassGIS maps as a guide).

()Snow Disposal Mapping Assistance

MassDEP has an online mapping tool to assist municipalities and businesses in identifying possible locations to potentially dispose of snow, should the need arise. The disposal locations depicted on these maps will also aid MassDEP and the Massachusetts Emergency Management Agency assist communities with snow disposal in the event of severe winter storm emergencies. The tool identifies wetland resource areas, public drinking water supplies and other sensitive locations where snow should not be disposed. The tool may be accessed through the Internet at the following web address: **https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/** (https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/).

By clicking on the link for the OLIVER Online Data Viewer, communities can select your town and overlay different resource areas. The MassGIS site includes MassDEP orthophoto maps depicting local wetland resources, hard copies of which were mailed to each Conservation Commission in the past.

2. SITE PREPARATION AND MAINTENANCE

In addition to carefully selecting disposal sites before the winter begins, it is important to prepare and maintain these sites to maximize their effectiveness. The following maintenance measures should be undertaken for all snow disposal sites:

- A silt fence or equivalent barrier should be placed securely on the downgradient side of the snow disposal site.
- To filter pollutants out of the meltwater, wherever possible a 50-foot vegetative buffer strip should be maintained during the growth season between the disposal site and adjacent waterbodies.
- Debris should be cleared from the site prior to using the site for snow disposal.
- Debris should be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.

3. SNOW DISPOSAL APPROVALS

Proper snow disposal may be undertaken through one of the following approval procedures:

1. Routine snow disposal – Minimal, if any, administrative review is required in these cases when upland and pervious snow disposal locations or upland locations on impervious surfaces that have functioning and maintained storm water management systems have been identified, mapped, and used for snow disposal following ordinary snowfalls. Use of upland and pervious snow disposal sites avoids wetland resource areas and allows snow meltwater to recharge groundwater and will help filter pollutants, sand, and other debris. This process will address the majority of snow removal efforts until a community exhausts all available upland snow disposal sites. The location and mapping of snow disposal sites will help facilitate each municipality's routine snow management efforts.
2. Emergency Certifications – If a community or business demonstrates that there is no remaining capacity at upland snow disposal locations, local conservation commissions are authorized to issue Emergency Certifications under the Massachusetts Wetlands Protection Act for snow disposal in buffer zones to wetlands, certain open water areas, and certain wetland resource areas, i.e. within flood plains. In such cases, Emergency Certifications can only be issued at the request of a public agency for the protection of the health or safety of citizens or by order of a public agency, and limited to those activities necessary to abate the emergency. Use the following guidelines in these emergency situations:
    a. Dispose of snow in open water with adequate flow and mixing to prevent ice dams from forming.
    b. Do not dispose of snow in salt marshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or IWPAs of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.

c. Do not dispose of snow where trucks may cause shoreline damage or erosion.

d. Consult with the municipal Conservation Commission to ensure that snow disposal in open water complies with local ordinances and bylaws.

3. Emergency Declarations – In the event of a large-scale severe weather event, MassDEP may issue a broader Emergency Declaration under the Wetlands Protection Act which allows State agencies, State authorities, municipalities, and businesses greater flexibility in snow disposal practices. Emergency Declarations typically authorize greater snow disposal options while protecting especially sensitive resources such as public drinking water supplies, vernal pools, land containing shellfish, FEMA designated floodways, coastal dunes, and salt marsh. In the event of severe winter storm emergencies, the snow disposal site maps created by municipalities will assist MassDEP and the Massachusetts Emergency Management Agency in helping communities identify appropriate snow disposal locations.

   If upland disposal sites have been exhausted, the Emergency Declaration issued by MassDEP allows for snow disposal near water bodies. A buffer of at least 50 feet, preferably vegetated, should still be maintained between the site and the waterbody in these situations. Furthermore, it is essential that the other guidelines for preparing and maintaining snow disposal sites be followed to minimize the threat to adjacent waterbodies.

   Under extraordinary conditions, when all land-based snow disposal options are exhausted, the Emergency Declaration issued by MassDEP may allow disposal of snow in certain waterbodies under certain conditions. ***A State agency, State authority, municipality or business seeking to dispose of snow in a waterbody should take the following steps****:*

   a. Call the emergency contact phone number - 1-888-304-1133 - and notify the MEMA bunker personnel of the municipality's intent.

   b. The MEMA bunker personnel will ask for some information about where the requested disposal will take place.

   c. The MEMA bunker personnel will confirm that the disposal is consistent with MassDEP's Emergency Declaration and these guidelines and is therefore approved.

During declared statewide snow emergency events, MassDEP's website will also highlight the emergency contact phone number (1-888-304-1133) for authorizations and inquiries. For further non-emergency information about this Guidance you may contact your MassDEP Regional Office Service Center:

Northeast Regional Office, Wilmington, 978-694-3234
Southeast Regional Office, Lakeville, 508-946-2714
Central Regional Office, Worcester, 508-767-2722
Western Regional Office, Springfield, 413-755-2214

Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook

Drainage Channels

Description: Drainage channels are traditional vegetated open channels that are designed to provide for non-erosive conveyance. They receive no infiltration or TSS removal credit (Standards 3 and 4).

Ability to meet specific standards

Standard	Description
2 - Peak Flow	Provides no peak flow attenuation
3 - Recharge	Provides negligible groundwater recharge.
4 - TSS Removal	0% TSS removal credit.
5 - Higher Pollutant Loading	Use as conveyance.
6 - Discharges near or to Critical Areas	May be used to achieve temperature reduction for runoff discharging to cold-water fisheries.
7 - Redevelopment	Limited applicability

Advantages/Benefits:

- Conveys stormwater
- Generally less expensive than curb and gutter systems.
- Accents natural landscape.
- Compatible with LID design practices
- Roadside channels reduce driving hazards by keeping stormwater flows away from street surfaces during storms

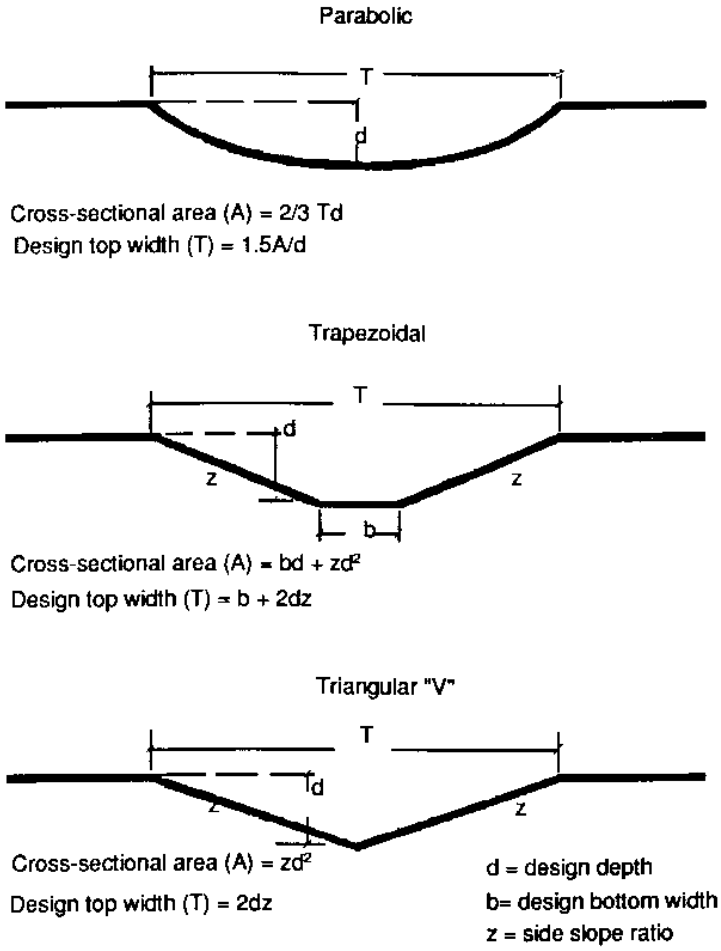
Disadvantages/Limitations:

- Higher degree of maintenance required than for curb and gutter systems.
- Roadside channels are subject to damage from off-street parking and snow removal.
- Provides limited pollutant removal compared to water quality swales
- May be impractical in areas with flat grades, steep topography or poorly drained soils
- Large area requirements for highly impervious sites.

