

STORMWATER REPORT NARRATIVE

JULY 2024

REVISED OCTOBER 2024

Proposed Redevelopment and Site Improvements
20 Broad Cove Road, Hingham, MA 02043

EXISTING CONDITIONS

The subject property is located at 20 Broad Cove Road in Hingham and is identified by the Hingham Assessor's Office as Map 38 Lot 89. The lot area is approximately 57,950 square feet. Broad Cove Road borders the property to the north, Broad Cove to the south, vacant land to the west and a small business to the east. Multiple residential properties exist across Broad Cove Road from the subject property.

The property has historically been used as commercial property. The property was developed in the 1920s and its use has varied over the years. Since being developed, the property has been used as a ballroom, a rental hall and an auction house. There is a single building (5,590 square feet) in the central portion of the site with a paved parking area encompassing the westerly portion of the property. The easterly portion of the site consists of lawn.

Subsurface soils are classified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) into hydrologic soil groups (HSGs) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs, which are A, B, C, and D, are one element used in determining runoff curve numbers when modeling stormwater runoff flowrates for existing and proposed conditions. According to the USDA NRCS mapping, the entire property is mapped as Newport loam, 15 to 35 percent slopes (Map Unit 325E). The NRCS notes that typical depths to groundwater table for this soil type are shallow, ranging between 20 to 29 inches, making this site likely unsuitable for groundwater recharge. The soil components of this soil type are classified in hydrologic soil group (HSG) D.

There is currently no stormwater management system on the subject property. The grade throughout most of the property is relatively flat. Stormwater runoff from the easterly portion of the site flows to one of three catch basins that exist in the Broad Cove Road right-of-way. There is a drainage divide within the developed portions of the site that includes the building and the paved parking area to the west of the building. Stormwater runoff from the northerly side of the developed areas of the site flows unimpeded into the Broad Cove Road right-of-way where it enters the street gutter and flows in a southerly direction. Stormwater runoff from the southerly side of the developed areas of the site flows unimpeded into the waters of Broad Cove to the south.

PROPOSED CONDITIONS

The applicant is proposing to make site improvements and complete maintenance activities on the already developed property. The majority of the activities proposed are located within previously developed areas. The proposed activities are as follows:

- Remove concrete pad on westerly side of site and replaced with lawn;
- Remove three (3) concrete walkways in front of building and replace with lawn;
- Replace existing brick edging in front of building and replace with paver walkways;
- Replace existing concrete sidewalk to the west of building and replace with paver walkway;
- Repave existing parking area and formalize parking lot with striping. Area of pavement to be reduced so that the total impervious surface area on the site is reduced;
- Construct formal site driveways with vertical granite curb, creating a grassed island between Broad Cove Road and the paved parking area;
- Remove paved roadway shoulder in front of the building and along the easterly side of the site so that the entire shoulder is grassed;
- Construct a post and rail fence in front of the building and along easterly property boundary;
- Install privet hedgerow along post and rail fence to the east of the building;
- Install grease trap and new sewer service;
- Install new domestic and fire suppression water services with fire hydrant;
- Install stormwater management system consisting of trench drains, stormwater treatment units and infiltration trench to intercept stormwater runoff flowing from the paved parking area into Broad Cove Road;
- Remove select trees that include dead, diseased or damaged trees and invasive vine growth;
- Install plantings in proposed mitigation area and native planting bed along coastal bank;
- Reseed lawn area to the east of the building;

The work described above is presented on the accompanying plans. The project will result in a decrease in impervious surfaces of about 2,816 square feet. Runoff patterns will not change with the project, however, stormwater that currently flows into Broad Cove Road will be collected through the proposed trench drains and be infiltrated. Runoff from the developed areas of the site will continue to flow toward Broad Cove to the south.

DEP STORMWATER MANAGEMENT STANDARDS AND DESIGN CRITERIA

The DEP Stormwater Management Regulations include ten Stormwater Management Standards. The Standards were established to provide clear and consistent guidelines for stormwater management projects. The Standards address both water quantity and quality by establishing a level of required controls, which can presumptively be achieved through site

planning processes, non-structural measures and the use of Best Management Practices (BMPs).

Each of the standards have been evaluated for their applicability to the proposed site improvements and maintenance activities at 20 Broad Cove Road:

1. **No new stormwater conveyances (outfalls/discharges) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**

No new untreated stormwater conveyances discharge stormwater directly to wetlands or waters of the Commonwealth from this site. Under existing conditions, runoff from certain developed portions of the site flow into the Broad Cove to the south. This drainage pattern will remain unchanged.

2. **Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.**

The project consists of site improvements and maintenance activities that will reduce impervious surfaces on the site by approximately 2,818 square feet. Additionally, stormwater runoff flowing into Broad Cove Road will be intercepted and conveyed to an infiltration trench. The trench has been sized to accommodate stormwater runoff from the 100-year storm event. As a result, stormwater runoff post-development peak discharge rates have been significantly reduced.

3. **Loss of annual recharge to ground water should be minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.**

This project is a redevelopment project and, therefore, this standard is required to be met only to the maximum extent possible. The project includes collecting stormwater runoff flowing into Broad Cove Road through trench drains and conveying it to a subsurface infiltration trench. Prior to discharge, stormwater will be routed through one of two stormwater treatment units. The trench has approximately 611 cubic feet of storage volume and has been sized to recharge the entire 100-year storm event.

