

STORMWATER MANAGEMENT REPORT
Culvert Modification

Sturbridge Meadows
94 Hall Road
Sturbridge, MA



August 28, 2023

McCLURE
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**Stormwater Management Report
Culvert Modification
Sturbridge Meadows
94 Hall Road, Sturbridge, MA**

Section I - Introduction

A. Scope of Analysis

The project Applicant, Sturbridge Meadows., retained McClure Engineering, Inc. (McClure) to prepare this engineering analysis of stormwater for the proposed work for the property located at 94 Hall Road, Sturbridge, MA (Site).

This Stormwater Management Report provides the required analysis of the proposed stormwater system for compliance with the Massachusetts Stormwater Standards and local regulations. The analysis includes pre- and post- conditions hydrologic modeling, and hydraulic sizing of the conveyance systems, sizing, and analysis of Stormwater Best Management Practices (BMPs) of structural or non-structural techniques for managing stormwater to prevent or reduce non-point source pollutants from entering surface waters or ground waters. This report will demonstrate that the stormwater management system as designed and laid out complies with the referenced regulations.

A copy of the “MA-DEP Checklist for Stormwater Report” is included as Appendix A.

B. Site Description

The Subject Site is referenced as Assessor’s Parcel I.D. 315-02631-094 and consists of approximately 2 acres. The property lies on the southern side of Hall Road and is approximately 200’ from the Hall Road and Route 200 intersection. The site is developed site housing a multifamily apartment building and is part of a larger apartment complex development known as Sturbridge Meadows.

The site was constructed in approximately 1984. At the time of construction, an intermittent stream flowing from southeast to northwest was diverted through an underground 24” corrugated metal pipe culvert which was installed under the apartment building. Catch basins were also installed in line on this culvert.

C. Proposed Development

The proposed work involves the relocation of a stream culvert from under an existing building. The stream/ culvert will be routed around the building. (2) in-line catch basins in the vicinity of the proposed work will be moved off-line. The new catch basins will be installed with sumps. One of the catch basins which is within an asphalt parking area will also be equipped with a hood.

The “**Culvert Modification Plan, 94 Hall Road, Sturbridge, MA**” Plan Set prepared by McClure Engineering, Inc., dated 8/24/23, provides details of the complete stormwater management system design.

Section II – Stormwater Standards

A. Standard 1 – Computations to Show That Discharge Does Not Cause Scour or Erosion

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Proposed Full Compliance:

No new discharges are proposed.

B. Standard 2 – Peak Rate Attenuation

Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

Proposed Full Compliance:

No changes in ground cover are proposed. As the total distance of the proposed culvert is almost two times that of the existing culvert, the slope is ½ that of the existing culvert. Therefore, the proposed culvert has been increased to a 30" diameter versus 24" in order to maintain adequate hydraulic capacity. The 30" culvert will be capable of passing the 100 year 24 hour flow rate of the intermittent stream as determined by USGS stream stats.

C. Standard 3 – Recharge

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

Proposed Full Compliance:

As there is no change in ground cover, there is no proposed increase of impervious area, and therefore ground water recharge is not required.

D. Standard 4 – Water Quality

Stormwater management systems must 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 implemented and maintained.*
- b. Stormwater BMPs 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.*

Proposed Full Compliance:

As stated prior, the project does not involve the addition of impervious area, therefore there is no need for water quality treatment of new impervious surfaces.

The project does propose to move two existing in-line catch basins existing on the culvert to off-line structures. One catch basin is located south of the building in existing lawn area. The second catch basin is located to the north of the building in the existing asphalt parking lot. Both structures will be moved off-line and deep sumps will be provided. The catch basin within the asphalt parking lot will also be equipped with a hood. The addition of sumps, a hood, and moving the structures off-line will provide for an increase of water quality treatment of the existing conditions.

A "Long Term Operation and Maintenance Plan" which outlines the maintenance of the catch basins is provided as Appendix E.

E. Standard 5 – Land Uses with Higher Potential Pollutant Loads

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm water Handbook to eliminate or reduce the discharge of storm water 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, or storm water runoff, the proponent shall use the specific storm water BMP's determined by the Department to be suitable for such use as provided in the Massachusetts Storm water Handbook.

Proposed Full Compliance:

Not applicable - the Site is not a Land Use with High Potential Pollutant Loads.

F. Standard 6 – Critical Areas

Storm water discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and storm water discharges near or any other critical area require the use of the specific storm water best management practices determined by the Department to be suitable for managing discharges to such area as provided in the Massachusetts Storm water Handbook.

Proposed Full Compliance:

Not applicable - the Site does not discharge to a critical area. Also, there is no proposed change in ground cover or increase in impervious area. Groundwater recharge is not proposed.

G. Standard 7 - Redevelopment

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.

Proposed Full Compliance:

The Site is considered a redevelopment, and all the standards will be fully met.