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS) - 0%
- Nutrients (Nitrogen, phosphorus) - Insufficient data
- Metals (copper, lead, zinc, cadmium) - Insufficient data
- Pathogens (coliform, e coli) - Insufficient data

Figure DC 1



adapted from the University of New Hampshire

Maintenance

Activity	Frequency
Inspect channels to make sure vegetation is adequate and for signs of rilling and gullying. Repair any rills or gullies. Replace dead vegetation.	The first few months after construction and twice a year thereafter.
Mow	As necessary. Grass height shall not exceed 6 inches.
Remove sediment and debris manually	At least once a year
Reseed	As necessary. Use of road salt or other deicers during the winter will necessitate yearly reseeding in the spring.

Special Features

Drainage channels cannot be used to meet the Stormwater Management Standards. They are a component of a larger stormwater management system and serve to convey runoff from impervious surfaces to or from stormwater treatment BMPs.

Drainage Channels

Drainage Channels versus Water Quality Swales

The distinction between drainage channels and water quality swales lies in the design and planned use of the open channel conveyance. Drainage channels are designed to have sufficient capacity to convey runoff safely during large storm events without causing erosion. Drainage channels typically have a cross-section with sufficient hydraulic capacity to handle the peak discharge for the 10-year storm. The dimensions (slope and bottom width) of a drainage channel must not exceed a critical erosive velocity during the peak discharge. They must be vegetated with grasses to maintain bank and slope integrity. Other than basic channel size and geometry, there are no other design modifications to enhance pollutant removal capabilities. Therefore, pollutant removal efficiency is typically low for drainage channels.

Water quality swales and grass channels, on the other hand, are designed for the required water quality volume and incorporate specific features to enhance their stormwater pollutant removal effectiveness. Pollutant removal rates are significantly higher for water quality swales and grass channels. A water quality swale or grass channel must be used in place of the drainage channel when a water quality treatment credit is sought.

Applicability

Drainage channels are suitable for residential and institutional areas of low to moderate density. The percentage of impervious cover in the contributing areas must be relatively small. Drainage channels can also be used in parking lots to break up areas of impervious cover.

Along the edge of roadways, drainage channels can be used in place of curb and gutter systems. However, the effectiveness of drainage channels may decrease as the number of driveway culverts increases. They are also generally not compatible with extensive sidewalk systems. When using drainage channels in combination with roadways and sidewalks, it is most appropriate to place the channel between the two impervious covers (e.g., between the sidewalk and roadway).

The topography of the site should allow for the design of a drainage channel with sufficient slope and cross-sectional area to maintain non-erosive flow velocities. The longitudinal slope of the swale should be as close to zero as possible and not greater than 5%.

Planning Considerations

The two primary considerations when designing a drainage channel are maximizing channel capacity and minimizing erosion. Use the maximum expected retardance when checking drainage channel capacity. Usually the greatest flow retardance occurs when vegetation is at its maximum growth for the year. This usually occurs during the early growing season and dormant periods.

Other factors to be considered when planning for the drainage channel are land availability, maintenance requirements and soil characteristics. The topography of the site should allow for the design of a drainage channel with sufficient slope and cross-sectional area to maintain a non-erosive flow velocity, generally less than five feet per second.

The shape of the cross-sectional channel is also an important planning consideration. Figure DC 1 shows three different design shapes. The V-shaped or triangular cross-section can result in higher velocities than other shapes, especially when combined with steeper side slopes, so use this design only if the quantity of flow is relatively small. The parabolic cross-section results in a wide shallow channel that is suited to handling larger flows and blends in well with natural settings. Use trapezoidal channels when deeper channels are needed to carry larger flows and conditions require relatively high velocities. Select a grass type for the channel lining that is appropriate for site conditions, including one that is able to resist shear from the design flow, is shade tolerant, is drainage tolerant, and has low maintenance requirements. Use vegetation that is water tolerant and has a dense root system. Alternatively, the drainage channel may be lined with stone.

Design

See the following for complete design references: Site Planning for Urban Stream Protection. 1995. Schueler. Center for Watershed Protection.

The length of the drainage channel depends on the slope, contributing impervious surface area, and runoff volume. Because drainage channels with low velocities can act as sediment traps, add extra capacity to address sediment accumulation without reducing design capacity. Add an extra 0.3 to 0.5

feet of freeboard depth, if sediment accumulation is expected. Use side slopes of 3:1 or flatter to prevent side slope erosion. Make the longitudinal slope of the channel as flat as possible and not greater than 5%.

Install check dams in drainage channels when necessary to achieve velocities of 5 feet per second or less. Do not use earthen check dams because they tend to erode on the downstream side, and it is difficult to establish and maintain grass on the dams. The maximum ponding time behind the check dam should not exceed 24 hours. Use outlet protection at discharge points from a drainage channel to prevent scour at the outlet.

The design for the drainage channel must include access for maintenance. When located along a highway, provide a breakdown lane with a width of 15 feet. When located along a street, off-street parking can be doubled up as the access, provided signs are posted indicating no parking is allowed during maintenance periods. When locating drainage channels adjacent to pervious surfaces, include a 15-foot wide grass strip to provide access for maintenance trucks.

Construction

Use temporary erosion and sediment controls during construction. Soil amendments, such as aged compost that contains no biosolids, may be needed to encourage vegetation growth. Select a vegetation mix that suits the characteristics of the site. Seeding will require mulching with appropriate materials, such as mulch matting, straw, wood chips, other natural blankets, or synthetic blankets. Anchor blanket immediately after seeding. Provide new seedlings with adequate water until they are well established. Refer to the "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials" for information regarding seeding, mulching, and use of blankets.

Maintenance

The maintenance and inspection schedule should take into consideration the effectiveness of the drainage channel. Inspect drainage channels the first few months after construction to make sure that there is no rilling or gullying, and that vegetation in the channels is adequate. Thereafter, inspect the channel twice a year for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation.

Regular maintenance tasks include mowing, fertilizing, liming, watering, pruning, weeding, and pest control. Mow channels at least once per year. Do not cut the grass shorter than three to four inches. Keep grass height under 6 inches to maintain the design depth necessary to serve as a conveyance. Do not mow excessively, because it may increase the design flow velocity.

Remove sediment and debris manually at least once per year. Re-seed periodically to maintain the dense growth of grass vegetation. Take care to protect drainage channels from snow removal procedures and off-street parking. When drainage channels are located on private residential property, the operation and maintenance plan must clearly specify the private property owner who is responsible for carrying out the required maintenance. If the operation and maintenance plan calls for maintenance of drainage channels on private properties to be performed by a public entity or an association (e.g. homeowners association), maintenance easements must be obtained.