4. **Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:**
 - a. **Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;**
 - b. **Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and,**
 - c. **Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.**

There is currently no stormwater management system on the site. Stormwater runoff from the southerly side of the paved area will continue to flow into Broad Cove to the south as it does under existing conditions. There are no new untreated stormwater discharges to wetland resource areas on the site.

Stormwater runoff from the northerly side of the paved area will be routed through one of two proprietary stormwater treatment units before being discharged into a subsurface infiltration trench. These units will achieve a minimum of 80% TSS removal.

5. **For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.**

There are no proposed uses on the project site that may expose stormwater runoff to any higher potential pollutant loads.

6. **Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a**

significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A “storm water discharge” as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

The proposed project does not discharge stormwater runoff to a Zone II or Interim Wellhead Protection Area of a public water supply or to any other critical area.

- 7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.**

The project consists of re-developing the historic commercial property by making site improvements, completing maintenance activities including repaving the existing parking lot and installing certain stormwater controls. Additionally, the project results in a reduction in impervious surface area. As a redevelopment project, it complies with this Standard.

- 8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.**

During the construction phase, non-structural BMPs will be utilized to mitigate possible short term sedimentation. These temporary non-structural BMPs will include a double row of staked silt socks (erosion control barrier), which will be placed on the down gradient sides of the site along the coastal bank site to prevent siltation to Broad Cove. Additionally, erosion control barriers will be installed around the Broad Cove Road catch basin inlets to prevent potential sedimentation to the catch basins. The locations of the erosion control barrier are presented on the accompanying plans.

It should be noted that the proposed project will not disturb more than one acre of land and is not required to obtain coverage under the NPDES Construction General Permit issued by the US EPA.

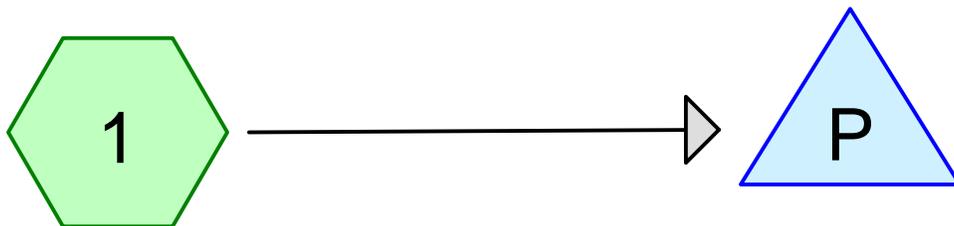
- 9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.**

A Stormwater Management System Operation and Maintenance Plan for the project site is enclosed.

10. All illicit discharges to the stormwater management system are prohibited.

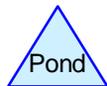
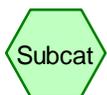
To the best of our professional knowledge and belief, no illicit discharges exist on or are proposed on the site.

DRAINAGE CALCULATIONS FOR INFILTRATION TRENCH



Paved Areas to Trench
Drains

Infiltration Trench



Infiltration Trench

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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment 1: Paved Areas to Trench Drains

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.048 af, Depth> 2.87"

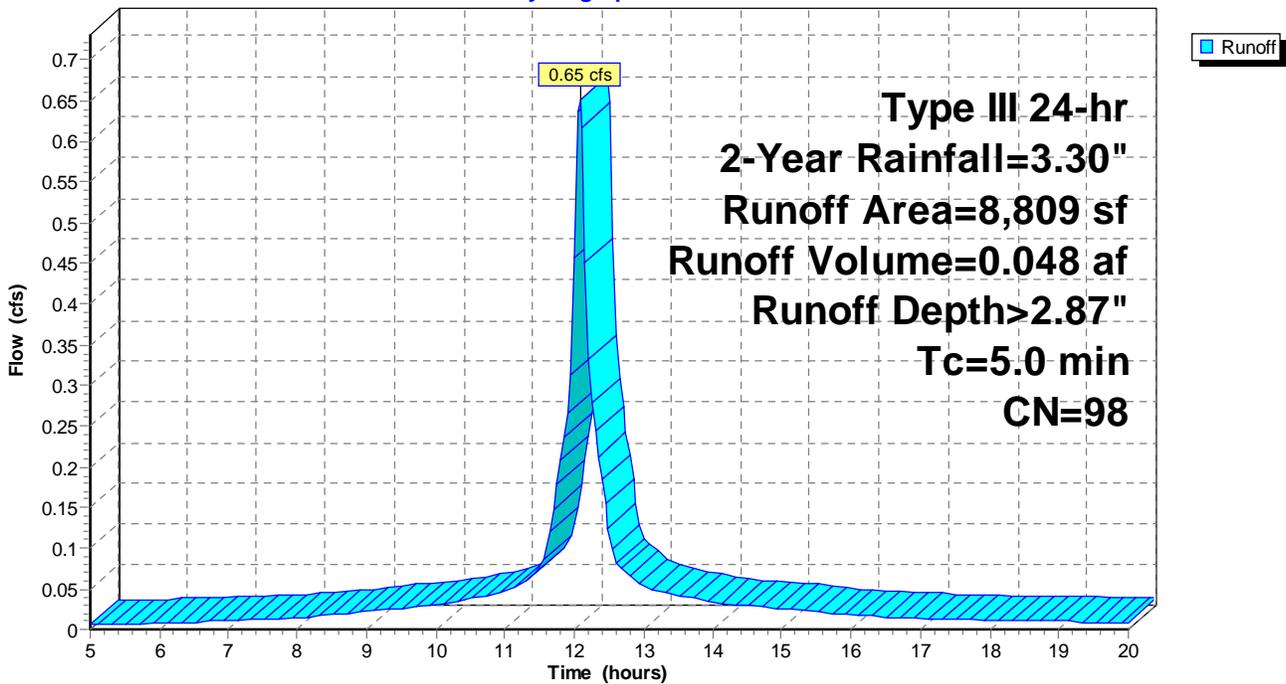
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
8,809	98	Paved parking, HSG A
8,809		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1: Paved Areas to Trench Drains