H. Standard 8 – Construction Period Controls

A plan to control construction related impacts including erosion sedimentation and other pollution prevention sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) must be implemented.

Proposed Full Compliance:

Draft - Weekly Construction Period Inspection Report is provided as Appendix D.

The proposed project will not disturb > 1 Acre, therefore coverage under the EPA-NPDES Construction General Permit is not required.

The construction period erosion and sedimentation control plan has been outlined on the referenced site plans along with the sequence for implementation. The construction period erosion and sedimentation control are shown on the referenced plans.

I. Standard 9 – Operation and Maintenance Plan

A long-term operation and maintenance plan must be developed and implemented to ensure that storm water management systems function as designed.

Proposed Full Compliance:

Long Term Operation and Maintenance Plan is included in the Stormwater Management Report, Appendix E.

J. Standard 10 – Illicit Discharges to Drainage System

All illicit discharges to the stormwater management system are prohibited.

Proposed Full Compliance:

The Long-Term Operation and Maintenance Plan provided in Appendix E addresses illicit discharges to drainage system.

The “**Culvert Modification Plan, 94 Hall Road, Sturbridge, MA**” Plan Set prepared by McClure Engineering, Inc., dated 8/24/23, provides details of the complete stormwater management system design.

- **Appendix A** includes a copy of the “MA-DEP Checklist for Stormwater Report”.
- **Appendix B** includes a USGS Site Map.
- **Appendix C** includes the USGS Stream Stats Report and FEMA Flood Plain Map.
- **Appendix D** provides a “Weekly Construction Period Inspection Report.”
- **Appendix E** provides a “Long Term Stormwater Operation & Maintenance Plan.”

APPENDIX A

MassDEP Stormwater Checklist



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



PCE 8-28-23
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior to* the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does *not* cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has *not* been included in the Stormwater Report but will be submitted *before* land disturbance begins.
- The project is *not* covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is *not* the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of any stormwater to post-construction BMPs.

APPENDIX B

USGS Map



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

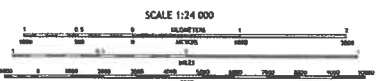
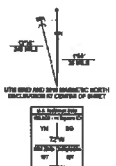


SOUTHBRIDGE QUADRANGLE
MASSACHUSETTS - CONNECTICUT
7.5-MINUTE SERIES



Produced by the United States Geological Survey
World Geodetic System of 1983 (WGS84) Projection and
1-Meter Digital Elevation Model (DEM) Data
This map is not a legal document. Standards may be
consulted for full map scale. Please look at the copyright
information for full details. Other products before
using for any purpose.

Source: **DEM**, September 2015, October 2016
ROAD, U.S. Census Bureau, 2010
BOUNDARY, U.S. Census Bureau, 2010
BOUNDARY, U.S. Census Bureau, 2010
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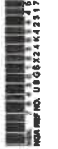


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

ROAD CLASSIFICATION

| | |
|------------------|-----------------|
| Expressway | Local Connector |
| Major Road | Local Road |
| Minor Road | Other |
| Interstate Route | US Route |
| | State Route |