Grassed Channel (Biofilter Swale)

Description: Grassed Channels (formerly known as Biofilter swales) are treatment systems with a longer hydraulic residence time than drainage channels. The removal mechanisms are sedimentation and gravity separation, rather than filtration. To receive TSS credit, a sediment forebay or equivalent must be provided for pretreatment. Note that the sediment forebay does not receive a separate TSS removal credit.

Ability to meet specific standards

Standard	Description
2 - Peak Flow	N/A
3 - Recharge	No infiltration credit
4 - TSS Removal	50% TSS with adequate pretreatment
5 - Higher Pollutant Loading	N/A
6 - Discharges near or to Critical Areas	Not suitable for vernal pools or bathing beaches. At other critical areas, may be used as a pretreatment device.
7 - Redevelopment	Typically not suited for retrofits.

Advantages/Benefits:

- Provides pretreatment if used as the first part of a treatment train.
- Open drainage system aids maintenance
- Accepts sheet or pipe flow
- Compatible with LID design measures.
- Little or no entrapment hazard for amphibians or other small animals

Disadvantages/Limitations:

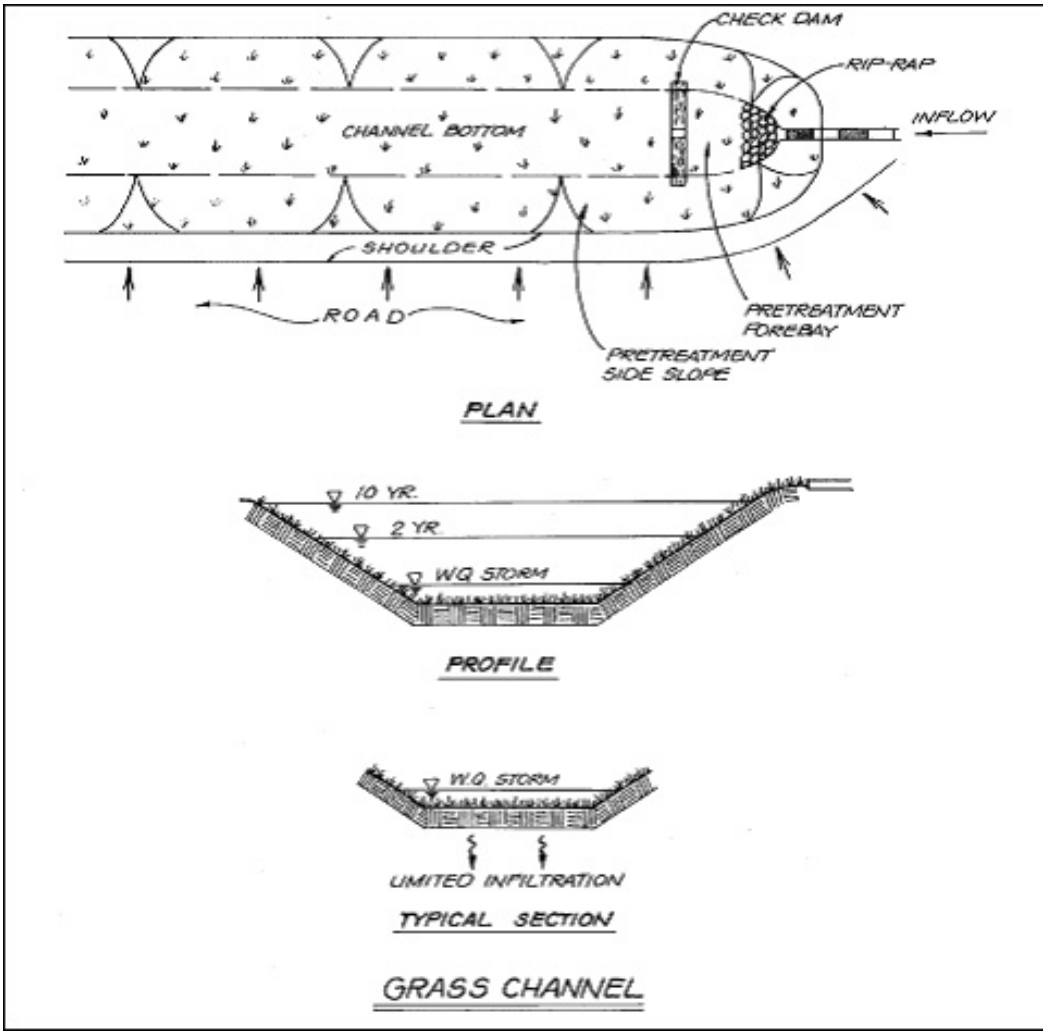
- Short retention time does not allow for full gravity separation·
- Limited biofiltration provided by grass lining.· Cannot alone achieve 80% TSS removal
- Must be designed carefully to achieve low flow rates for Water Quality Volume purposes (<1.0 fps)
- Mosquito control considerations

Pollutant Removal Efficiencies

• Total Suspended Solids (TSS)	50%[1] for Regulatory Purposes (47%)[2]
• Total phosphorus (TP)	-121%[2]
• Total Nitrogen	Insufficient Data
• Metals (copper, lead, zinc, cadmium)	Insufficient Data
• Pathogens (coliform, e. coli)	Insufficient Data

[1] Atlanta Regional Commission et al, 2001, Georgia Stormwater Manual, Volume 2, Section 3-3-2, http://georgiastormwater.com/vol2/3-3-2.pdf

[2] International Stormwater Database, based on MassDEP analysis of raw influent & effluent values reported in 2005.



adapted from the Vermont Stormwater Manual

Maintenance

Activity	Frequency
Remove sediment from forebay	Annually
Remove sediment from grass channel	Annually
Mow	Once a month during growing season
Repair areas of erosion and revegetate	As needed, but no less than once a year

Special Features

Reduces volume and rate of runoff.

Grass Channels

Grass channels convey and treat stormwater. Grass channels were referred to as biofilter swales in the 1996 MassDEP/CZM Stormwater Handbook, based on the nomenclature coined by the Center for Watershed Protection (CWP). The CWP is now referring to biofilter swales as grass channels – so MassDEP is adopting the same name as the CWP to minimize confusion.

Properly designed grass channels are ideal when used adjacent to roadways or parking lots, where runoff from the impervious surfaces can be directed to the channel via sheet flow. Runoff can also be piped to the channel. If piped, locate the sediment forebay at the pipe outlet and include a check dam separating the forebay from the channel. For sheet flow, use a vegetated filter strip on a gentle slope or a pea gravel diaphragm. Make the longitudinal slope as flat as possible. This increases the Hydraulic Residence Time (HRT) and allows gravity separation of solids and maximizes sediment removal. Install check dams to further increase the HRT.

Review of the International Stormwater Database, updated in 2005, indicates lower TSS removal when compared to similar treatment practices (dry water quality swales, wet water quality swales, and bioretention areas). The information in the International Stormwater Database indicates grass channels are likely to export phosphorus (hence the negative removal efficiency cited above). Grass channels are not a practice suitable for treating stormwater that discharges to waters impaired by phosphorus or for waters where phosphorus TMDLs have been established.

