



To: City of Worcester Planning Board

Date: July 11, 2024

Memorandum

Project #: 16406.00

From: Brittany Gesner, PE

Re: Stormwater Management Memorandum:  
Polar Views Development  
Worcester, MA

## Project Description

Polar Views, LLC (the Applicant) is proposing to construct a four-story, 12-unit residential development, with 10 at grade covered parking spaces, new utility connections, and landscaping areas (the Project) on 0.21-acre of land addressed as 10 Grosvenor Street in Worcester, MA (the Site), as generally shown on the Site Plans titled Multifamily Development, prepared by VHB dated July 11, 2024 (the Plans).

## Site Description

The Site is currently developed as a single family residential property. The Site has frontage along Grosvenor Street to the east, frontage along Lamartine Street to the north, and is bounded by a vacant lot to the west and a 4-8 unit residential building to the south. Site access is currently provided by a single curb cut along Lamartine Street.

## Existing Drainage Conditions

Under existing conditions, the Site is previously developed with impervious area comprised of pavement and a building, with generally flat topography to the north. There are no stormwater detention, recharge, or treatment BMPs on the site under existing conditions.

Figure 1 in Attachment E illustrates the existing drainage patterns on the Site. Table 1 below provides a summary of the existing conditions hydrologic data. Under existing conditions, the Site is divided into 2 drainage areas as stormwater runoff flows to 1 Design Point, which is identified as DP1.

**Table 1 Existing Conditions Hydrologic Data**

Drainage Area	Discharge Location	Design Point	Area (Acres)	Curve Number	Time of Concentration (min)
EX-1	Drainage system in Lamartine Street	DP1	0.242	74	5.0
		Total	0.242		

## Proposed Drainage Conditions

Figure 2 in Attachment E illustrates the proposed "post construction" drainage conditions for the project. As shown, the Site will be divided into 2 drainage areas that discharge treated stormwater to the 1 Design Point. Table 2 below provides a summary of the proposed conditions hydrologic data.

**Table 2 Proposed Conditions Hydrologic Data**

Drainage Area	Discharge Location	Design Point	Area (Acres)	Curve Number	Time of Concentration (min)
PR-1	Subsurface Infiltration Basin (P1)	DP1	0.186	95	5.0
PR-2	Drainage system in Lamartine Street (DP1)	DP1	0.056	85	5.0
		Total	0.242		

**Stormwater Management Standards**

As demonstrated below and on the Stormwater Checklist in Attachment A, the proposed Project complies with the Massachusetts Department of Environmental Protection Stormwater Management Standards.

- **Standard 1:** No New Untreated Discharges or Erosion to Wetlands

This Project has been designed to comply with Standard 1.

There are no wetlands located on the Site and the runoff is collected by the City of Worcester drainage system. The Best Management Practices (BMPs) included in the proposed stormwater management system have been designed in accordance with the Massachusetts Stormwater Handbook. Supporting information and computations demonstrating that no new untreated discharges will result from the Project are presented through compliance with Standards 4 through 6.

- **Standard 2:** Peak Rate Attenuation

The Project has been designed to comply with Standard 2.

The rainfall-runoff response of the Site under existing and proposed conditions was analyzed for storm events with recurrence intervals of 2, 10, and 100 years. The results of the analysis, as summarized in Table 3 below, indicate that there is no increase in peak discharge rates between the existing and proposed conditions.

**Table 3 Peak Discharge Rates (cfs\*)**

Design Point	2-year	10-year	100-year
<b>Design Point: DP1</b>			
Existing	0.28	0.67	1.36
Proposed	0.22	0.63	1.08

- **Standard 3:** Stormwater Recharge

The Project has been designed to comply with Standard 3.

In accordance with the Stormwater Handbook, the Required Recharge Volume for the Project is therefore 749 cubic feet.

Recharge of stormwater has been provided through the use of a subsurface infiltration basin (Stormtech SC-740), which has been sized using the Static method. Each infiltration BMP has been designed to drain completely within 72 hours. Table 5 below provides a summary of the proposed infiltration BMPs utilized for the Project.

**Table 6 Summary of Recharge Calculations**

<b>Infiltration BMP</b>	<b>Provided Recharge Volume (cubic feet)</b>
Subsurface Infiltration Basin (P1)	458
<b>Total Provided Recharge</b>	<b>458</b>
<b>Total Required Recharge</b>	<b>428</b>

- **Standard 4:** Water Quality

The Project has been designed to comply with Standard 4.

The proposed stormwater management system implements a treatment train of BMPs that has been designed to provide 80% TSS removal of stormwater runoff from all proposed impervious surfaces as well as 44% pretreatment prior to infiltration BMPs.

Supporting information, including the Long-Term Pollution Prevention Plan, is included in Attachments C and K.

- **Standard 5:** Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

The Project is not considered a LUHPPL.

- **Standard 6:** Critical Areas

The Project will not discharge stormwater near or to a Critical Area.

- **Standard 7:** Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The Project has been designed to comply with all ten of the Stormwater Management Standards.

Refer directly to each Standard for applicable computations and supporting information demonstrating compliance with each.

- **Standard 8:** Construction Period Pollution Prevention and Erosion and Sedimentation Controls

The Project will disturb approximately 0.4 acres of land and is not required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. In lieu of the Stormwater Pollution Prevention Plan (SWPPP) required under NPDES, a Construction Period Pollution Prevention and Erosion Sedimentation Control Plan has been included in Attachment B.

- **Standard 9:** Operation and Maintenance Plan

In compliance with Standard 9, a Post Construction Stormwater Operation and Maintenance (O&M) Plan has been developed for the Project. The O&M Plan is included in Attachment C as part of the Long-Term Pollution Prevention Plan.

- **Standard 10:** Prohibition of Illicit Discharges

Sanitary sewer and storm drainage structures which were part of the previous development on this site are to be completely removed during the site redevelopment. The design plans submitted with this report have been designed to be in full compliance with current standards. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharge.

### Attachments:

- A. Stormwater Checklist
- B. Construction Period Pollution Prevention Plan
- C. Long-Term Pollution Prevention Plan
- D. Precipitation Frequency Data
- E. Existing and Proposed Drainage Area Figures
- F. Existing HydroCAD Report
- G. Proposed HydroCAD Report
- H. Recharge and Drawdown Calculations
- I. Water Quality Volumes
- J. Illicit Discharge Compliance Statement
- K. TSS Removal Worksheet

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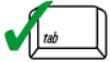
**Attachment A: Stormwater Checklist**



# 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.<sup>1</sup> 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 8<sup>2</sup>
- 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.