Hydrograph



Infiltration Trench

Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Pond P: Infiltration Trench

Inflow Area = 0.202 ac, 100.00% Impervious, Inflow Depth > 2.87" for 2-Year event
 Inflow = 0.65 cfs @ 12.07 hrs, Volume= 0.048 af
 Outflow = 0.52 cfs @ 12.05 hrs, Volume= 0.048 af, Atten= 20%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 12.05 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 0.22' @ 12.13 hrs Surf.Area= 450 sf Storage= 40 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.3 min (737.8 - 737.5)

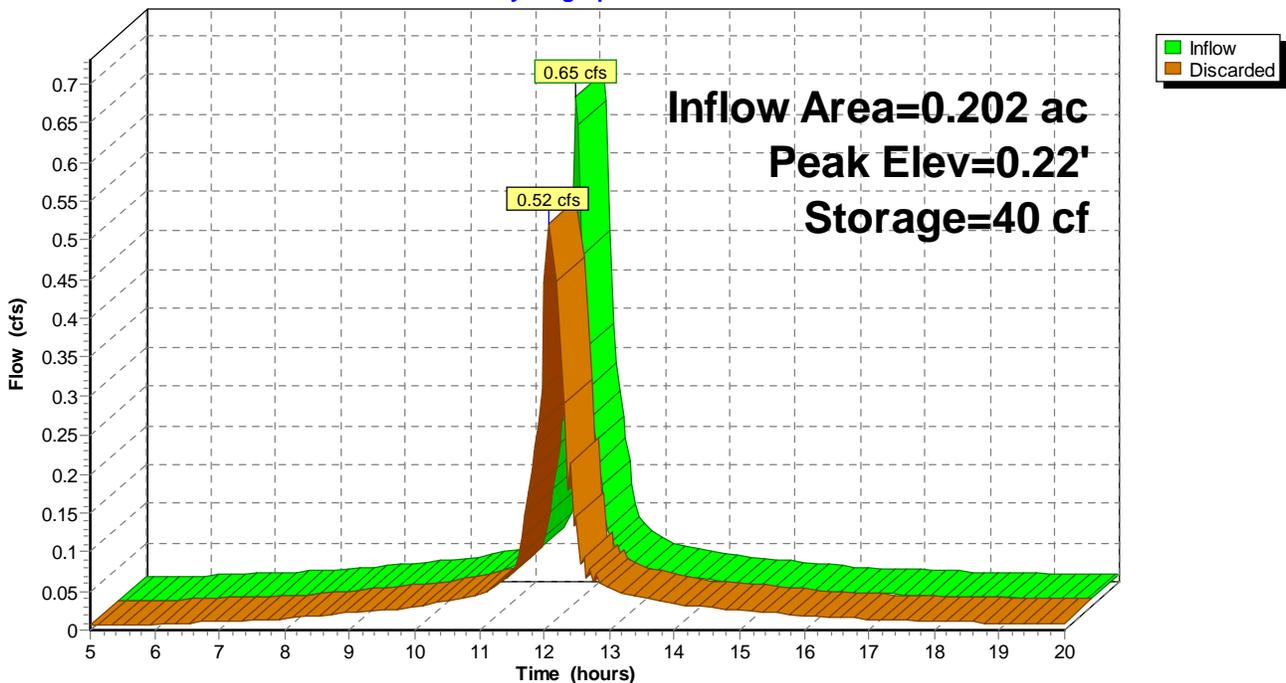
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	493 cf	3.00'W x 150.00'L x 3.00'H Prismatoid 1,350 cf Overall - 118 cf Embedded = 1,232 cf x 40.0% Voids
#2	0.50'	118 cf	12.0" Round Pipe Storage Inside #1 L= 150.0'
		611 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.52 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.52 cfs @ 12.05 hrs HW=0.09' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Pond P: Infiltration Trench

Hydrograph



Infiltration Trench

Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Subcatchment 1: Paved Areas to Trench Drains

Runoff = 0.94 cfs @ 12.07 hrs, Volume= 0.070 af, Depth> 4.15"