Differences from dry water quality swales, wet water quality swales, bioretention cells, and drainage channels: Dry water quality swales contain a specific soil media mix and underdrain, providing greater treatment than grass channels. Wet water quality swales are designed with a permanent wet channel, whereas grass channels must be designed to completely drain between storms. Bioretention areas, including rain gardens, are designed solely as a treatment practice, and not for conveyance. Lastly, drainage channels act solely as a conveyance, in contrast to properly designed grass channels where runoff flow is deliberately lagged to provide treatment.

Design Considerations

Sizing:

Water Quality Volume: Design grass channels to maximize contact with vegetation and soil surface to promote greater gravity separation of solids during the storm associated with the water quality event (either ½ inch or 1-inch runoff). Design the channel such that the velocity does not exceed 1 foot per second during the 24-hour storm associated with the water quality event. Do not allow the water depth during the storm associated with the water quality event to exceed 4 inches (for design purposes). Make sure the selected design storm provides at least 9 minutes of HRT within the channel. Increasing the HRT beyond 9 minutes increases the likelihood of achieving the 50% TSS removal efficiency. Adding meanders to the swale increases its length and may increase the HRT.

2-year and 10-year conveyance capacity: Design grass channels to convey both the 2-year and 10-year 24-hour storms. Provide a minimum of 1-foot freeboard above the 10-year storm. Make sure that the runoff velocities during the 2-year 24-hour storm do not cause erosion problems.

Channel Length: Length depends on design factors to achieve the minimum 9-minute residence time for the storm associated with the water quality event.

Channel Crossings: In residential settings, driveways will cross over the channel, typically via culverts (pre-cast concrete, PVC, or corrugated metal pipe).

Soils: Grass channels may be constructed from most parent soils, unless the soils are highly impermeable. Soils must be able to support a dense grass growth. MassDEP recommends sandy loams, with an organic content of 10 to 20%, and no more than 20% clay. Highly impermeable soils, such as clays, are not suitable for grass channels, because they do not support dense grass stands. Similarly, gravelly and coarse soils may not be suitable due to their lower moisture retention capability, leading to potential die-back of the grass lining during the summer when the inter-event period between storms is longer than during other times of the year.

Grasses: The grasses serve to stabilize the channel, and promote conditions suitable for sedimentation, such as offering resistance to flow, which reduces water velocities and turbulence. Select a grass height of 6 inches or less. Grasses over that height tend to flatten when water flows

over them, inhibiting sedimentation. Select grasses that produce a fine, uniform and dense cover that can withstand varying moisture conditions. Regularly mow the channel to ensure that the grass height does not exceed 6 inches. Select grasses that are salt tolerant to withstand winter deicing of roadways. In the spring, replant any areas where grasses died off due to deicing. (Franklin 2002 and Knoxville 2003 provide recommendations for the best grass species.)

Pea Gravel Diaphragm: Use clean bank-run gravel, conforming to ASTM D 448, varying in size from 1/8 inch to 3/8 inch (No. 6 stone).

Outlet Protection: Must be used at discharge points to prevent scour downstream of the outlet.

Construction Considerations: Stabilize the channel after it is shaped before permanent turf is established, using natural or synthetic blankets. Never allow grass channels to receive construction period runoff.

Site Constraints

A proponent may not be able to install a grass channel swale because of:

- High groundwater;
- Presence of utilities; or
- Other site conditions that limit depth of excavation because of stability.

Maintenance

Access: Maintenance access must be designed as part of the grass channel. If located adjacent to a roadway, make the maintenance access at least 15 feet wide, which can also be combined with a breakdown lane along a highway or on-street parking along a residential street. When combined with on-street parking, post signs prohibiting parking when the swale is to be inspected and cleaned. Do not use travel lanes along highways and streets as the required maintenance access.

Mowing: Set the mower blades no lower than 3 to 4 inches above the ground. Do not mow beneath the depth of the design flow during the storm associated with the water quality event (e.g., if the design flow is no more than 4 inches, do not cut the grass shorter than 4 inches). Mow on an as-needed basis during the growing season so that the grass height does not exceed 6 inches.

Inspection: Inspect semi-annually the first year, and at least once a year thereafter. Inspect the grass for growth and the side slopes for signs of erosion and formation of rills and gullies. Plant an alternative grass species if the original grass cover is not successfully established. If grass growth is impaired by winter road salt or other deicer use, re-establish the grass in the spring.

Trash/Debris Removal: Remove accumulated trash and debris prior to mowing.

Sediment Removal: Check on a yearly basis and clean as needed. Use hand methods (i.e., a person with a shovel) when cleaning to minimize disturbance to vegetation and underlying soils. Sediment build-up in the grass channel reduces its capacity to treat and convey the water quality event, 2-year and 10-year 24-hour storm.

References:

Atlanta Regional Commission et al, 2001, Georgia Stormwater Management Manual, Volume 2, Section 3-3-2, Grass Channel, http://georgiastormwater.com/vol2/3-3-2.pdf

Center for Watershed Protection, undated, Stormwater Management Fact Sheet: Grass Channel, http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool6_Stormwater_Practices/Open%20Channel%20Practice/Grassed%20Channel.htm (accessed October 23, 2007)

Shanti R. Colwell, Richard R. Horner, Derek B. Booth, 2000, Characterization of Performance Predictors and Evaluation of Mowing Practices in Biofiltration Swales, http://depts.washington.edu/cwws/Research/Reports/swale%20mowing.pdf

Franklin, City of, 2002, PTP-05, Biofilters: Swales and Strips, http://www.franklin-gov.com/engineering/STORMWATER/bmp/ptp/ptp-05.pdf

Idaho Department of Environmental Quality, 2005, Storm Water Best Management Practices Catalog, BMP 1, Biofiltration Swale (Vegetated Swale).

International Stormwater BMP Data Base, 2005

Knoxville, City of, 2003, ST-05, Filter Strips and Swales, http://www.ci.knoxville.tn.us/engineering/bmp_manual/ST-05.pdf

Minton, G., 2002, Stormwater Treatment, Resource Planning Associates, Seattle, WA, p. 174

Water Quality Swale

Description: Water quality swales are vegetated open channels designed to treat the required water quality volume and to convey runoff from the 10-year storm without causing erosion.

There are two different types of water quality swales that may be used to satisfy the Stormwater Management Standards:

- Dry Swales
- Wet Swales

Unlike drainage channels which are intended to be used only for conveyance, water quality swales and grass channels are designed to treat the required water quality volume and incorporate specific features to enhance their stormwater pollutant removal effectiveness. Water quality swales have higher pollutant removal efficiencies than grass channels.

Ability to meet specific standards

Standard	Description
2 - Peak Flow	With careful design may be able to reduce peak flow at small sites
3 - Recharge	May not be used to satisfy Standard 3
4 - TSS Removal	Wet swales and dry swales achieve 70% TSS removal when provided with a pretreatment device such as a sediment forebay with a check dam.
5 - Higher Pollutant Loading	Dry swale recommended as pretreatment BMP. Must be lined. For some land uses with higher potential pollutant load, an oil grit separator or equivalent may be required before discharge to the swale.
6 - Discharges near or to Critical Areas	Dry and Wet Swales recommended as treatment BMPs for cold-water fisheries. Must be lined unless 44% TSS has been removed before discharge to swale. Should not be used near shellfish growing areas and bathing beaches.
7 - Redevelopment	Recommended for redevelopments and urban applications if sufficient land is available.