<sup>1</sup> 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.

<sup>2</sup> 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.

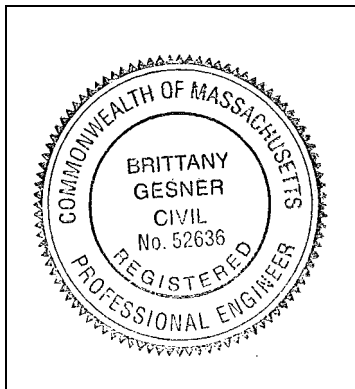
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that 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



*Brittany Gesner*

7/11/2024

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

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## 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

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## 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 Field<sup>1</sup>
- 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.

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



# Checklist for Stormwater Report

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## 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

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The  $\frac{1}{2}$ " 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 propriety 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

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## 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

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## 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.

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**Attachment B: Construction Period Pollution  
Prevention Plan**

# Construction Period Pollution Prevention and Erosion and Sedimentation Controls

## Polar Views Multifamily Development

July 2024

The Project will disturb less than 1 acre of land and therefore is not required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. In lieu of the Stormwater Pollution Prevention Plan (SWPPP) required under NPDES, a Construction Period Pollution Prevention and Erosion Sedimentation Control Plan is outlined below.

### 1. Pollution Prevention

There are various pollutant generating activities that are likely to occur on the Site as part of construction of the Project. Pollution prevention procedures that may be used during the construction phase of the Project are listed below.

#### **Fueling and Maintenance of Equipment or Vehicles**

When fueling or maintaining equipment or vehicles, the contractor will adhere to the following requirements, including, but not limited to: provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities; if applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR 112 and Section 311 of the CWA; ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids; use drip pans and absorbents under or around leaky vehicles; dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and, clean up spills or contaminated surfaces immediately, using dry clean up measures where possible, and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge. Do not clean surfaces by hosing the area down.

#### **Washing of Equipment and Vehicles**

When washing equipment and/or vehicles, the contractor will adhere to the following requirements: provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of washing; ensure that there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and, for storage of soaps, detergents, or solvents, the contractor must provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these detergents from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas. Effective controls may include, but are not restricted to, locating activities away from surface waters and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediments trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

## **Storage, Handling, and Disposal of Construction Products, Materials, and Wastes**

When storing, handling, and disposing of construction products, materials, and wastes, the contractor will adhere to the following good-housekeeping practices: an effort will be made to store only enough product required to do the job; all materials stored on-site will be stored in a neat, orderly manner in their appropriate containers, and (if possible) under a roof or other enclosure; products will be kept in their original containers with the original manufacturer's label; substances will not be mixed with one another unless recommended by the manufacturer; whenever possible, all of a product will be used before disposing of the container; manufacturer's recommendations for proper use and disposal will be followed; and, the site superintendent will inspect the storage area daily to ensure proper use and disposal of materials on-site.

The following practices will reduce the risks associated with hazardous materials (e.g., petroleum products, solvents): a copy of all Material Safety Data Sheets (MSDS) for materials or products used during construction will be kept in the office trailer; products will be kept in original containers unless they are not re-sealable; original labels and material safety data (MSD sheets) will be retained; they contain important product information; and, if surplus product must be disposed, manufacturer's or local- and state-recommended methods for proper disposal will be followed.

### ***Building Products***

All containers will be tightly sealed and covered with plastic sheeting or a temporary roof when not required for use. Excess materials will be properly disposed of according to manufacturer's instructions or state and local regulations and shall not be discharged to the storm sewer system. No storage will occur within 100 feet of a wetland or waterway.

### ***Pesticides, Herbicides, Insecticides***

Pesticides, herbicides, and insecticides will not be used at the Project Site.

### ***Deisel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals***

Products stored on site will be contained in water-tight containers with either a cover to minimize the exposure of the container to precipitation and to stormwater or a similarly effective means detained to minimize the discharge of pollutants from these areas such as secondary containment.

All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. Spills will be cleaned up immediately, using dry clean-up methods where possible. The source of the spill will be eliminated to prevent continuation of an on-going discharge.

No vehicle maintenance or handling of petroleum products will occur within 100 feet of a wetland or waterway.

Any asphalt substances used on-site will be applied according to manufacturer's recommendations. No petroleum-based or asphalt substances will be stored within 100 feet of a wetland or waterway.



### ***Hazardous or Toxic Waste***

The contractor will: separate hazardous or toxic waste from construction and domestic waste; store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements; store all containers that will be stored outside within appropriately sized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in covered area or having a spill kit available on site); clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly; not utilize hosing as a method to clean surfaces or spills; and, eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

All hazardous waste materials (e.g., petroleum products, solvents) will be disposed in the manner specified by local and state regulation, or by the manufacturer. Site personnel will be instructed in these practices, and the site construction supervisor will be responsible for seeing that these procedures are followed.

### ***Construction and Domestic Waste***

The contractor will provide waste containers (e.g., dumpster or trash receptacle) of sufficient size and number to contain construction and domestic wastes. Waste containers will be covered to prevent precipitation from entering the container and becoming a source of pollution. Alternatively, the waste container will be kept in secondary containment to prevent discharges of contaminated stormwater.

Daily loose trash removal will prevent litter, construction debris, and construction chemicals exposed to stormwater from becoming a pollutant source for stormwater discharges. All loose trash will be placed in appropriate storage containers and will be disposed of properly.

### ***Large Structures Built or Renovated prior to January 1980***

The contractor will implement controls to minimize the exposure of PCB-containing building materials including paint, caulk, and pre-1980s fluorescent light fixtures to precipitation and stormwater and ensure that disposal of such materials is performed in compliance with applicable state, federal and local laws.

### ***Sanitary Waste***

Portable toilets will be placed away from waters of the U.S., stormwater inlets and/or conveyances and will be secured in place so that they will not tip or be knocked over. All sanitary waste will be collected from the portable units by a licensed contractor as required, and disposed in compliance with state and local regulations.