SOUTHBRIDGE, MA, CT
2021



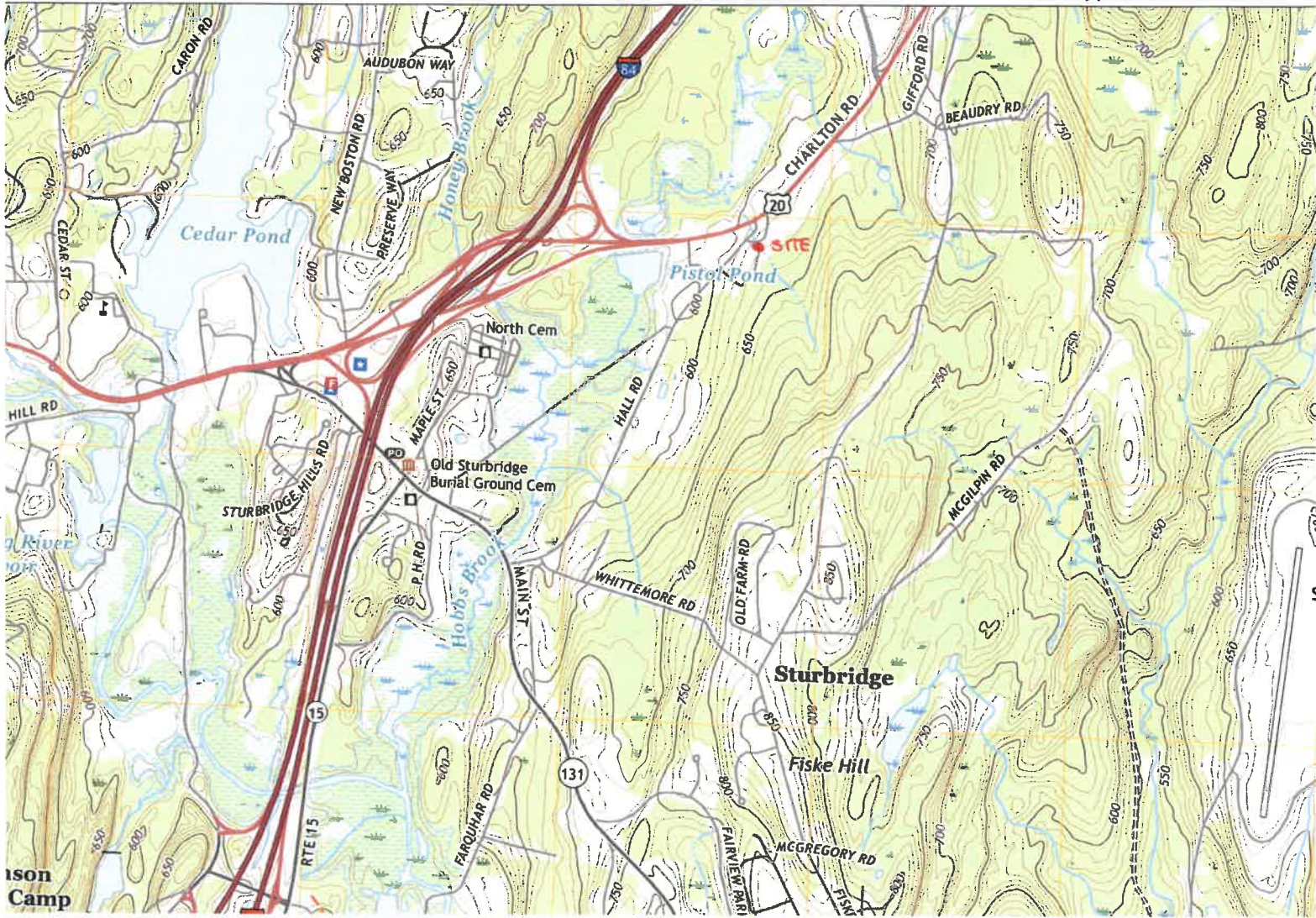
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Camp

APPENDIX C

FEMA Flood Plan Map USGS Stream Stats

StreamStats Report

Region ID: MA

Workspace ID: MA20230714153515653000

Clicked Point (Latitude, Longitude): 42.11604, -72.06343

Time: 2023-07-14 11:30:07 -0400



[+ Collapse All](#)

➤ Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|----------------|--|--------|----------------------|
| BSLDEM10M | Mean basin slope computed from 10 m DEM | 8.767 | percent |
| BSLDEM250 | Mean basin slope computed from 1:250K DEM | 6.146 | percent |
| DRFTPERSTR | Area of stratified drift per unit of stream length | 0 | square mile per mile |
| DRNAREA | Area that drains to a point on a stream | 0.0964 | square miles |

| Parameter Code | Parameter Description | Value | Unit |
|----------------|---|-------|---------------|
| ELEV | Mean Basin Elevation | 731 | feet |
| FOREST | Percentage of area covered by forest | 88.74 | percent |
| LC06STOR | Percentage of water bodies and wetlands determined from the NLCD 2006 | 3.61 | percent |
| MAREGION | Region of Massachusetts 0 for Eastern 1 for Western | 0 | dimensionless |
| PCTSNDGRV | Percentage of land surface underlain by sand and gravel deposits | 0 | percent |

➤ Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|-------------------------------|--------|--------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 0.16 | 512 |
| ELEV | Mean Basin Elevation | 731 | feet | 80.6 | 1948 |
| LC06STOR | Percent Storage from NLCD2006 | 3.61 | percent | 0 | 32.3 |

Peak-Flow Statistics Disclaimers [Peak Statewide 2016 5156]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Peak Statewide 2016 5156]

| Statistic | Value | Unit |
|----------------------|-------|--------------------|
| 50-percent AEP flood | 8.08 | ft ³ /s |
| 20-percent AEP flood | 14.2 | ft ³ /s |
| 10-percent AEP flood | 19.3 | ft ³ /s |
| 4-percent AEP flood | 27.1 | ft ³ /s |

| Statistic | Value | Unit |
|-----------------------|-------|--------------------|
| 2-percent AEP flood | 33.7 | ft ³ /s |
| 1-percent AEP flood | 40.9 | ft ³ /s |
| 0.5-percent AEP flood | 48.9 | ft ³ /s |
| 0.2-percent AEP flood | 60.7 | ft ³ /s |

Peak-Flow Statistics Citations

Zarriello, P.J., 2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (<https://dx.doi.org/10.3133/sir20165156>)

➤ **Low-Flow Statistics**

Low-Flow Statistics Parameters [Statewide Low Flow WRIR00 4135]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|------------------------------------|--------|----------------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 1.61 | 149 |
| BSLDEM250 | Mean Basin Slope from 250K DEM | 6.146 | percent | 0.32 | 24.6 |
| DRFTPERSTR | Stratified Drift per Stream Length | 0 | square mile per mile | 0 | 1.29 |
| MAREGION | Massachusetts Region | 0 | dimensionless | 0 | 1 |