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS)
  1. Dry Swale 70%
  2. Wet Swale 70%
- Total Nitrogen - 10% to 90%
- Total Phosphorus 20% to 90%
- Metals (copper, lead, zinc, cadmium) Insufficient data
- Pathogens (coliform, e coli) Insufficient data

Advantages/Benefits:

- May be used to replace more expensive curb and gutter systems.
- Roadside swales provide water quality and quantity control benefits, while reducing driving hazards by keeping stormwater flows away from street surfaces.
- Accents natural landscape.
- Compatible with LID designs
- Can be used to retrofit drainage channels and grass channels
- Little or no entrapment hazard for amphibians or other small animals

Disadvantages/Limitations:

- Higher degree of maintenance required than for curb and gutter systems.
- Roadside swales are subject to damage from off-street parking, snow removal, and winter deicing.
- Subject to erosion during large storms
- Individual dry swales treat a relatively small area
- Impractical in areas with very flat grades, steep topography or poorly drained soils
- Wet swales can produce mosquito breeding habitat
- Should be set back from shellfish growing areas and bathing beaches

Maintenance

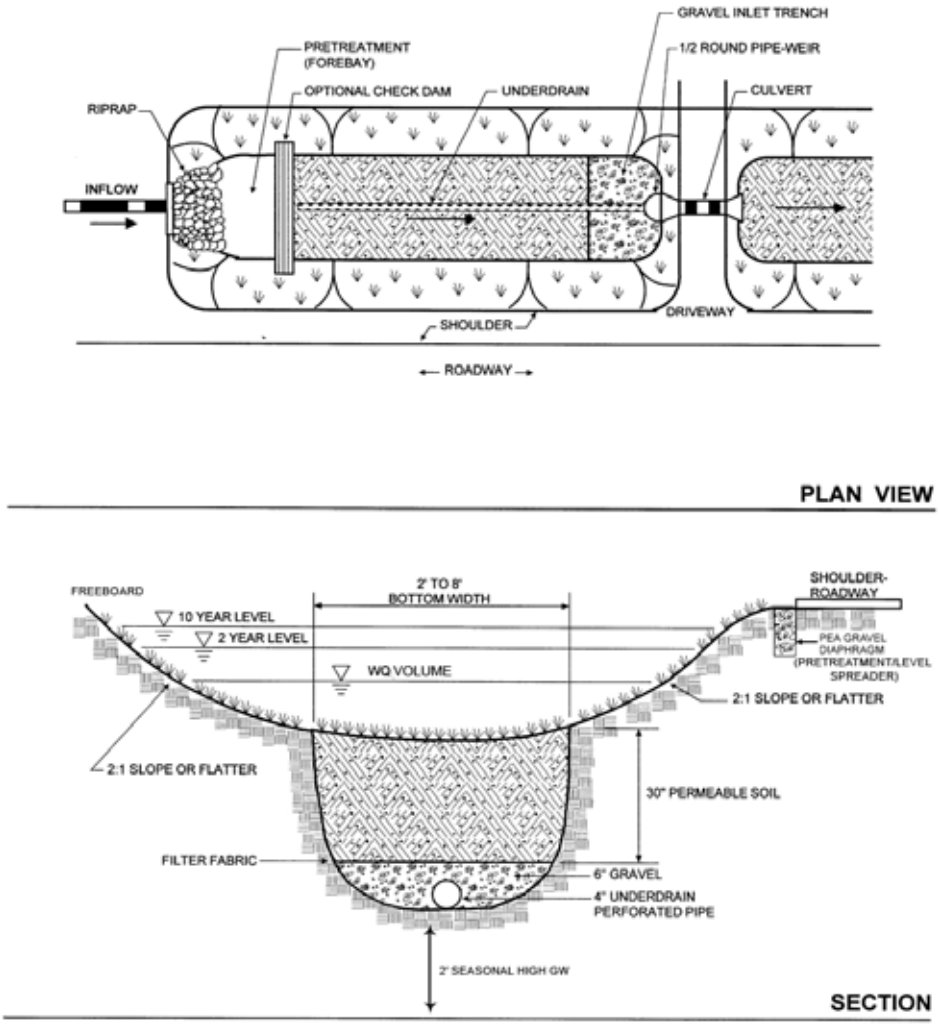
Activity	Frequency
Inspect swales to make sure vegetation is adequate and slopes are not eroding. Check for rilling and gullying. Repair eroded areas and revegetate.	The first few months after construction and twice a year thereafter.
Mow dry swales. Wet swales may not need to be mowed depending on vegetation.	As needed.
Remove sediment and debris manually	At least once a year
Re-seed	As necessary

Special Features

There are two types of swales that may be used to satisfy the Stormwater Management Standards - dry swales and wet swales.

Dry Swale

Dry swales are designed to temporarily hold the water quality volume of a storm in a pool or series of pools created by permanent check dams at culverts or driveway crossings. The soil bed consists of native soils or highly permeable fill material, underlaid by an underdrain system.