## **Washing of Applicators and Containers used for Paint, Concrete or Other Materials**

The contractor must provide an effective means of eliminating the discharge of water from the washout and cleanout of stucco, paint, concrete, form release oils, curing compounds, and other construction materials. To comply with this requirement, the contractor must: direct all washwater into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation; do not dump liquid wastes in storm sewers; locate any washout or cleanout activities as far away as possible from surface waters, wetlands, and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

## **Fertilizers**

Only slow-release organic fertilizers will be used in landscaped areas. This protocol will limit the amount of potential nutrients that could enter the stormwater and wetland systems. Fertilizer use will be reduced once the vegetated stabilization measures are established. The Contractor will adhere to the following requirements when applying fertilizer products: apply at a rate and in amounts consistent with manufacturer's specifications; apply at the appropriate time of year for the project location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth; avoid applying before heavy rains that could cause excess nutrients to be discharged; never apply to frozen ground; never apply to stormwater conveyance channels with flowing water; and follow all other federal, state, tribal, and local requirements regarding fertilizer application.

## **Pavement Sweeping**

Pavement sweeping may be performed daily or as needed, when track-out has occurred. The sweeping program will remove sediments and contaminants directly from paved surfaces before their release into stormwater runoff. Pavement sweeping has been demonstrated to be an effective initial treatment for reducing pollutant loading into stormwater.

## **Spill Prevention and Response**

The following practices will be followed for spill control, notification, and cleanup:

- › The General Contractor is responsible for the daily operations and is also responsible for coordinating spill prevention and cleanup coordination. The General Contractor will designate at least three other site personnel to receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.
- › Spills of toxic or hazardous material in excess of reportable quantities will be reported to the following agencies as soon as the General Contractor has knowledge of the release:

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**Massachusetts Department of  
Environmental Protection Division of**

(617) 292-5851  
or  
(978) 661-7679

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## **Hazardous Waste**

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**National Response Center**

(800) 424-8802

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- › All spills will be cleaned up immediately after discovery;
- › The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance; and
- › Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies;
- › Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to the emergency response equipment listed herein;

A comprehensive Spill Prevention Control and Countermeasure (SPCC) plan will be developed and implemented by the General Contractor and other Operators. At a minimum the SPCC, will discuss:

- › Spill prevention equipment;
- › Spill prevention supplies provided on-site; and
- › Spill prevention training to be provided by the Owner and/or Tenant to designated employees.

### ***Initial Notification***

In the event of a spill, site personnel will notify the 24-hour Emergency Contact immediately.

The 24-hour Emergency Contact or their chosen delegate will immediately notify emergency response services and notify the local boards and commissions at the first possible opportunity: Fire Department (immediately); the Police Department (immediately); the Board of Health (at first opportunity); and, the Conservation Commission (at first opportunity).

### ***Further Notification***

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (DEP) 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 cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees. A hazardous waste spill report shall be completed as necessary using the attached form.

***Assessment – Initial Contamination***

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. A list of recommended spill equipment to be kept on site is included on the following pages.

***Reporting***

The following Spill Report Template (on the next page) shall be completed.

# Hazardous Waste / Oil Spill Report

Date: \_\_\_/\_\_\_/\_\_\_

Time: \_\_\_\_\_ AM / PM

Exact location: \_\_\_\_\_

Type of equipment: \_\_\_\_\_ Make: \_\_\_\_\_ Size: \_\_\_\_\_

License or S/N: \_\_\_\_\_ Weather Conditions: \_\_\_\_\_

On or near water  Yes If yes, name of body of water: \_\_\_\_\_  
 No

Type of chemical / oil spilled: \_\_\_\_\_

Amount of chemical / oil spilled: \_\_\_\_\_

Cause of spill: \_\_\_\_\_

Measures taken to contain or clean up spill: \_\_\_\_\_

Amount of chemical / oil recovered: \_\_\_\_\_ Method: \_\_\_\_\_

Material collected as a result of clean up \_\_\_\_\_

drums containing: \_\_\_\_\_

drums containing: \_\_\_\_\_

drums containing: \_\_\_\_\_

Location and method of debris disposal: \_\_\_\_\_

Name and address of any person, firm, or corporation suffering damages:

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring: \_\_\_\_\_

Spill reported to General Office by: \_\_\_\_\_ Time: \_\_\_\_\_ AM / PM

Spill reported to DEP / National Response Center by: \_\_\_\_\_

DEP Date: \_\_\_/\_\_\_/\_\_\_ Time: \_\_\_\_\_ AM / PM Inspector: \_\_\_\_\_

NRC Date: \_\_\_/\_\_\_/\_\_\_ Time: \_\_\_\_\_ AM / PM Inspector: \_\_\_\_\_

Additional comments: \_\_\_\_\_

## EMERGENCY NOTIFICATION PHONE NUMBERS

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		T(P):
1A	<b>Facility Manager</b>	T(S):
		T(T):
<hr/>		
		T(P):
1B	<b>Alternate Contact</b>	T(S):
		T(T):
<hr/>		
2	<b>Fire and Police</b>	911
<hr/>		
3	<b>Cleanup Contractor</b>	T:
<hr/>		
4	<b>MassDEP</b>	T(P): (800) 340-1133
<hr/>		
5A	<b>National Response Center</b>	T: (800) 424-8802
<hr/>		
		T(E): (800) 424-8802
5B	<b>USEPA</b>	T(B): (800) 424-8802
<hr/>		
6	<b>Worcester Board of Health</b>	B: (508)-799-8531
<hr/>		
7	<b>Worcester Conservation Commission</b>	B: (508) 799-1400

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(P) = Primary, (S) = Secondary, (T) = Tertiary, (E) = Emergency, (B) = Business

*Post this list of emergency contact numbers in the main construction/facility office in a location that is readily accessible to all employees.*

### **Emergency Response Equipment**

The following is an example of an equipment and materials list that must be prepared by the Owner and Tenant. Equipment and supplies on this list shall be maintained at all times and stored in a secure area for long-term emergency response need.