Low-Flow Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [Statewide Low Flow WRIR00 4135]

| Statistic | Value | Unit |
|------------------------|----------|--------------------|
| 7 Day 2 Year Low Flow | 0.0028 | ft ³ /s |
| 7 Day 10 Year Low Flow | 0.000871 | ft ³ /s |

Low-Flow Statistics Citations

➤ Flow-Duration Statistics

Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|------------------------------------|--------|----------------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 1.61 | 149 |
| DRFTPERSTR | Stratified Drift per Stream Length | 0 | square mile per mile | 0 | 1.29 |
| MAREGION | Massachusetts Region | 0 | dimensionless | 0 | 1 |
| BSLDEM250 | Mean Basin Slope from 250K DEM | 6.146 | percent | 0.32 | 24.6 |

Flow-Duration Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

| Statistic | Value | Unit |
|---------------------|---------|--------------------|
| 50 Percent Duration | 0.0879 | ft ³ /s |
| 60 Percent Duration | 0.0493 | ft ³ /s |
| 70 Percent Duration | 0.0218 | ft ³ /s |
| 75 Percent Duration | 0.015 | ft ³ /s |
| 80 Percent Duration | 0.0122 | ft ³ /s |
| 85 Percent Duration | 0.00832 | ft ³ /s |
| 90 Percent Duration | 0.00559 | ft ³ /s |
| 95 Percent Duration | 0.00286 | ft ³ /s |
| 98 Percent Duration | 0.00163 | ft ³ /s |
| 99 Percent Duration | 0.00105 | ft ³ /s |

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

➤ August Flow-Duration Statistics

August Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|------------------------------------|--------|----------------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 1.61 | 149 |
| BSLDEM250 | Mean Basin Slope from 250K DEM | 6.146 | percent | 0.32 | 24.6 |
| DRFTPERSTR | Stratified Drift per Stream Length | 0 | square mile per mile | 0 | 1.29 |
| MAREGION | Massachusetts Region | 0 | dimensionless | 0 | 1 |

August Flow-Duration Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

August Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

| Statistic | Value | Unit |
|----------------------------|---------|--------------------|
| August 50 Percent Duration | 0.00826 | ft ³ /s |

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

➤ Bankfull Statistics

Bankfull Statistics Parameters [Bankfull Statewide SIR2013 5155]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|-------------------------------|--------|--------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 0.6 | 329 |
| BSLDEM10M | Mean Basin Slope from 10m DEM | 8.767 | percent | 2.2 | 23.9 |

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|----------------|--------|--------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 0.07722 | 940.1535 |

Bankfull Statistics Parameters [New England P Bieger 2015]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|----------------|--------|--------------|-----------|------------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 3.799224 | 138.999861 |

Bankfull Statistics Parameters [USA Bieger 2015]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|----------------|--------|--------------|-----------|------------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 0.07722 | 59927.7393 |

Bankfull Statistics Disclaimers [Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [Bankfull Statewide SIR2013 5155]

| Statistic | Value | Unit |
|----------------|-------|-----------------|
| Bankfull Width | 6.21 | ft |
| Bankfull Depth | 0.498 | ft |
| Bankfull Area | 3.04 | ft ² |

| Statistic | Value | Unit |
|---------------------|--------------|--------------------|
| Bankfull Streamflow | 7.45 | ft ³ /s |

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

| Statistic | Value | Unit |
|---------------------------------------|--------------|-----------------|
| Bieger_D_channel_width | 5.76 | ft |
| Bieger_D_channel_depth | 0.573 | ft |
| Bieger_D_channel_cross_sectional_area | 3.32 | ft ² |

Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [New England P Bieger 2015]

| Statistic | Value | Unit |
|---------------------------------------|--------------|-----------------|
| Bieger_P_channel_width | 13.1 | ft |
| Bieger_P_channel_depth | 0.822 | ft |
| Bieger_P_channel_cross_sectional_area | 10.5 | ft ² |

Bankfull Statistics Flow Report [USA Bieger 2015]

| Statistic | Value | Unit |
|---|--------------|-----------------|
| Bieger_USA_channel_width | 5.44 | ft |
| Bieger_USA_channel_depth | 0.732 | ft |
| Bieger_USA_channel_cross_sectional_area | 4.83 | ft ² |