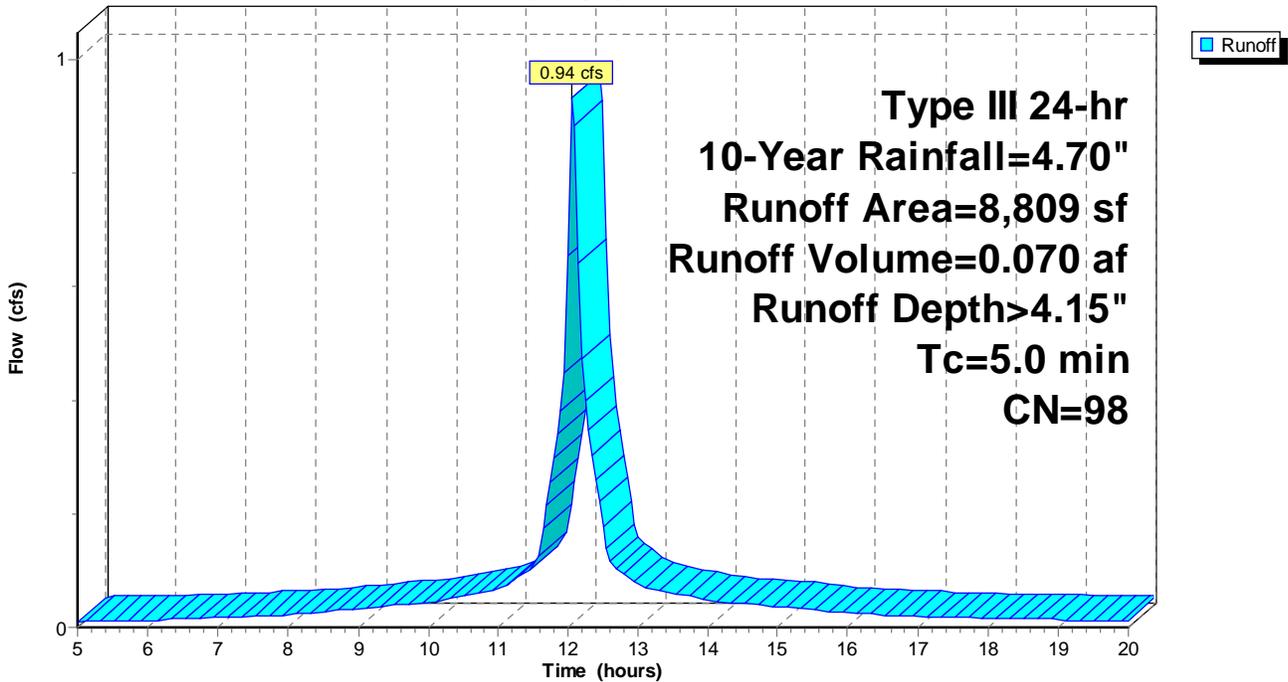
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
8,809	98	Paved parking, HSG A
8,809		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1: Paved Areas to Trench Drains

Hydrograph



Infiltration Trench

Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Pond P: Infiltration Trench

Inflow Area = 0.202 ac, 100.00% Impervious, Inflow Depth > 4.15" for 10-Year event
 Inflow = 0.94 cfs @ 12.07 hrs, Volume= 0.070 af
 Outflow = 0.52 cfs @ 12.00 hrs, Volume= 0.070 af, Atten= 44%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 12.00 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 0.88' @ 12.19 hrs Surf.Area= 450 sf Storage= 184 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.2 min (735.9 - 734.8)

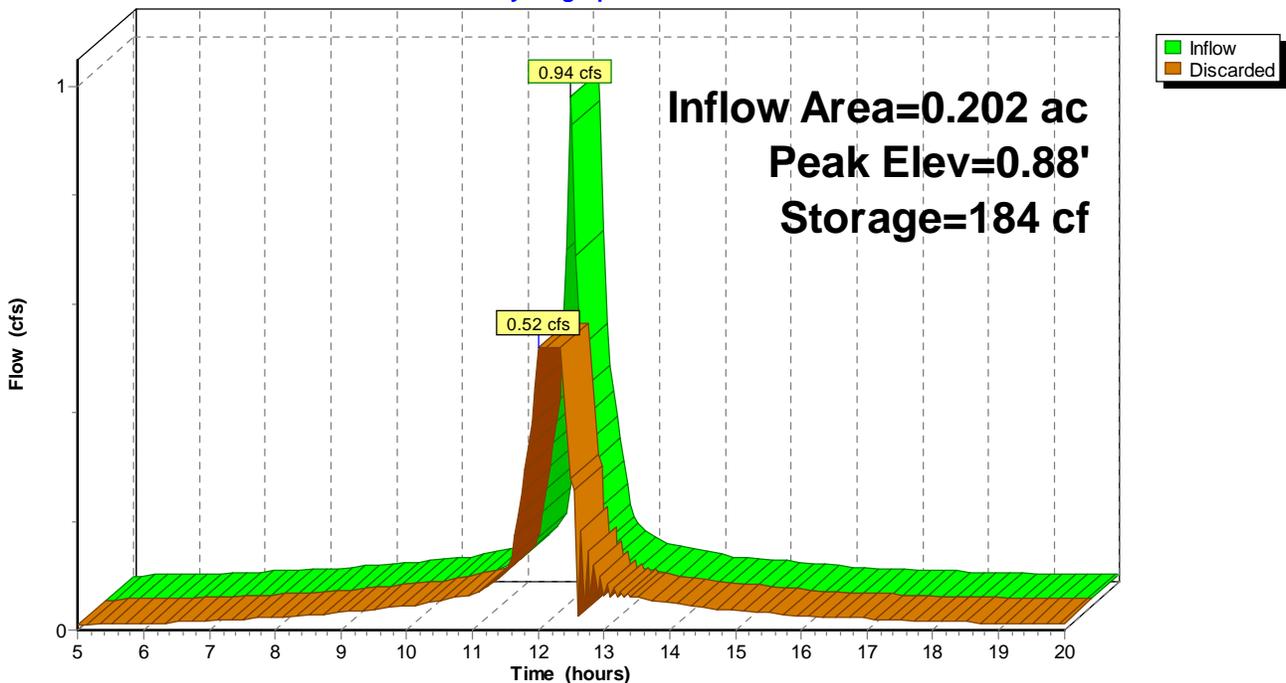
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	493 cf	3.00'W x 150.00'L x 3.00'H Prismatoid 1,350 cf Overall - 118 cf Embedded = 1,232 cf x 40.0% Voids
#2	0.50'	118 cf	12.0" Round Pipe Storage Inside #1 L= 150.0'
		611 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.52 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.52 cfs @ 12.00 hrs HW=0.10' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Pond P: Infiltration Trench