#### **Emergency Response Equipment**

<b>Supply</b>	<b>Quantity</b>	<b>Supplier</b>
Sorbent Pillows (Pigs)	2	<a href="http://www.newpig.com">http://www.newpig.com</a>
Sorbent Boom/Sock	25 feet	Item # KIT276 — mobile container with two pigs, 26 feet of sock, 50 pads, and five pounds of absorbent (or equivalent)
Sorbent Pads	50	
Lite-Dri® Absorbent	5 pounds	<a href="http://www.forestry-suppliers.com">http://www.forestry-suppliers.com</a>
Shovel	1	Item # 33934 — Shovel (or equivalent)
Pry Bar	1	Item # 43210 — Manhole cover pick (or equivalent)
Goggles	1 pair	Item # 23334 — Goggles (or equivalent)
Heavy Gloves	1 pair	Item # 90926 — Gloves (or equivalent)

## **2. Erosion and Sedimentation Controls**

Stormwater controls will be designed, installed, and maintained throughout construction in accordance with local requirements. The purpose of erosion and sedimentation controls will be to minimize the discharge of pollutants from earth-disturbing activities during the construction phase of the Project. The program described herein incorporates BMPs specified in guidelines developed by MassDEP and the U.S. EPA.

Proper implementation of the erosion and sedimentation control program will:

- › Minimize exposed soil areas through temporary stabilization and construction sequencing;
- › Minimize sediment track-out from the Site;
- › Minimize the generation of dust;
- › Minimize soil compaction;
- › Place structures to manage stormwater runoff and erosion; and
- › Establish permanent vegetative cover or other forms of stabilization.

Stormwater controls will be installed prior to the commencement of each phase of earth-disturbing activities. All manufactured control measures will be installed and maintained in

accordance with the manufacturer's specifications. The site contractor will inspect all erosion and sediment controls regularly and will perform corrective actions as required.

Erosion and sedimentation controls that may be used during the construction phase of the Project are listed below. The contractor will implement, modify, and amend the stormwater controls as necessary.

### **Natural Buffers or Equivalent Sediment Controls**

There are no locations in which earth disturbance will occur within any wetlands buffer zone. Therefore, the project does not need to implement erosion and sediment controls that achieve a sediment load reduction but will include sediment and erosion controls to protect any erosion or sedimentation to offsite locations. Erosion and sediment controls will be selected and designed in accordance with guidelines developed by MassDEP and the U.S. EPA.

### **Perimeter Controls**

Installation of perimeter controls will be completed prior to the commencement of earth-disturbing activities. The contractor will maintain project logs of installation, inspection, maintenance, and removal of all perimeter controls. Specific perimeter controls that are likely to be used will be either straw wattles and/or straw bale and silt-fence.

### **Sediment Track-out**

Sediment track-out controls may be structural or non-structural. Non-structural controls include restricting vehicle use to properly designated exit points, and sweeping, shoveling, or vacuuming to manually remove sediment from public rights-of-way (hosing or sweeping sediment directly into a stormwater conveyance, storm drain inlet, or surface water is prohibited). In the event that sediment is tracked out of the site and onto the surface of off-site streets, other paved areas, and sidewalks, the contractor will remove the deposited sediment by the end of the same workday. If track-out occurs on a non-workday, the contractor will remove the sediment by the end of the next workday. The contractor will maintain project logs of installation, inspection, maintenance, and removal of all sediment track-out controls. Specific sediment track-out controls that are likely to be used are stabilized construction entrance/exits.

### **Stockpiled Sediment or Soil**

Cover or appropriate temporary stabilization will be provided to stockpiles that will remain inactive/unused for more than 14 days. Temporary stabilization may be performed using vegetative or non-vegetative stabilization practices. Stockpiles will be physically separated from other stormwater conveyances, drain inlets, and areas where stormwater flows are concentrated. Stockpiles will also be protected from contact with stormwater (including run-on) by using a temporary perimeter sediment barrier, provided cover, and/or other appropriate temporary stabilization measures to avoid direct contact with precipitation or wind. Stockpiles will not be hosed down, and soil will not be swept into any stormwater conveyance storm drain inlet. Additionally, sediment will not be accumulated on pavement



or other impervious surfaces. The contractor will maintain project logs of installation, inspection, maintenance, and removal of all stockpiled soil. Specific stockpile controls that are likely to be used include vegetative stabilization and non-vegetative stabilization.

### **Minimize Dust**

When airborne dust is generated on-site, soil wetting will be performed to minimize the movement of dust and fine-grained sediment. The contractor shall apply water as a fine spray to wet the upper 0.5 inches of soil. The contractor will maintain project logs of installation, inspection, maintenance, and removal of all dust control activities.

### **Minimize the Disturbance of Steep Slopes**

During the design phase of the Project, the design engineers minimized construction impacts on steep slopes to the maximum extent practicable. Where disturbances to steep slopes are still required, the contractor will minimize disturbances through the implementation of erosion and sediment control practices designed for use on steep slopes. Stabilization practices on steep slopes will occur within 14 days after grading or construction activities have temporarily or permanently ceased. Specific steep slope controls that are likely to be used include vegetative controls and/or erosion control blankets.

### **Topsoil**

Topsoil is minimal on the site but will be preserved to the maximum extent practicable. Where it is infeasible to preserve topsoil in place, it will be repurposed throughout the Site, or stockpiled and disposed of in accordance with local, state, and federal regulations, as necessary. The contractor will maintain project logs of stockpiling and disposal of topsoil.

### **Soil Compaction**

To avoid soil compaction, the contractor will limit vehicle and equipment use in areas where final vegetative stabilization will occur or where infiltration practices will be installed. Prior to seeding or planting of these areas, the soil will be inspected to determine if compaction will hinder vegetative growth. If compaction has occurred, techniques that condition soil to support vegetative growth will be implemented. Soil conditioning techniques shall be specified, as needed by the contractor.

### **Storm Drain Inlets**

Prior to any earth-disturbing activities, inlet protection measures will be installed. Inlet protection measures are required to remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater flow from the Site to a nearby waterbody. The contractor will maintain project logs of installation, inspection, maintenance, and removal of all storm drain inlet controls. Specific storm drain inlet controls that are likely to be used will be either silt sack sediment traps or straw bale and non-woven filter fabric. The storm drain inlet controls will be inspected and maintained regularly to prevent sediment accumulation and clogging and to ensure continuity.