Bankfull Statistics Flow Report [Area-Averaged]

| Statistic | Value | Unit |
|---------------------|--------------|--------------------|
| Bankfull Width | 6.21 | ft |
| Bankfull Depth | 0.498 | ft |
| Bankfull Area | 3.04 | ft ² |
| Bankfull Streamflow | 7.45 | ft ³ /s |

| Statistic | Value | Unit |
|---|-------|------|
| Bieger_D_channel_width | 5.76 | ft |
| Bieger_D_channel_depth | 0.573 | ft |
| Bieger_D_channel_cross_sectional_area | 3.32 | ft^2 |
| Bieger_P_channel_width | 13.1 | ft |
| Bieger_P_channel_depth | 0.822 | ft |
| Bieger_P_channel_cross_sectional_area | 10.5 | ft^2 |
| Bieger_USA_channel_width | 5.44 | ft |
| Bieger_USA_channel_depth | 0.732 | ft |
| Bieger_USA_channel_cross_sectional_area | 4.83 | ft^2 |

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (<http://pubs.usgs.gov/sir/2013/5155/>)
Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_

➤ Probability Statistics

Probability Statistics Parameters [Perennial Flow Probability]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|----------------|--------------------------------------|--------|---------------|-----------|-----------|
| DRNAREA | Drainage Area | 0.0964 | square miles | 0.01 | 1.99 |
| PCTSNDGRV | Percent Underlain By Sand And Gravel | 0 | percent | 0 | 100 |
| FOREST | Percent Forest | 88.74 | percent | 0 | 100 |
| MAREGION | Massachusetts Region | 0 | dimensionless | 0 | 1 |

Probability Statistics Flow Report [Perennial Flow Probability]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

| Statistic | Value | Unit | PC |
|--|--------------|-------------|-----------|
| Probability Stream Flowing Perennially | 0.172 | dim | 71 |

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006-5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

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Application Version: 4.16.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

APPENDIX D

Weekly Construction Period Inspection Report

Weekly Stormwater Construction Site Inspection Report

94 Hall Road, Sturbridge, MA 01566

| General Information | | | | |
|--|------------------------------|--|--|------------------------------------|
| Project Name | 94 Hall Road | | | |
| MassDEP File Number: | | | | |
| Date of Inspection | | Start/End Time | | |
| Inspector's Name(s) & Contact Information | | | | |
| Type of Inspection: <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event | | | | |
| Weather Information | | | | |
| Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in): | | | | |
| Weather at time of this inspection? <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: Temperature: | | | | |
| Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: | | | | |
| Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: | | | | |
| | Site – Specific BMPs | BMP Installed? | BMP Maintenance Required? | Corrective Action Needed and Notes |
| 1 | Erosion Control Barrier | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 2 | Catch Basin Inlet Protection | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 3 | Temporary Soil Stabilization | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 4 | Stormwater System | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |

CERTIFICATION STATEMENT

“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.”

Print name and title: _____

Signature: _____ **Date:** _____

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

| | BMP/activity | Implemented? | Maintenance Required? | Corrective Action Needed and Notes |
|----|---|--|--|---|
| 1 | Slopes and disturbed areas not actively being worked properly stabilized? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 2 | Natural Resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 3 | Perimeter Controls and sediment barriers adequately installed (keyed into substrate) and maintained? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | *Surround Stockpiles w/ straw bales if > 1 week |
| 4 | Discharge Points and receiving waters free of any sediment deposits? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 5 | Storm Drain Inlets properly protected? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 6 | Construction exit preventing sediment from being tracked into the street? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 7 | Trash / Litter from work areas collected and placed in covered dumpsters? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 8 | Washout Facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 9 | Vehicle and Equipment Fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 10 | Materials that are potential stormwater contaminants stored inside or under cover? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 11 | Non-stormwater discharges (wash water, dewatering) properly controlled? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |

APPENDIX E

Long Term Operation and Maintenance Plan

STORMWATER MANAGEMENT SYSTEM

Long Term Operations and Maintenance Plan

**94 Hall Road
Sturbridge, MA**

Prepared For:
Jessie Albert
Dawn Home Management
20 Corporate Woods Boulevard, 5th Floor
Albany, NY 1221

August 28, 2023

McCLURE

ENGINEERING, INC

119 Worcester Road – Charlton, Massachusetts 01507 – T: 508.248.2005

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- Attachment #1 Illicit Discharger Compliance Statement**
- Attachment #2 Inspection Log & Maintenance Plan**

**Long-Term Operation & Maintenance Plan
Site Stormwater Management System
94 Hall Road, Sturbridge, MA 01566**

Property Owner/Responsible Party: **Jessie Albert**
 Dawn Homes Management
 20 Corporate Woods Boulevard, 5th Floor
 Albany, NY 1221
 Phone: (518) 465-4500
 Email: jalbert@dawnhomes.com

Storm Water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **Yes**

The Responsible Party Shall:

- Prepare an **“Operation and Maintenance (O&M) Compliance Statement” (Attachment #1)**
- Implement the routine and non-routine operation, maintenance, and inspection tasks in accordance with the procedures specified in this document to ensure that all storm water management systems function as designed.
- Maintain a log of all operation and maintenance (O & M) activities. Keep records for the last three (3) years, including inspections, repairs, replacement, and disposal (for disposal, the log shall indicate the type of material and disposal location).
- Make this log available to **Town of Sturbridge** official representatives upon request.
- Allow **Town of Sturbridge** official representatives to inspect each storm water system “best management practice” (BMP) to determine whether the responsible party is implementing the operation and maintenance plan.
- Agree to notify in writing all future property owners of the presence of the storm water management system and the requirement for proper operation and maintenance.