Hydrograph



Infiltration Trench

Type III 24-hr 25-Year Rainfall=5.60"

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Summary for Subcatchment 1: Paved Areas to Trench Drains

Runoff = 1.12 cfs @ 12.07 hrs, Volume= 0.084 af, Depth> 4.97"

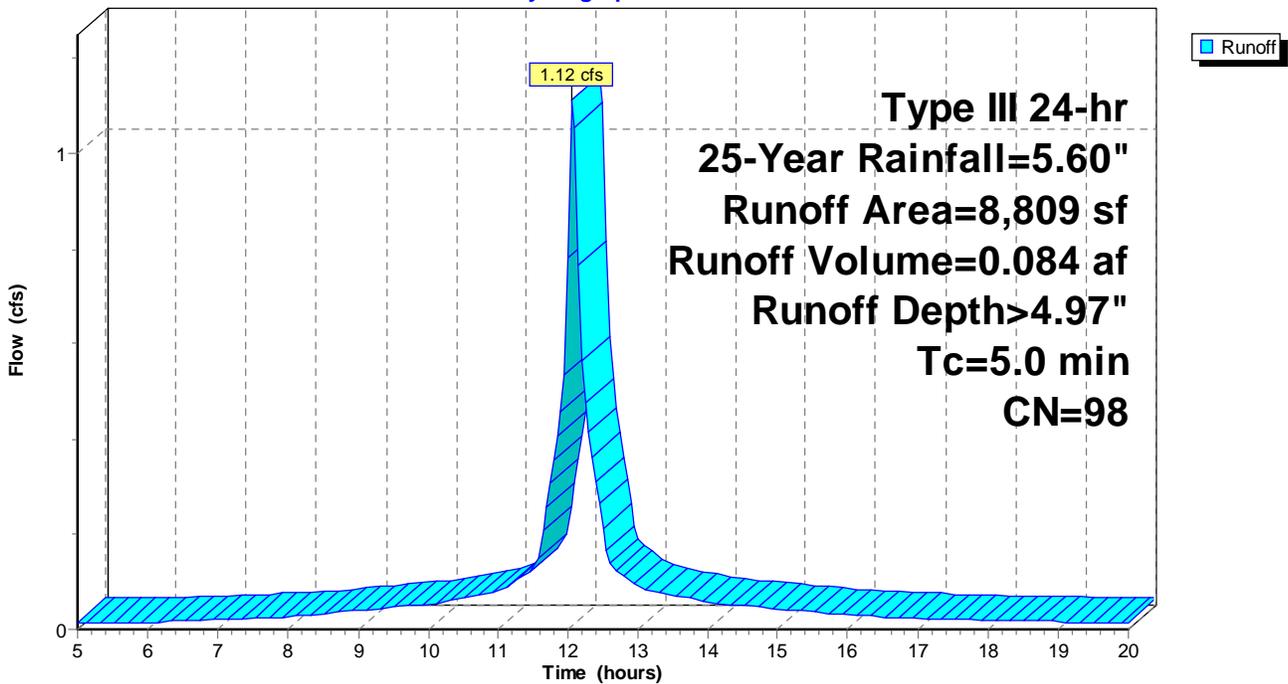
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
8,809	98	Paved parking, HSG A
8,809		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1: Paved Areas to Trench Drains

Hydrograph



Infiltration Trench

Type III 24-hr 25-Year Rainfall=5.60"

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Summary for Pond P: Infiltration Trench

Inflow Area = 0.202 ac, 100.00% Impervious, Inflow Depth > 4.97" for 25-Year event
 Inflow = 1.12 cfs @ 12.07 hrs, Volume= 0.084 af
 Outflow = 0.52 cfs @ 11.95 hrs, Volume= 0.084 af, Atten= 53%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.95 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 1.34' @ 12.23 hrs Surf.Area= 450 sf Storage= 304 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.2 min (735.9 - 733.8)