## **Constructed Stormwater Conveyance Channels**

Constructed stormwater conveyance channels may be used to collect runoff from construction areas and discharge to either sedimentation basins or protected catch basin inlets. The contractor may use erosion controls and velocity dissipation devices within and along the length of any stormwater conveyance channel and at any outlet to slow runoff down and to minimize erosion. The contractor will maintain project logs of installation, inspection, maintenance, and removal of constructed stormwater conveyance channels.

## **Sediment Basins**

Sediment basins may be used to collect runoff from construction areas to allow for suspended sediments to settle out of stormwater prior to discharge to points downstream. Sediment basins will be designed and constructed to avoid collecting water from wetlands and waterbodies, and to provide storage for either the volume of runoff generated from a 2-year, 24-hour design storm or a 3,600 cubic feet per acre of contributing area. Outlet structures will be designed to withdraw water from the surface of the basin, and inlets and outlets will be constructed to dissipate velocity and prevent erosion. The contractor will maintain project logs of installation, inspection, maintenance, and removal of sediment basins.

## **Chemical Treatment**

Chemical treatment may only be applied during the situations detailed herein. Chemicals may only be applied where the treated stormwater is directed to a sediment control (e.g., a sediment basin, perimeter control) prior to discharge. Chemicals must be appropriately suited to the types of soils likely to be exposed during construction, and present in the discharges being treated. Safety Data Sheets must be provided to the project manager prior to bringing chemicals on site. If chemicals will be stored on the Site, chemicals must be stored in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures. The volume of chemicals stored on site must be kept to a minimum. Use of chemicals must comply with applicable state and local requirements. Use of the chemicals must be in accordance with good engineering practices and specifications of the chemical provider/supplier. The contractor will be responsible for removal and disposal of unused chemicals. All personnel who handle and/or use treatment chemicals must be undergo appropriate product-specific training. No polyfluoroalkyl chemicals (PFAS) should not be used.

## **Site Stabilization**

Site stabilization measures will be initiated immediately in any areas of exposed soil where construction activities have ceased and will not resume for 14 or more calendar days. Site stabilization practices may be temporary or permanent, and vegetative or non-vegetative. Specific site stabilization controls are likely to include the following: temporary vegetative stabilization which will be completed using annual grasses, such as annual rye; and non-vegetative stabilization, such as mulch application or erosion control blanket.

## **Dewatering Practices**

If Project activities require dewatering, the contractor will implement dewatering practices to comply with the following requirements:

- › Treat dewatering discharges with controls to minimize discharges of pollutants;
- › Will not discharge visible floating solids or foam;
- › Use an oil-water separator or suitable filtration device that is designed to remove oil, grease, or other products if dewatering water is found to contain these materials;
- › Discharge water to vegetated, upland areas of the site to promote infiltration;
- › Comply with velocity dissipation requirements;
- › Handle backwash water by either hauling it away or returning it to the beginning of the treatment process; and
- › Replace and clean the filter media used in the dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

The contractor will maintain project logs to document regular installation, inspection, maintenance, and removal or dewatering controls. Specific dewatering practices may include straw bale basin or dewatering filter bag.

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**Attachment C: Long-Term Pollution Prevention  
Plan**

# Stormwater Management Operations and Maintenance

## Polar Views Multifamily Development July 2024

Exterior long-term operations and maintenance for the project will be as generally outlined herein.

### 1. Source Control

A comprehensive source control program will be implemented at the site, which includes the following components:

- › Clearing litter from the exterior site hardscape and landscape areas
- › Regular maintenance
- › Spill Prevention training

### 2. Spill Prevention

The following practices will be followed for spill control, notification, and cleanup:

- › At least three site personnel will receive spill prevention and cleanup training. These individuals will each become responsible for spill prevention and cleanup. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.
- › Spills of toxic or hazardous material in excess of reportable quantities will be reported to the following agencies as soon as possible:

---

<b>Massachusetts Department of Environmental Protection Division of Hazardous Waste</b>	(617) 292-5851 or (978) 661-7679
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<b>National Response Center</b>	(800) 424-8802
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- › All spills will be cleaned up immediately after discovery;
- › The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance; and
- › Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies;

- › Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to the emergency response equipment listed herein;

A comprehensive Spill Prevention Control and Countermeasure (SPCC) plan will be developed and implemented by the General Contractor and other Operators. At a minimum the SPCC, will discuss:

- › Spill prevention equipment;
- › Spill prevention supplies provided on-site; and
- › Spill prevention training to be provided by the Owner and/or Tenant to designated employees.

### ***Initial Notification***

In the event of a spill, site personnel will notify the 24-hour Emergency Contact immediately.

The 24-hour Emergency Contact or their chosen delegate will immediately notify emergency response services and notify the local boards and commissions at the first possible opportunity: Fire Department (immediately); the Police Department (immediately); the Board of Health (at first opportunity); and, the Conservation Commission (at first opportunity).

### ***Further Notification***

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (DEP) 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 cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees. A hazardous waste spill report shall be completed as necessary using the attached form.

### ***Assessment – Initial Contamination***

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. A list of recommended spill equipment to be kept on site is included on the following pages.

### ***Reporting***

The following Spill Report Template shall be completed.

# Hazardous Waste / Oil Spill Report

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Time: \_\_\_\_ AM / PM

Exact location: \_\_\_\_\_

Type of equipment: \_\_\_\_\_ Make: \_\_\_\_\_ Size: \_\_\_\_\_

License or S/N: \_\_\_\_\_ Weather Conditions: \_\_\_\_\_

On or near water  Yes If yes, name of body of water: \_\_\_\_\_  
 No

Type of chemical / oil spilled: \_\_\_\_\_

Amount of chemical / oil spilled: \_\_\_\_\_

Cause of spill: \_\_\_\_\_

Measures taken to contain or clean up spill: \_\_\_\_\_

Amount of chemical / oil recovered: \_\_\_\_\_ Method: \_\_\_\_\_

Material collected as a result of clean up \_\_\_\_\_

drums containing: \_\_\_\_\_

drums containing: \_\_\_\_\_

drums containing: \_\_\_\_\_

Location and method of debris disposal: \_\_\_\_\_

Name and address of any person, firm, or corporation suffering damages:  
\_\_\_\_\_