Responsible Party shall maintain a contract with the following companies:

Landscaping and Pavement Maintenance: _____

Snow Removal and Plowing: _____

Storm Water System Maintenance: _____

Long-Term Operation & Maintenance Plan
94 Hall Road, Sturbridge, MA 01566

Site Description:

The Subject Site is referenced as Assessor's Parcel I.D. 315-02631-094 and consists of approximately 2 acres. The property lies on the southern side of Hall Road and is approximately 200' from the Hall Road and Route 20 intersection. The site is developed site housing a multifamily apartment building and is part of a larger apartment complex development known as Sturbridge Meadows.

The site was constructed in approximately 1984. At the time of construction, an intermittent stream flowing from southeast to northwest was diverted through an underground 24" corrugated metal pipe culvert which was installed under the apartment building. Catch basins were also installed in line on this culvert.

"Culvert Modification Plan" 94 Hall Road, Sturbridge, MA" Plan Set prepared by McClure Engineering, Inc., dated 8/24/23.

Operation and Maintenance (O&M) Plan

The purpose of this Storm Water Management System Operation and Maintenance Plan is to prevent erosion, sedimentation, pollution or other deterioration of the storm water management system and resource areas located on and adjacent to the property located at 94 Hall Road, Sturbridge, MA 01566. The storm water management system shall be maintained properly to assure its continued performance. Inspection and maintenance for the system should be in compliance with Table 1.

TABLE 1

| STORMWATER SYSTEM INSPECTION AND MAINTENANCE SCHEDULE | | |
|--|--|---|
| Town of Sturbridge 94 Hall Road, Sturbridge, MA | | |
| Best Management Practice (BMP) | Inspection Frequency | Maintenance Frequency |
| STRUCTURAL BMPs | | |
| Deep Sump & Hooded Catch Basin | Quarterly | As Needed |
| Pipe Outfall/Rip Rap Apron | After heavy rains and Bi-Annually Min (Early Spring & Late Fall) | Bi-Annual Min (Early Spring & Late Fall) and/or As Needed |
| NON-STRUCTURAL STORMWATER CONTROLS | | |
| Landscaping | Bi-Annual (Early Spring & Late Fall) | Seasonally As Needed |
| Parking Area Sweeping | Bi-Annual (Early Spring & Late Fall) | Bi-Annual (2-Times / Year) (Apr/May and Oct/Nov.) |
| Snow Removal | Seasonally As Needed | In Accordance with M.G.L. Title XIV. Public Ways and Works; Chapter 85 |
| Site Inspections | Bi-Annual (Early Spring & Late Fall) | Keep Records on File at Site for Three (3) Years |

Responsible Party shall be responsible for the system and all Operation and Maintenance procedures, including those outlined in the following sections.

STRUCTURAL STORM WATER BMP MAINTENANCE:

Deep Sump & Hooded Catch Basin:

Infiltration basins are prone to clogging and failure so it is imperative to develop and implement aggressive maintenance plans and schedules. Installing the required pretreatment BMPs will significantly reduce maintenance requirements for the basin. Perform inspections and preventive maintenance at least twice a year, and after every time drainage discharges through the high outlet orifice. Inspect the pretreatment BMPs in accordance with the minimal requirements specified for those practices and after every major storm event. A major storm event is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (generally 2.9 to 3.6 inches in a 24-hour period, depending in geographic location in Massachusetts). Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary, take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include: signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, sediment accumulation, and the health of the turf. At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

Pipe Outfall/Rip Rap Apron/Level Spreader:

Inspect riprap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet pad. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade. If erosion is occurring down gradient of the outfall, the down gradient vegetation is not stable and the area should be stabilized, the rip rap apron is not long or wide enough and needs to be increased, or the riprap stones are too small or not graded well. If movement of stone is occurring: riprap stones may be too small or not graded well, or the appropriate filter fabric may not be installed under riprap. If erosion occurs around apron and scour holes appear at outlet, foundation may not be excavated wide or deep enough. If erosion of the foundation is occurring, the appropriate filter fabric may not be installed under riprap.

Level spreaders should be inspected periodically and after every major storm. Any detrimental sediment accumulation should be removed. If rilling has taken place on the lip, the damage should be repaired and re-vegetated. Vegetation should be mowed occasionally to control weeds and encroachment of woody vegetation. Clippings should be removed and disposed of outside the spreader and away from the outlet area. Fertilization should be done as necessary to keep the

vegetation healthy and dense. The spreader should be inspected after every runoff event to ensure that it is functioning correctly.