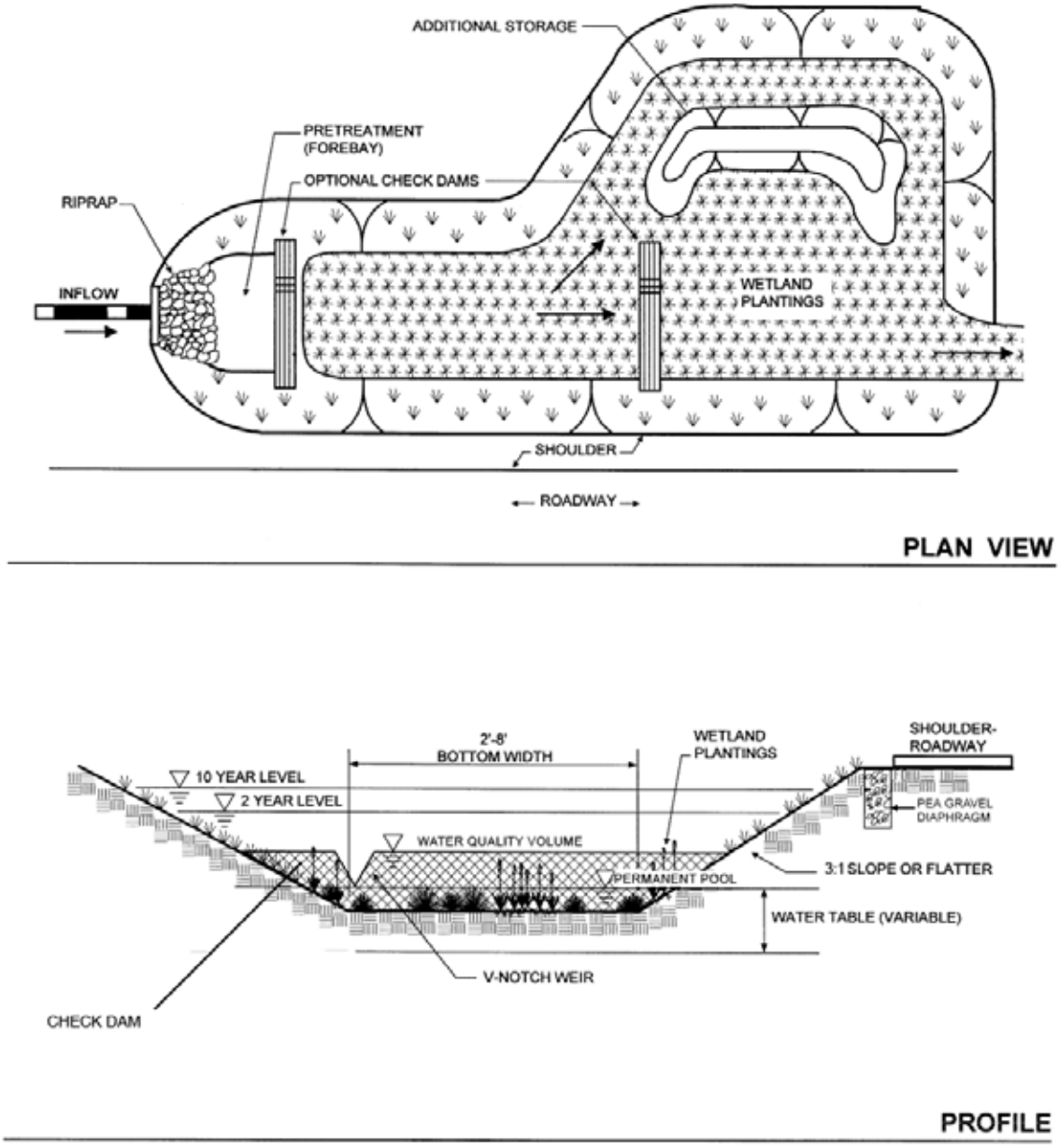


adapted from the Vermont Stormwater Manual

Example of Dry Swale

Wet Swale

Wet swales also temporarily store and treat the required water quality volume. However, unlike dry swales, wet swales are constructed directly within existing soils and are not underlaid by a soil filter bed or underdrain system. Wet swales store the water quality volume within a series of cells within the channel, which may be formed by berms or check dams and may contain wetland vegetation (Metropolitan Council, 2001). The pollutant removal mechanisms in wet swales are similar to those of stormwater wetlands, which rely on sedimentation, adsorption, and microbial breakdown.



Example of Wet Swale

adapted from the Vermont Stormwater Manual

Water Quality Swales

Applicability

Use water quality swales:

- As part of a treatment train
- As one of the best BMPs for areas discharging to cold-water fisheries if they are lined.
- As one of the best BMPs for redevelopments and urban applications.
- For residential and institutional settings (especially dry swales)

Water quality swales have many uses. Dry swales are most applicable to residential and institutional land uses of low to moderate density where the percentage of impervious cover in the contributing areas is relatively low. Wet swales may not be appropriate for some residential applications, such as frontage lots, because they contain standing water that may attract mosquitoes.

Water quality swales may also be used in parking lots to break up areas of impervious cover. Along the edge of small roadways, use water quality swales in place of curb and gutter systems. Water quality swales may not be suitable for sites with many driveway culverts or extensive sidewalk systems. When combining water quality swales with roadways and sidewalks, place the swale between the two impervious areas (e.g. between road and sidewalk or in-between north and south bound lanes of a roadway/highway).

The topography and soils on the site will determine what is appropriate. The topography should provide sufficient slope and cross-sectional area to maintain non-erosive flow velocities. Porous soils are best suited to dry swales, while soils with poor drainage or high groundwater conditions are more suited to wet swales. Design water quality swales to retain and treat the required water quality volume. Because they must also be designed to convey the 2-year and 10-year 24-hour storms, they may have to convey additional runoff volume to other downgradient BMPs.

Planning Considerations

The primary factors to consider when designing a water quality swale are soil characteristics, flow capacity, erosion resistance, and vegetation. Site conditions and design specifications limit the use of water quality swales.

Swale storage capacity should be based on the maximum expected reduction in velocity that occurs during the annual peak growth period. Usually the maximum expected drop in velocity occurs when vegetation is at its maximum growth for the year. Use the minimum level when checking velocity through the swale or the ability of the swale to convey the 2-year 24-hour storm without erosion. This usually occurs during the early growing season and dormant periods.

Other important factors to consider are land availability, maintenance requirements and soil characteristics. The topography of the site should allow for the design of a swale with sufficient slope and cross-sectional area to maintain a non-erosive flow rate, and to retain or detain the required water quality volume. The longitudinal slope of the swale should be as close to zero as possible and not greater than 5%. The grass or vegetation types used in swales should be suited to the soil and water conditions. Wetland hydrophytes (plants adapted to grow in water) or obligate species (i.e., species that occur 99% of the time under natural conditions in wetlands) are generally more water-tolerant than facultative species (i.e., species that occur 67% to 99% of the time under natural conditions in wetlands) and are good selections for wet swales, while dry swales should be planted with species that produce fine and dense cover and are adapted to varying moisture conditions.

Design

See the following for complete design references:
Site Planning for Urban Stream Protection. 1995. Schueler. Center for Watershed Protection.
Watershed Protection Techniques, Volume 2, Number 2, 1996. Center for Watershed Protection.
Biofiltration swale performance, recommendations, and design considerations.
1992. Metro Seattle: Water Pollution Control Department, Seattle,WA.

Access for maintenance must be incorporated into both designs. The maintenance access way must be a minimum of 15 feet wide on at least one longitudinal side of the swale to enable a maintenance truck to drive along the swale and gain access to any one point. When constructed along a highway, the breakdown lane can be used as the access. When constructed in a residential subdivision, an on-street parking lane may double as the maintenance access, provided signs are posted

indicating no parking is allowed during periods when the swales are being maintained.

Dry Swales

- Size dry swales to provide adequate residence time for the required water quality volume. Hydraulic Residence Time (HRT) must be a minimum of 9 minutes. Use Manning's Equation to determine the HRT.
- Dry swales should have a soil bed that is a minimum of 18 inches deep and composed of approximately 50% sand and 50% loam.
- Pretreatment is required to protect the filtering and infiltration capacity of the swale bed. Pretreatment of piped flows is generally a sediment forebay behind a check dam with a pipe inlet. For lateral inflows (sheet flow), use a vegetated filter strip on a gentle slope or a "pea gravel diaphragm."
- Design dry swales to completely empty between storms. Where soils do not permit full dewatering between storms, place a longitudinal perforated underpipe on the bottom of the swale bed. The inter-event period used in design to dewater the swale must be no more than 72 hours.
- Dry swales must have parabolic or trapezoidal cross-sections, with side slopes no greater than 3:1 (horizontal: vertical) and bottom widths ranging from 2 to 8 feet.
- Size dry swales to convey the 10-year storm and design swale slopes and backs to prevent erosion during the 2-year event. At least one foot of freeboard must be provided above the volume expected for the 10-year storm.
- Make sure that the seasonal high water table is not within 2 to 4 feet of the dry swale bottom.
- Use outlet protection at any discharge point from a dry swale to prevent scour at the outlet.

Wet Swales

- Size wet swales to retain the required water quality volume.
- Use wet swales only where the water table is at or near the soil surface or where soil types are poorly drained. When the swale is excavated, keep the swale bed soils.
- Pretreatment is required to protect the filtering and infiltration capacity of the wet swale bed. Pretreatment is generally a sediment forebay behind a check dam with a pipe inlet. For lateral inflows, use gentle slopes or a pea gravel diaphragm.
- Use check dams in wet swales to achieve multiple cells. Use V-notched weirs in the check dams to direct low flow volumes.
- Plant emergent vegetation or place wetland soils on the wet swale bottom for seed stock.
- Wet swales are parabolic or trapezoidal in cross-section, with side slopes no greater than 3:1 (horizontal: vertical) and bottom widths ranging from 2 to 8 feet.
- Size wet swales to convey the 10-year 24-hour storm and design wet swale slopes to prevent erosion during the 2-year 24-hour event.
- Use outlet protection at any discharge point from wet swales to prevent scour at the outlet.