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring: \_\_\_\_\_

Spill reported to General Office by: \_\_\_\_\_ Time: \_\_\_\_\_ AM / PM

Spill reported to DEP / National Response Center by: \_\_\_\_\_

DEP Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM Inspector: \_\_\_\_\_

NRC Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM Inspector: \_\_\_\_\_

Additional comments: \_\_\_\_\_

**EMERGENCY NOTIFICATION PHONE NUMBERS**

---

		T(P):
1A	<b>Facility Manager</b>	T(S):
		T(T):
<hr/>		
		T(P):
1B	<b>Alternate Contact</b>	T(S):
		T(T):
<hr/>		
2	<b>Fire and Police</b>	911
<hr/>		
3	<b>Cleanup Contractor</b>	T:
<hr/>		
4	<b>MassDEP</b>	T(P): (800) 340-1133
<hr/>		
5A	<b>National Response Center</b>	T: (800) 424-8802
<hr/>		
		T(E): (800) 424-8802
5B	<b>USEPA</b>	T(B): (800) 424-8802
<hr/>		
6	<b>Worcester Board of Health</b>	B: (508)-799-8531
<hr/>		
7	<b>Worcester Conservation Commission</b>	B: (508) 799-1400

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(P) = Primary, (S) = Secondary, (T) = Tertiary, (E) = Emergency, (B) = Business

*Post this list of emergency contact numbers in the main construction/facility office in a location that is readily accessible to all employees.*



### **Emergency Response Equipment**

The following is an example of an equipment and materials list that must be prepared by the Owner and Tenant. Equipment and supplies on this list shall be maintained at all times and stored in a secure area for long-term emergency response need.

#### **Emergency Response Equipment**

<b>Supply</b>	<b>Quantity</b>	<b>Supplier</b>
Sorbent Pillows (Pigs)	2	<a href="http://www.newpig.com">http://www.newpig.com</a>
Sorbent Boom/Sock	25 feet	Item # KIT276 — mobile container with two pigs, 26 feet of sock, 50 pads, and five pounds of absorbent (or equivalent)
Sorbent Pads	50	
Lite-Dri® Absorbent	5 pounds	<a href="http://www.forestry-suppliers.com">http://www.forestry-suppliers.com</a>
Shovel	1	Item # 33934 — Shovel (or equivalent)
Pry Bar	1	Item # 43210 — Manhole cover pick (or equivalent)
Goggles	1 pair	Item # 23334 — Goggles (or equivalent)
Heavy Gloves	1 pair	Item # 90926 — Gloves (or equivalent)

### **3. Snow Management**

- › Snow storage areas will be managed to prevent blockage of storm drain catch basins and stormwater drainage swales. Snow combined with sand and debris may block a storm drainage system, diminishing the infiltration capacity of the system and causing localized flooding.
- › Sand and debris deposited on vegetated or paved areas shall be cleared from the site and properly disposed of at the end of the snow season, no later than May 15.
- › Snow shall not be dumped into any waterbody, pond, or wetland resource area.

### **4. Maintenance of Exterior Site Components**

- › More frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.
- › Check loading docks and dumpster areas frequently for spillage and/or pavement staining and clean as necessary.

#### **Roof Drain Leader**

- › Perform routine roof inspections quarterly.
- › Keep roofs clean and free of debris.

- › Keep roof drainage systems clear.
- › Keep roof access limited to authorized personnel.
- › Clean inlets twice per year or as necessary.

### **Vegetated Areas Maintenance**

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning of the stormwater management system. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings and proper aeration of soils.

- › Inspect planted areas on a semi-annual basis and remove any litter.
- › Maintain planted areas adjacent to pavement to prevent soil washout.
- › Immediately clean any soil deposited on pavement.
- › Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- › Plant alternative mixture of grass species in the event of unsuccessful establishment.
- › The grass vegetation should be cut to a height between three and four inches.
- › Pesticide/Herbicide Usage – No pesticides are to be used unless a single spot treatment is required for a specific control application.
- › Fertilizer usage should be avoided. If deemed necessary, slow release fertilizer should be used. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas, but should not be applied on a regular basis unless necessary.
- › Annual application of compost amendments and aeration are recommended.

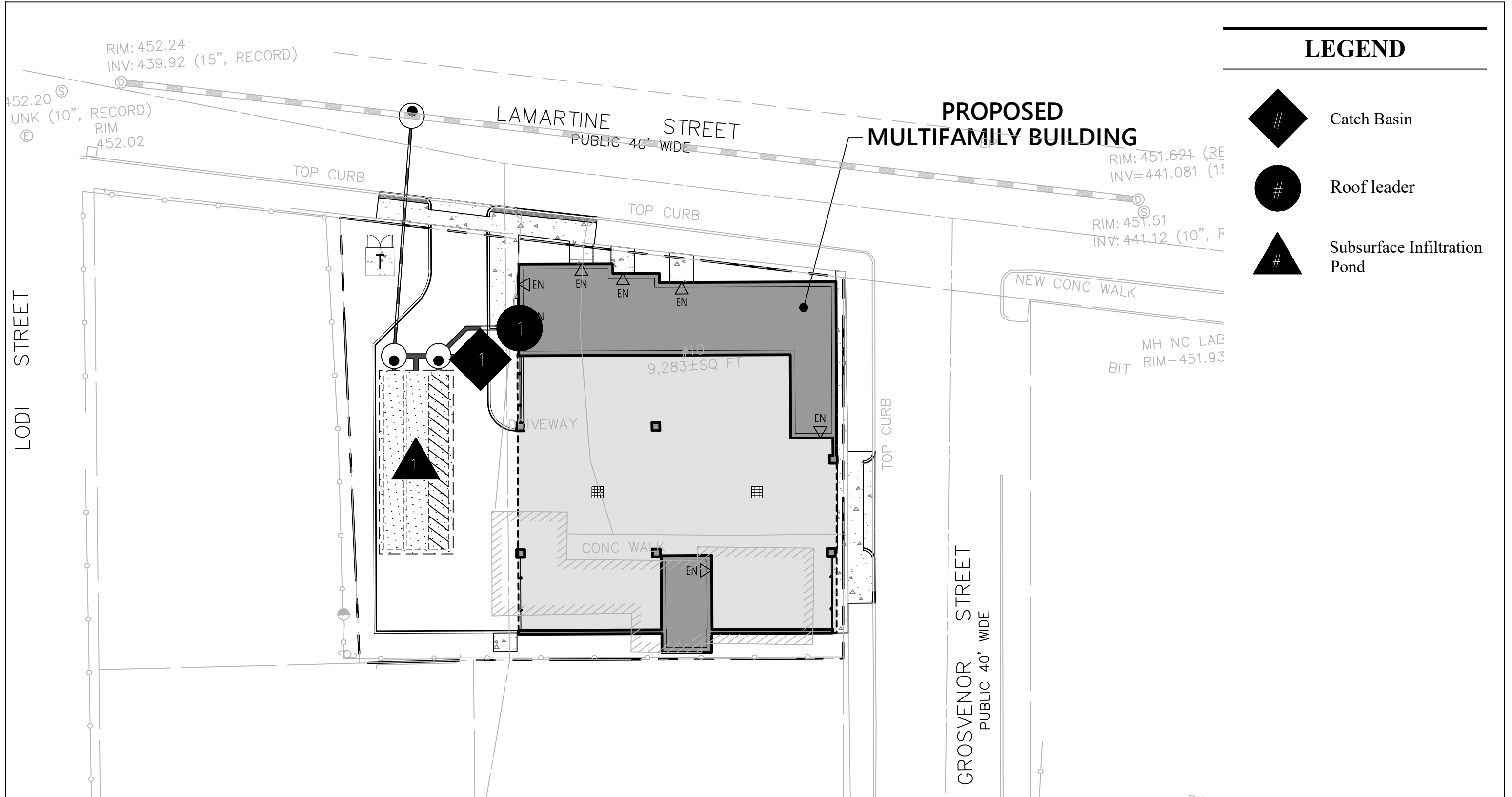
## **5. Maintenance of Exterior Site Components**