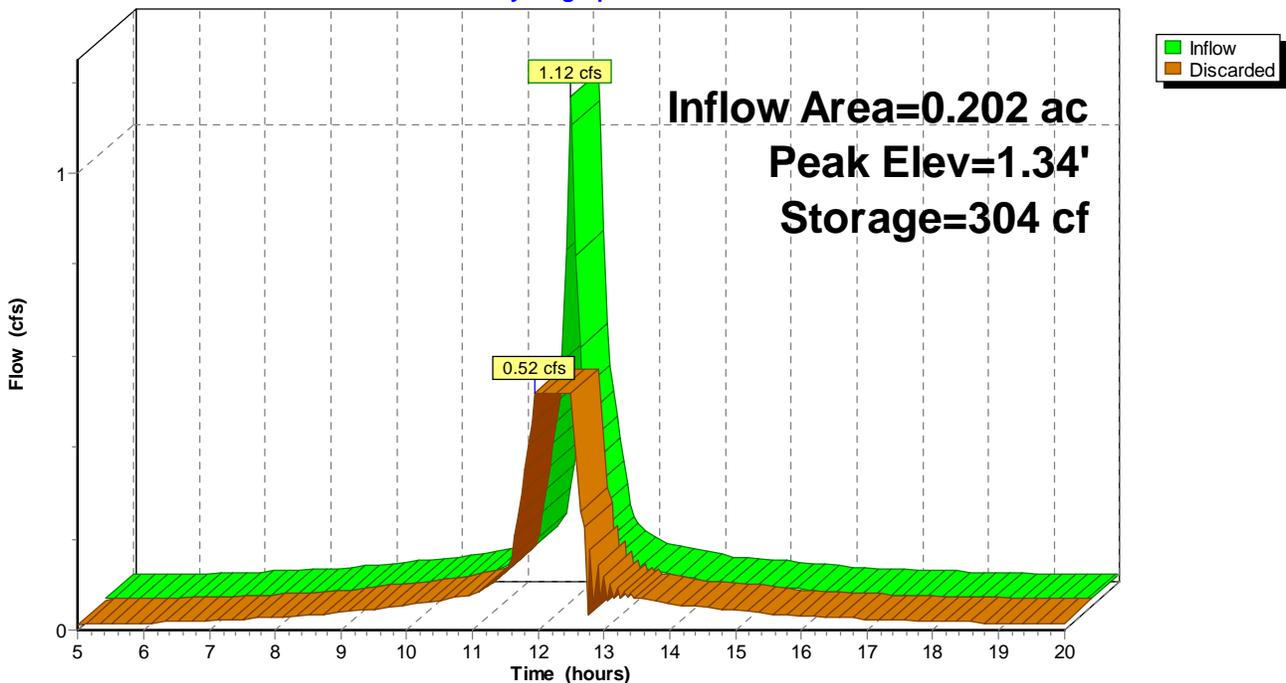
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	493 cf	3.00'W x 150.00'L x 3.00'H Prismaoid 1,350 cf Overall - 118 cf Embedded = 1,232 cf x 40.0% Voids
#2	0.50'	118 cf	12.0" Round Pipe Storage Inside #1 L= 150.0'
		611 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.52 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.52 cfs @ 11.95 hrs HW=0.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Pond P: Infiltration Trench

Hydrograph



Infiltration Trench

Type III 24-hr 100-Year Rainfall=6.90"

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Summary for Subcatchment 1: Paved Areas to Trench Drains

Runoff = 1.38 cfs @ 12.07 hrs, Volume= 0.104 af, Depth> 6.15"

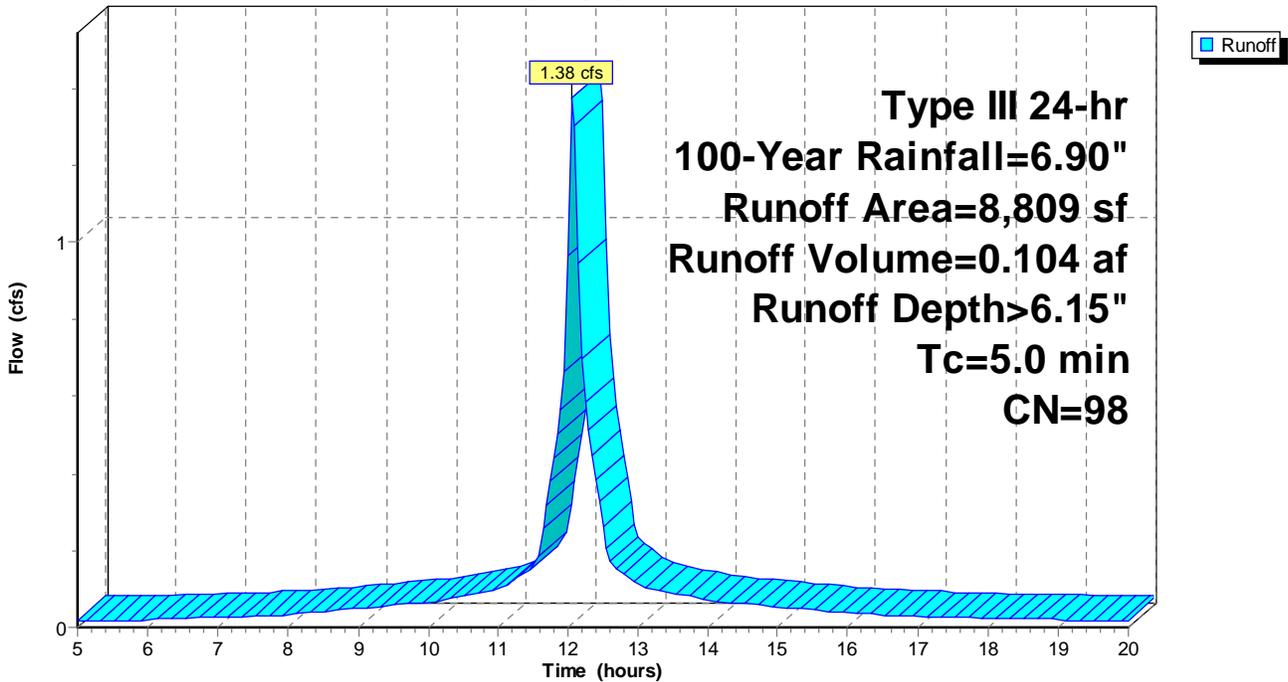
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=6.90"

Area (sf)	CN	Description
8,809	98	Paved parking, HSG A
8,809		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1: Paved Areas to Trench Drains

Hydrograph



Infiltration Trench

Type III 24-hr 100-Year Rainfall=6.90"

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Summary for Pond P: Infiltration Trench

Inflow Area = 0.202 ac, 100.00% Impervious, Inflow Depth > 6.15" for 100-Year event
 Inflow = 1.38 cfs @ 12.07 hrs, Volume= 0.104 af
 Outflow = 0.52 cfs @ 11.90 hrs, Volume= 0.104 af, Atten= 62%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.90 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 2.54' @ 12.30 hrs Surf.Area= 450 sf Storage= 529 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 4.0 min (736.9 - 732.8)