NON - STRUCTURAL STORM WATER MANAGEMENT CONTROLS / GOOD HOUSEKEEPING PRACTICES:

Straw Bales/Wattles:

Inspect straw bales/wattles before a forecasted storm event, immediately after each runoff producing rainfall and at least daily during prolonged rainfall. Ensure there are not gaps between bales or evidence of undermining. Close attention should be paid to the repair of damaged bales, undercutting beneath bales, and flow around the ends of the bales. Necessary repairs to barriers or replacement of bales should be accomplished promptly. Replace rotted or sediment covered bales as necessary. Sediment deposits should be checked after each runoff-producing rainfall. They must be removed when the level of deposition reaches approximately one-half the height of the barrier. Any sediment deposits remaining in place after the straw bale barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

Silt Fence:

A sediment fence requires a great deal of maintenance. Silt fences should be inspected immediately after each rainfall and at least daily during prolonged rainfall. Remove accumulated sediment when it reaches one half the height of the sediment fence. Remove sediment deposits promptly to provide adequate storage volume for the next rain and to reduce pressure on fence. Take care to avoid undermining fence during cleanout. Sagging, frayed, torn, or otherwise damaged fabric should be repaired or replaced. Repair end runs and undercutting. Inspect reinforcement and staking materials for structural integrity and replace when necessary. Sediment deposits remaining after the fabric has been removed should be graded to conform to the existing topography and vegetated.

Mulching:

Mulching shall be used in areas which cannot be seeded because of the season or are otherwise unfavorable for plant growth (traffic and parking areas). When properly applied, mulch offers a fast, effective means of controlling erosion and dust. Soil surfaces should be roughened prior to mulching. Run track-mounted machinery up and down the slope in order to leave horizontal depressions in the soil running parallel to the slope. Roughened soil surfaces should be mulched and/or seeded as soon as possible. Ensure there is a continuous, uniform, even coverage. Ensure mulch layer is not so thick that it suppresses desired seed germination and plant growth. Ensure rilling or gullying does not occur beneath "banded" mulch. Replace or repair mulch if washed or blown away. On steep slopes and critical areas such as waterways, use netting or anchoring with mulch to hold it in place. Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting. Straw or grass mulches that blow or wash away should be repaired promptly. Blanket mulch that is displaced by flowing water should be repaired as soon as possible. Continue inspections until vegetation is well established.

Temporary & Permanent Seeding

Well-established vegetation is widely considered the most effective form of erosion control. The presence of temporary or permanent cover will provide stabilization and erosion protection to disturbed areas. Temporary seed mixes contain annual vegetation that grows quickly and helps stabilize an area until permanent vegetation can be established. Proper soil bed preparation, seeding method and soil moisture are critical for successful seed application. Before planting, scarify/roughen the soil surface and install appropriate surface drainage measures to prevent erosion and scouring. Seed with an approved conservation cover mix during the specified growing season, using native plant species. Seeding operations should be performed within one of the following periods: April 1 - May 31, August 1 - September 10, November 1 - December 15 as a dormant seeding (seeding rates shall be increased by 50% for dormant seeding). As needed, provide water, fertilizer, lime, and mulch to the seedbed. If it is unlikely that growth will occur due to cold weather, apply mulch for temporary stabilization. Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary. Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to prevent runoff. Inspect seeded areas for failure and make appropriate repairs and re-seed and re-plant as necessary. Inspect for bare spots, rilling, or gulying and correct as necessary. If stand has less than 40% cover, re-evaluate selection of seeding materials and quantities of fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations. If the season prevents resowing, mulch or jute netting is an effective temporary cover. Lack of water may also be an issue. Conduct a follow up survey after one year and re-seed failed areas. Temporarily stabilized areas will require permanent stabilization when the area has been completed as designed or when the growing season begins.

Landscape & Pavement Maintenance

Landscape areas shall be maintained in a neat and orderly fashion. Landscape maintenance debris shall not be deposited on adjacent properties and properly disposed of off-site as necessary to maintain a clean and orderly appearance. If areas need constant maintenance apply mulch/wood chips to help prevent further erosion.

Pavement areas will be swept at least once twice per year to remove accumulated winter sand and salt and fall leaves and shall be swept as required to remove litter. Collected material will be properly disposed of off-site.

Fertilizer, Herbicide, and Pesticide Storage

Storage of all fertilizers, herbicides, and pesticides will be indoors. Use of all fertilizers, herbicides, and pesticides shall be in a manner consistent with the products intended use.

Waste Storage & Trash Removal

All waste products are to be stored indoors, under cover, or within a covered dumpster. Inspect on-site area for litter and trash on a weekly basis. Any accumulated trash, litter, and discarded materials in this area will be removed and will be disposed of at a suitable location on a weekly basis. The loading and dumpster areas throughout the site will be inspected on a daily basis for cardboard and/or paper products and will be inspected on a weekly basis for any accumulated trash, litter, and discarded material. Dumpster to be kept closed when not in use.

Gates to the dumpster enclosure areas are proposed to be locked when not in use.