The subsurface infiltration/detention basins are used to detain and infiltrate roadway and rooftop runoff. There is one (1) subsurface infiltration basins at Polar Views Multifamily Development. Each of these basins has a water quality pre-treatment device in the form of a subsurface sediment removal row (isolator row) to protect the infiltration bed from clogging. The sediment removal row is an integral part of the underground infiltration system and is comprised of a perforated pipe, wrapped in a filter fabric and surrounded with gravel. To maintain pre-treatment functionality, this sediment removal row requires regular inspection and cleaning. A map of the infiltration basin locations is included in Section E.5 Maintenance Checklists and Device Location Maps.

### **Inspections and Cleaning**

- › The subsurface infiltration systems will be inspected at least once each year by removing the manhole/access port covers and determining the thickness of sediment that has accumulated in the sediment removal row.
- › If sediment is more than six inches deep, it must be suspended via flushing with clean water and removed using a vactor truck.

- › Manufacturer's specifications and instructions for cleaning the sediment removal row are provided as an attachment to this section.
- › Emergency overflow pipes will be examined at least once each year and verified that no blockage has occurred.
- › System will be observed after rainfalls to see if it is properly draining.



# Device Location Map

## Polar Views - Multifamily Development

### 10 Grosvenor Street, Worcester MA

Source:  
Prepared for:  
Date: **July 2024**



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**Attachment D: Precipitation Frequency Data**