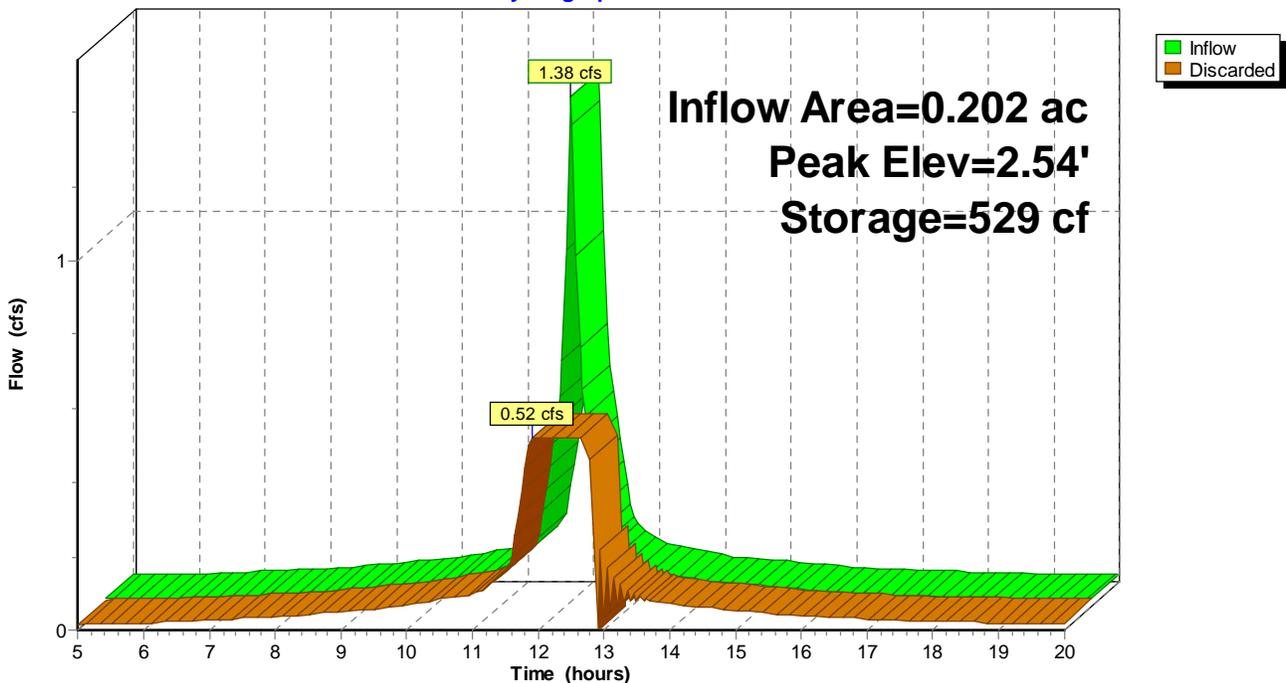
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	493 cf	3.00'W x 150.00'L x 3.00'H Prismatoid 1,350 cf Overall - 118 cf Embedded = 1,232 cf x 40.0% Voids
#2	0.50'	118 cf	12.0" Round Pipe Storage Inside #1 L= 150.0'
		611 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.52 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.52 cfs @ 11.90 hrs HW=0.05' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Pond P: Infiltration Trench

Hydrograph



OPERATION AND MAINTENANCE PLAN

STORWMATER MANAGEMENT SYSTEM
OPERATION & MAINTENANCE PLAN
&
LONG TERM POLLUTION PREVENTION PLAN

for

REDEVELOPMENT & SITE IMPROVEMENTS
20 BROAD COVE ROAD
HINGHAM, MA 02043

Prepared For:

Douglas Karo
247 River Street
Weymouth, MA 02191

Prepared By:

SITEC Engineering & Environmental Consultants, Inc.
769 Plain Street, Unit A
Marshfield, MA 02050

July 2024 Revised October 2024

**REDEVELOPMENT & SITE IMPROVEMENTS
20 BROAD COVE ROAD
HINGHAM, MASSACHUSETTS**

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1.0 - OWNERSHIP

Douglas Karo, herein referred to as the Owner, shall be the owner of the stormwater management system. The stormwater management system shall include the following components:

- (2) Trench Drain Inlet Structures
- Drain Lines
- (2) CDS Stormwater Treatment Units
- Subsurface Infiltration Trench
- Stormwater Outfall with Rip Rap Apron

2.0 - MAINTENANCE AGREEMENTS

The Owner shall be the party responsible for managing the maintenance operations of the components of the stormwater management system listed above as described in this Plan. The Owner may perform routine and non-routine maintenance tasks such as maintaining vegetation and clearing debris and accumulated sediment from the stormwater management system components including the paved areas and outlets. All collected debris and sediments shall be legally disposed of in accordance with federal, state, and local regulations.

The rights, liabilities, agreements, and obligations herein and set forth in this Plan shall run with the property and be legally binding to all subsequent Owners and their executors, administrators, heirs, and assigns.

3.0 - REQUIREMENTS FOR ROUTINE INSPECTIONS & MAINTENANCE OF STORMWATER BMPS

Below are the Stormwater BMPs subject to inspection and maintenance. The BMPs are presented on the enclosed Utility Plan.