Hazardous Waste or Oil Spill Response Procedure

Initial Notification: In the event of a spill of hazardous waste or oil the facility manager or supervisor will be notified immediately by telephone.

Assessment – Initial Containment: The supervisor or manager will assess the incident and initiate control measures. The supervisor will first contact the Town of Sturbridge Fire Department and then notify the Town of Sturbridge. The Fire Department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department Telephone: 911 (Emergency)
(508) 347-2525 (Non-Emergency/Dispatch)

Police Department Telephone: 911 (Emergency)
(208) 347-2525 (Non-Emergency/Dispatch)

Further Notification: Based on the assessment by the Fire Chief, additional notification to a clean up contractor may be made. The Massachusetts Department of Environmental Protection and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of clean up and notification required.

SNOW MANAGEMENT PLAN:

Snow plowing will be done to allow access to the site and provide safe passage from vehicle to front door. No salt shall be used to treat unpaved areas during snow and ice conditions. Snow from lighter storms will be plowed to the perimeter of the parking lots and allowed to melt onto the pavement surfaces. Snow will be temporarily stockpiled on the pavement surface during larger storm events to keep the parking area open for customers. This stockpiling will be temporary and will be located within designated areas throughout the Site, furthest away from the building entrances. If Site snow storage interferes with parking lot operations, (i.e. blocking of travel aisles, sight distance, or parking) snow piles will be either removed or reduced legally in a legal manner by the snow plow vendor within 24 hours.

Winter Road Salt & Sand Use Restrictions

Salt and sand for winter de-icing will only be stored indoors or under cover. Use of road salt and sand will only be used on a limited basis during the winter months to insure safe passage of pedestrian walkways and parking areas.

INSPECTIONS / RECORDKEEPING / TRAINING:

Routine Inspections

Routine inspections and maintenance to be conducted with the frequency described in this Operation and Maintenance Plan. An example inspection form is provided in **Attachment #2**.

Recordkeeping

Records of all drainage system inspections and maintenance shall be kept on file for a period of at least three (3) years and provided to the Town of Sturbridge upon request.

Annual Training

Annual refresher training should be conducted each spring to coincide with the “Bi-annual Stormwater Inspection”.

The “responsible party” will ensure all staff involved with maintaining the Site stormwater management system are familiar with all aspects of this O & M Plan.

PUBLIC SAFETY FEATURES:

All cast iron storm water structure grates and covers shall be kept in good condition and kept closed at all times. Any damaged or broken structures will be replaced immediately upon discovery.

OPERATION AND MAINTENANCE BUDGET ESTIMATE:

The responsible party agrees to maintain an adequate annual budget to provide for the routine maintenance activities detailed in this document including but not limited to:

- Deep Sump & Good Catch Basin Maintenance
- Pipe Outfall/Rip Rap Apron Maintenance
- Landscape Maintenance
- Trash Removal
- Snow Plowing & Removal

Attachment #1

**Operation & Maintenance (O & M)
Compliance Statement**

Illicit Discharge Compliance Statement
Site Storm water Management System
94 Hall Road, Sturbridge, MA 01566

Property Owner/Responsible Party: **Jessie Albert**
 Dawn Homes Management
 20 Corporate Woods Boulevard, 5th Floor
 Albany, NY 1221
 Phone: (518) 465-4500
 Email: jalbert@dawnhomes.com

Storm water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **Yes**

The above listed Responsible Party is responsible for implementation of this “Long-Term Operation and Maintenance Plan” and certifies that:

- The site has been inspected for erosion and appropriate steps have been taken to permanently stabilize any eroded areas.
- All aspects of storm water BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the storm water at the site may be managed in accordance with the Stormwater Management Standards, revised date January 2, 2008.
- There is no record or knowledge of existing illicit discharges to the on-site stormwater management system.
- All “future property owners” must be notified of their continuing legal responsibility to operate and maintain the existing stormwater management system structures.
- The “Long-Term Operation and Maintenance Plan” for the storm water BMPs is being implemented.

Signature of Responsible Party:

Jessie Albert
Dawn Homes Management

Date

Attachment #2

Inspection & Maintenance Reports

**Long-Term Operation and Maintenance Plan
Storm Water Management System
94 Hall Road, Sturbridge, MA 01566**

INSPECTION AND MAINTENANCE REPORT FORM

Note: This Log should be copied prior to use. Note Additional Comments on back of Form.

Inspector's Name: _____ Date: _____ Time: _____ am/pm

Inspector's Qualifications: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

| Item/Condition to be Checked | Maintenance Required | | Corrective Action & Date |
|--------------------------------|----------------------|-----|--------------------------|
| | No | Yes | |
| Deep Sump & Hooded Catch Basin | | | |
| Pipe Outfall/Rip Rap Apron | | | |
| Driveway Sweeping | | | |
| Landscaping/Trash removal | | | |
| Snow Removal (seasonal) | | | |