Construction

Use temporary erosion and sediment controls during construction. Select the vegetation mix to suit the characteristics of the site. Seeding will require mulching with appropriate materials, such as mulch matting, straw, and wood chips. Anchor the mulch immediately after seeding. Water new seedlings well until they are established. Refer to "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials" for information on seeding and mulching.

Maintenance

Incorporate a maintenance and inspection schedule into the design to ensure the effectiveness of water quality swales. Inspect swales during the first few months after installation to make sure that the vegetation in the swales becomes adequately established. Thereafter, inspect swales twice a year. During the inspections, check the swales for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation.

Regular maintenance includes mowing, fertilizing, liming, watering, pruning, and weed and pest control. Mow swales at least once per year. Do not cut the grass shorter than three to four inches, otherwise the effectiveness of the vegetation in reducing flow velocity and removing pollutants may be reduced. Do not let grass height exceed 6 inches.

Manually remove sediment and debris at least once per year, and periodically re-seed, if necessary, to maintain a dense growth of vegetation. Take care to protect water quality swales from snow removal and disposal practices and off-street parking. When grass water quality swales are located on private residential property, the operation and maintenance plan must clearly identify the property owner who is responsible for carrying out the required maintenance. If the operation and maintenance plan calls for maintenance of water quality swales on private properties to be accomplished by a public entity or an association (e.g. homeowners association), maintenance easements must be secured.

BMP Accessories: Level Spreaders, Check Dams, Outlet Structures, Catch Basin Inserts

BMP accessories are not BMPs themselves but are required to facilitate the operation and function of BMPs. This section presents four of the most common and important BMP accessories: level spreaders, check dams, outlet structures, and catch basin inserts.

Level Spreaders

Description

A level spreader receives concentrated flow from channels, outlet structures, or other conveyance structures, and converts it to sheet flow where it can disperse uniformly across a stable slope. A level spreader is not a pollutant reduction device. It improves the efficiency of other BMPs, such as vegetated swales, filter strips, or infiltration systems that depend on sheet flow to operate properly.

Applicability and Planning Considerations

Level spreaders are used in wide, level areas where concentrated runoff occurs. They should be placed on undisturbed soil that has been stabilized with vegetation. Disturbed soils are more erodible. If the spreader is not absolutely level, flow will concentrate at the low point and may worsen erosion problems. Flows to the level spreader should be relatively free of sediment, or the level spreader could be quickly overwhelmed by sediment and lose its effectiveness.

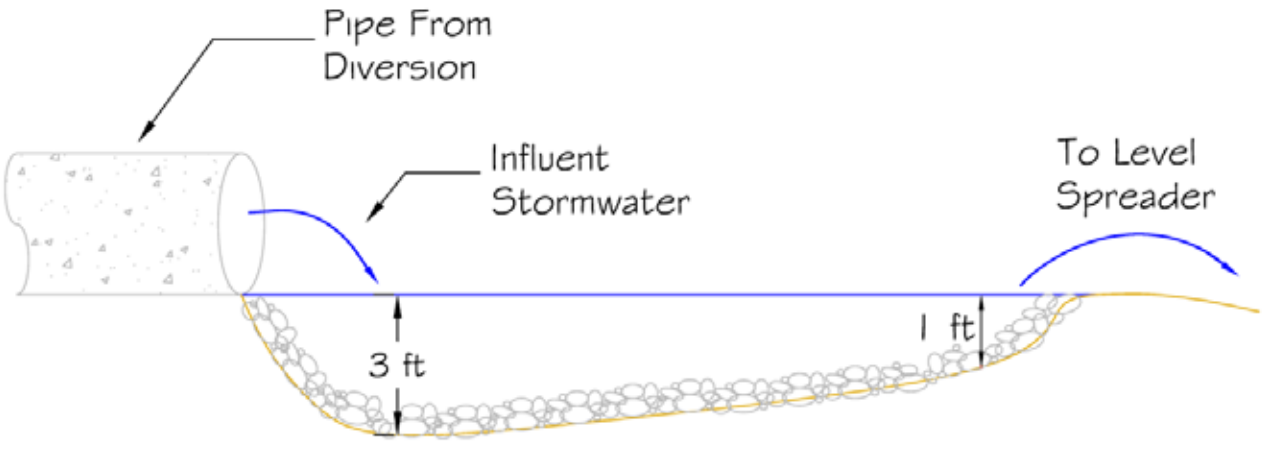
Design and Construction

Level spreaders are usually made of rocks, lumber, or concrete. Typical depths of flow behind each spreader range from 6 to 12 inches.

Construct level spreaders to be absolutely level. Small variations in height of even 0.25 inches can cause water to quickly concentrate and create erosion problems. A 4-inch variation in ground elevation across the entire length of the level spreader can make level construction difficult.

The height of the spreader is based on design flow, allowing for sediment and debris deposition. Design the length of the spreader based on the 10-year design flow for the site or the sheet flow path width, whichever is greater. When designing for the 10-year design flow, use the following table:

Level Spreader



adapted from the North Carolina State University

Drainage Area	Minimum spreader length
1 acre	10 feet
2 acres	10 feet
3 acres	15 feet
4 acres	18 feet
5 acres	20 feet

The slope leading to the level spreader should be less than 1% for at least 20 feet immediately upstream, to keep runoff velocities less than 2 feet per second during the 10-year storm event. The slope at the outlet of the spreader should be 6% or less.

Maintenance

Inspect level spreaders regularly, especially after large rainfall events. Note and repair any erosion or low spots in the spreader.

Adapted from:
Idaho Department of Environmental Quality. Catalog of Stormwater BMPs for Cities and Counties, 209-210.
MassDEP, Massachusetts Nonpoint Source Pollution Management Manual, 2006.
http://www.mass.gov/dep/water/laws/policies.htm#storm
Additional Resources:
Hunt, W.F. et al. Designing Level Spreaders to Treat Stormwater Runoff. North Carolina State University, as presented at North Carolina Department of Transportation Level Spreader Workshop, February 19, 2001, Raleigh, NC.

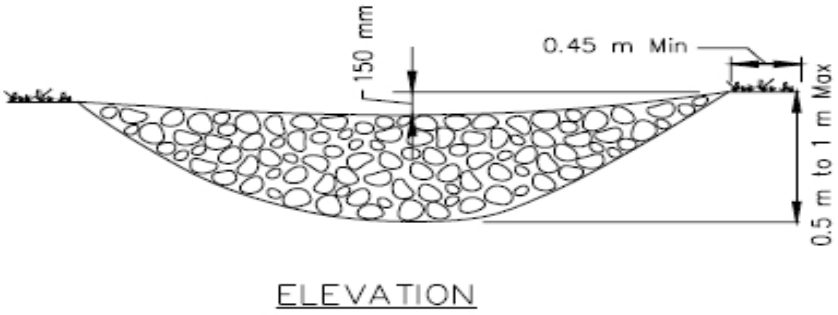
Check Dams

Description

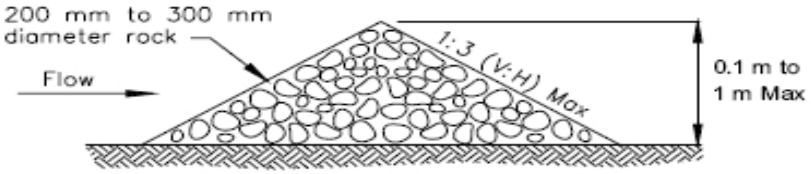
A check dam is a small dam constructed across a drainage ditch, swale, or channel to lower the velocity of flow. Reduced runoff velocity reduces erosion and gullying in the channel and allows sediments to settle out. A check dam may be built from stone, sandbags (filled with pea gravel), logs, or concrete. Check dams are relatively easy and inexpensive to construct. Permanent check dams should be constructed from stone or concrete. Sandbag dams filled with pea gravel or logs are suitable only as temporary practices. Never use a filter fence or a hay bale as a check dam, either on a temporary or permanent basis.