Drain Lines

After construction, the drain lines shall be inspected after every major storm (exceeding 1" of rainfall in a 24-hour period) for the first two months to ensure proper functions. The presence of accumulated sand and silt would indicate more frequent maintenance of the pre-treatment devices is required. Thereafter, the drain lines shall be inspected at least once per year.

Stormwater Outfall with Rip Rap Apron

It is not expected that stormwater be present within this device since it is an emergency overflow pipe, however after construction, the stormwater outfall and rip rap apron shall be inspected after every major storm (exceeding 1" of rainfall in a 24-hour period) for the first two months for the presence of accumulated sediment and to ensure proper function. The presence of accumulated

sand and silt may indicate more frequent maintenance of the pre-treatment devices are required. When all surfaces are stabilized, the outfall shall be inspected at least once per year. The rip rap apron shall be cleaned by (preferably by vacuum truck) if accumulated sediment reaches a depth of six (6) inches or if sediment is observed beyond the limit of the apron.

Trench Drain Inlets

After construction, the trench drain inlets shall be inspected at least once per year, and at the end of foliage and snow removal seasons. Trench drain inlet sumps shall be inspected for depth of accumulated sediment, leaves and other debris. Trench drain inlets shall be cleaned (preferably by vacuum truck) if accumulated sediment rises to within six inches of the outlet pipe invert. Disposal of the accumulated sediment and hydrocarbons shall be in accordance with applicable local, state, and federal guidelines and regulations.

Stormwater Treatment Units

The CDS stormwater treatment units should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend on site activities, i.e., unstable soils or heavy winter sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

Inspections

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed once per year or when winter weather requires sanding operations that may lead to rapid accumulation of a large volume of sediment.

The proposed stormwater treatment units shall be inspected and maintained in accordance with the manufacturer's recommendations, a copy of which is attached to this plan.

Cleaning

Cleaning of the CDS units should be done during dry weather conditions when no flow is entering the system. Cleanout of the CDS units with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Remove the manhole cover and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. If anyone physically enters the unit, Confined Space Entry procedures need to be followed.

Disposal of all material removed from the CDS units should be done in accordance with local regulations.

Subsurface Infiltration Trench

After construction, the infiltration trench shall be inspected after every major storm (exceeding 1" of rainfall in a 24-hour period) for the first two months to ensure proper function. Thereafter, the systems shall be inspected at least once per year by a qualified professional with experience in the design and operation of infiltration systems. Water level in the observation well should be recorded on the Inspection Schedule and Evaluation Checklist over several days to check infiltration efficiency. If water does not drain from the trench within twenty-four (24) hours after the end of the storm, remedial measures shall be taken to restore the infiltration capacity of the trench.

4.0 INSPECTIONS

The owner shall be responsible to secure the services of a Licensed Engineer or similar professional (inspector) on an on-going basis as outlined above. The inspector shall review the project with respect to the following:

- Proper installation and performance of the Stormwater Management System.
- Review of the controls to determine any damaged or ineffective controls.
- Visual and olfactory survey of drainage structures to determine if any hydrocarbons have accumulated in the drainage system
- Corrective actions. Typical corrective actions would include the vacuum pumping of any drainage structure where excess hydrocarbons or sediment have built up, and the removal of litter or debris from inlets, drain lines, or the grassed swale.

The inspector shall prepare a report documenting the findings and should request the required maintenance or repair for the pollution prevention controls when the inspector finds that it is necessary for the control to be effective. The inspector shall notify the Owner to make the changes.

5.0 SNOW DISPOSAL & PLOWING PLAN

Snow from smaller storms will be plowed up against the curbing at the edge of driveways and parking areas, to a maximum height of approximately 3 feet and for a distance of 18 inches maximum from the curb onto the pavement. Any snow accumulation exceeding these amounts will be plowed to an on-site snow disposal area.

Snow disposal areas are to be located adjacent to or on pervious surfaces. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris which can be removed in the springtime. Snow disposal areas shall be selected so that meltwater is directed towards either on-site stormwater inlets, or on-site landscaped areas where meltwater can infiltrate. Under no circumstances shall meltwater be allowed to run off directly to Broad Cove or abutting properties.

6.0 PAVEMENT SWEEPING

Pavement sweeping can provide important non-point source pollution control. The performance of pavement sweeping efforts to remove pollutants varies according to frequency, type of equipment and the amount of pollutants present. Pavement shall be swept twice per year as a minimum, once in the early spring and once in the early fall. A conventional street sweeping or vacuum street sweeping machine may be used. All accumulated debris shall be disposed of in accordance with federal, state, and local regulations.

7.0 - PLAN REFERENCES

Prepared by: SITEC Engineering & Environmental Consultants, Inc.
769 Plain Street, Unit A
Marshfield, MA 02050

UP-1 Utility Plan

8.0 - DESCRIPTION OF SAFETY MEASURES

All confined space entry work such as cleaning and/or maintaining the stormwater treatment units, drain manholes and other subsurface structures shall conform to the applicable OSHA standards. Safety goggles, safety vests and hard hats shall be worn at all times.

9.0 - FUNDING

The cost of the maintenance shall be the responsibility of the Owner. The cost of the annual inspection and maintenance is minimal and should average about \$2,000.00 per year.

Inspection and Monitoring Log
Stormwater Management System Maintenance Plan
20 Broad Cove Road, Hingham, MA 02043

Date	Structure or Activity	Date Completed	Depth of Sediment (if applicable)	Action Taken	Maintenance Contractor

Date	Structure or Activity	Date Completed	Depth of Sediment (if applicable)	Action Taken	Maintenance Contractor

Comments:

CDS[®] Inspection and Maintenance Guide



Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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