Applicability

Use check dams where temporary channels or permanent channels are not yet vegetated, channel lining is infeasible, where velocity checks are needed, or to induce stormwater exfiltration into the ground within a BMP such as a dry water quality swale. Check dams may also be used as a temporary or emergency measure to limit erosion by reducing flow in small open channels. Other uses for



ELEVATION



TYPICAL ROCK CHECK DAM SECTION

CHECK DAM
NOT TO SCALE

adapted from Caltrans Stormwater Handbooks

check dams include:

- To reduce flow in small temporary channels that are presently undergoing degradation,
- Where permanent stabilization is impractical due to the temporary nature of the problem,
- To reduce flow in small eroding channels where construction delays or weather conditions prevent timely installation of non-erosive liners.

Check dams can be installed in small open channels that drain 10 acres or less, or channels where stormwater velocities exceed 5 feet per second. Note that some BMPs such as grass channels require flows to not exceed 1 foot per second for the water quality volume. Check dams cause water to pond. Under low-flow situations, water ponds behind the structure and then slowly seeps through the check dam and/or exfiltrates into the underlying soil, depending on the soil permeability. Under high-flow situations, water flows over and/or through the structure.

Advantages

- Inexpensive and easy to install.
- Reduces velocity and may provide aeration of the water.
- Prevents gully erosion from occurring before vegetation is established, and also causes a high proportion of the sediment load in runoff to settle out.
- In some cases, if carefully located and designed, check dams can remain as permanent installations with very minor regrading, etc.
- They may be left as either spillways, in which case accumulated sediment would be graded and seeded, or as check dams to capture sediment coming off that site.
- They must be constructed in dry water quality swales to reduce velocity and induce exfiltration.

Disadvantages

- May kill grass linings in channels if the water level remains high after rainstorms or if there is significant sedimentation.
- Clogging by leaves in the fall may be a problem.
- Should not be used in live streams
- Promotes sediment trapping but resuspension can occur during subsequent storms
- Require extensive maintenance following high velocity flows
- Should not be made from straw bales or silt fences

Design

Install check dams at a distance and a height to allow small pools to form behind them. Install the first check dam about 15 feet from the outfall device and at regular intervals after that, depending on slope and soil type. In multiple check dam installations, design the system so that backwater from the downstream check dam reaches the toe of the next upstream dam. High flows (typically a 2-year or larger storm) should flow over the check dam without increasing upstream flooding or damaging the dam. Form check dams by hand or mechanically. Never dump rock directly into the channel or swale. Rock check dams should consist of well-graded stone consisting of a mixture of rock sizes.

When used in dry water quality swales, the height of the check dam shall be no less than the elevation associated with the Water Quality Volume (1/2 inch or 1-inch times contributing impervious surface).

Exercise care in designing the ends of a check dam to ensure that it is long enough and adequately anchored to prevent ponded water from scouring the soil at the ends, and flowing around the dam.

Some check dam designs may require weirs. For example, if the same check dam is used for water quality treatment (for the water quality volume), and to lag the peak rate of runoff (for the velocity associated with runoff from the 2-year storm), a weir must be included as part of the check dam design. In instances where a permanent check dam is to be used for both water quality treatment and lag peak flows with a weir, use a durable material such as concrete. If the check dam is constructed from stone such as pea gravel, the weir would most likely lose its shape when higher velocities occur.

Maintenance

Inspect check dams after every significant rainfall event. Repair damage as needed. Remove sediment as needed.

Adapted from:

Caltrans, Storm Water Quality Handbooks. Section 4. SC-4 P.

MassDEP, Massachusetts Nonpoint Source Pollution Management Manual, 2006.

http://www.mass.gov/dep/water/laws/policies.htm#storm

Tighe&Bond

APPENDIX D

Training Date:	
Title of Training:	
Training Duration (minutes):	
Subject(s) covered during Training: (Check items or attach copy of training materials)	
Employee(s) Trained:	**Signature:**

General Information	
Date of Inspection:	**Time of Inspection:**
Name and Title of Inspector(s):	
Contact Information of Inspector:	
Signature of Inspector:	

Inspection Period: *Inspections shall be conducted at least once each calendar quarter. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.*

❑ 1st Quarter (July - September) ❑ 3rd Quarter (January - March)

❑ 2nd Quarter (October - December) ❑ 4th Quarter (April - June)

Weather Information

Weather at time of this inspection:

❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snow ❑ High Winds

❑ Other:

Temperature:

Discharge Information

Have any previously unidentified discharges of pollutants from the site occurred since the last inspection? ❑Yes ❑No

If yes, describe:

Are there any discharges occurring at the time of inspection? ❑Yes ❑No

If yes, describe:

Control Measures Needing Maintenance or Repairs

Structural Control Measure	Specific Inspection Notes	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Corrective Action Needed and Notes (identify needed maintenance and repairs, or any failed control measures that need replacement)
Catch Basins (4)	Are any sumps more than 50% full (approx.) of material? ❑Yes ❑No *If yes, clean ASAP.* Are any of the follow present? • Sewage odor ❑Yes ❑No • Suds ❑Yes ❑No • Bulk material/trash ❑Yes ❑No Any structural issues? ❑Yes ❑No	❑Yes ❑No	❑ Maintenance ❑ Repair ❑ Replacement	*Indicate CBs requiring corrective action on Site Plan on p.5.*

Areas of Industrial Materials or Activities Exposed to Stormwater

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Material loading/ unloading and stockpile areas	❑Yes ❑No	Waste, debris on ground ❑Yes ❑No General cleanliness ❑Good ❑Bad	❑Yes ❑No	
Equipment operations and maintenance areas	❑Yes ❑No	General cleanliness ❑Good ❑Bad	❑Yes ❑No	
Solid waste handling and disposal areas	❑Yes ❑No	General cleanliness ❑Good ❑Bad	❑Yes ❑No	

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Sand/salt storage pile	❑Yes ❑No	Large quantity of sand or salt on ground outside shed ❑Yes ❑No General cleanliness ❑Good ❑Bad Other comments:	❑Yes ❑No	

Overall Site Walkthrough

Any signs of spill or leaks ❑Yes ❑No
Any erosion problems ❑Yes ❑No
Any housekeeping problems ❑Yes ❑No
Comments:

Additional Control Measures

Describe any additional control measures needed to reduce potential for pollution or improve good housekeeping:

Other Notes

Use this space and the Site Plan on the back for any additional notes or observations from the inspection:

Date of incident:	
Location of incident:	
Description of incident:	Spill or Leak:
	Type of Material:
	Quantity (approximate):
	Other Notes:
Circumstances leading to release:	Source:
	Other Notes:
Actions taken in response to release:	Amount of Material Recovered (approx.):
	Material still exposed to stormwater? (Yes/No)
	Other Notes:
Measures taken to prevent recurrence:	

Amend. No.	Description of the Amendment	Date of Amendment	Amendment Prepared by (Name/Signature)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			