**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.341 (0.273-0.422)	0.401 (0.320-0.497)	0.500 (0.398-0.620)	0.581 (0.459-0.729)	0.694 (0.528-0.910)	0.779 (0.579-1.05)	0.867 (0.621-1.21)	0.962 (0.653-1.39)	1.09 (0.711-1.64)	1.20 (0.759-1.84)
10-min	0.483 (0.386-0.598)	0.569 (0.454-0.704)	0.709 (0.564-0.881)	0.824 (0.651-1.03)	0.983 (0.748-1.29)	1.10 (0.819-1.48)	1.23 (0.880-1.72)	1.36 (0.925-1.97)	1.55 (1.01-2.33)	1.70 (1.08-2.61)
15-min	0.569 (0.455-0.703)	0.669 (0.534-0.828)	0.833 (0.663-1.04)	0.969 (0.766-1.21)	1.16 (0.880-1.52)	1.30 (0.964-1.74)	1.44 (1.04-2.02)	1.60 (1.09-2.32)	1.82 (1.18-2.74)	2.00 (1.26-3.07)
30-min	0.772 (0.617-0.955)	0.909 (0.726-1.13)	1.13 (0.901-1.41)	1.32 (1.04-1.65)	1.58 (1.20-2.07)	1.77 (1.31-2.38)	1.97 (1.41-2.75)	2.18 (1.48-3.15)	2.48 (1.62-3.73)	2.72 (1.72-4.19)
60-min	0.976 (0.780-1.21)	1.15 (0.918-1.42)	1.43 (1.14-1.78)	1.67 (1.32-2.09)	1.99 (1.52-2.61)	2.24 (1.66-3.01)	2.49 (1.79-3.48)	2.77 (1.88-3.99)	3.14 (2.05-4.72)	3.45 (2.18-5.30)
2-hr	1.24 (0.995-1.52)	1.47 (1.18-1.80)	1.84 (1.48-2.28)	2.16 (1.72-2.68)	2.59 (1.98-3.38)	2.91 (2.18-3.90)	3.25 (2.36-4.55)	3.64 (2.48-5.23)	4.22 (2.75-6.30)	4.70 (2.98-7.18)
3-hr	1.41 (1.14-1.73)	1.69 (1.36-2.07)	2.13 (1.71-2.62)	2.50 (2.00-3.10)	3.01 (2.32-3.93)	3.39 (2.55-4.54)	3.79 (2.77-5.31)	4.27 (2.91-6.11)	4.98 (3.26-7.42)	5.58 (3.55-8.50)
6-hr	1.77 (1.44-2.15)	2.13 (1.73-2.59)	2.72 (2.20-3.32)	3.20 (2.57-3.94)	3.88 (3.00-5.04)	4.38 (3.32-5.84)	4.91 (3.61-6.86)	5.56 (3.81-7.91)	6.54 (4.28-9.68)	7.38 (4.70-11.2)
12-hr	2.18 (1.78-2.64)	2.65 (2.16-3.21)	3.41 (2.78-4.15)	4.05 (3.27-4.95)	4.92 (3.84-6.36)	5.57 (4.24-7.38)	6.27 (4.63-8.70)	7.11 (4.89-10.0)	8.38 (5.51-12.3)	9.47 (6.06-14.2)
24-hr	2.59 (2.13-3.11)	3.17 (2.60-3.81)	4.11 (3.37-4.97)	4.90 (3.98-5.96)	5.98 (4.69-7.68)	6.78 (5.20-8.94)	7.65 (5.68-10.6)	8.70 (6.00-12.2)	10.3 (6.79-15.0)	11.7 (7.48-17.4)
2-day	2.95 (2.45-3.52)	3.63 (3.01-4.34)	4.74 (3.91-5.69)	5.66 (4.63-6.84)	6.92 (5.47-8.85)	7.86 (6.06-10.3)	8.88 (6.64-12.2)	10.1 (7.02-14.1)	12.1 (7.98-17.5)	13.7 (8.85-20.4)
3-day	3.21 (2.67-3.82)	3.94 (3.28-4.69)	5.14 (4.25-6.14)	6.13 (5.04-7.37)	7.49 (5.94-9.54)	8.50 (6.58-11.1)	9.60 (7.20-13.2)	11.0 (7.60-15.2)	13.1 (8.65-18.9)	14.9 (9.59-22.0)
4-day	3.45 (2.88-4.09)	4.21 (3.51-5.00)	5.47 (4.54-6.52)	6.51 (5.36-7.81)	7.94 (6.30-10.1)	8.99 (6.98-11.7)	10.1 (7.63-13.9)	11.6 (8.04-16.0)	13.8 (9.13-19.8)	15.7 (10.1-23.1)
7-day	4.11 (3.45-4.85)	4.95 (4.14-5.84)	6.31 (5.26-7.48)	7.44 (6.16-8.88)	9.00 (7.17-11.3)	10.2 (7.90-13.1)	11.4 (8.58-15.4)	12.9 (9.01-17.8)	15.2 (10.1-21.8)	17.2 (11.1-25.1)
10-day	4.78 (4.02-5.62)	5.65 (4.75-6.65)	7.07 (5.92-8.36)	8.25 (6.86-9.82)	9.88 (7.89-12.4)	11.1 (8.64-14.2)	12.4 (9.31-16.6)	13.9 (9.74-19.1)	16.2 (10.8-23.1)	18.1 (11.7-26.4)
20-day	6.82 (5.78-7.97)	7.75 (6.56-9.06)	9.26 (7.80-10.9)	10.5 (8.79-12.4)	12.2 (9.81-15.1)	13.6 (10.6-17.1)	14.9 (11.1-19.6)	16.3 (11.5-22.2)	18.3 (12.3-25.9)	19.9 (13.0-28.9)
30-day	8.54 (7.26-9.93)	9.49 (8.06-11.1)	11.0 (9.35-12.9)	12.3 (10.4-14.5)	14.1 (11.3-17.3)	15.5 (12.1-19.4)	16.9 (12.6-21.9)	18.2 (12.9-24.6)	20.0 (13.5-28.1)	21.3 (13.9-30.8)
45-day	10.7 (9.11-12.4)	11.7 (9.94-13.5)	13.3 (11.3-15.5)	14.6 (12.3-17.1)	16.5 (13.3-20.0)	17.9 (14.0-22.3)	19.3 (14.4-24.8)	20.6 (14.6-27.7)	22.1 (15.0-31.0)	23.2 (15.1-33.3)
60-day	12.4 (10.7-14.4)	13.5 (11.5-15.6)	15.1 (12.9-17.6)	16.5 (14.0-19.3)	18.4 (14.9-22.3)	19.9 (15.6-24.7)	21.4 (15.9-27.2)	22.6 (16.1-30.3)	24.0 (16.3-33.5)	24.9 (16.3-35.7)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

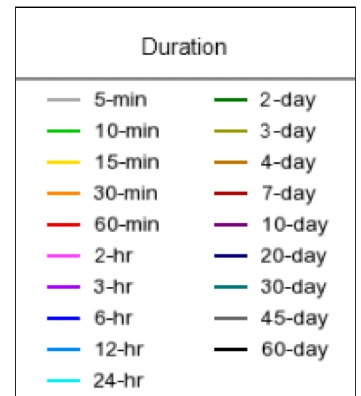
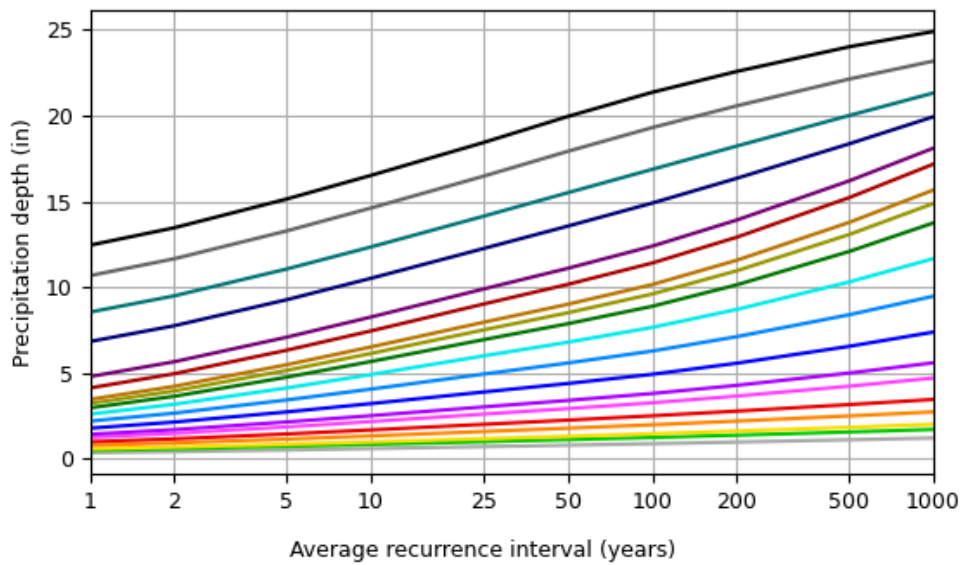
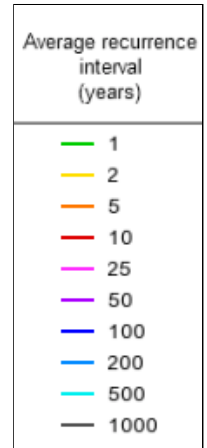
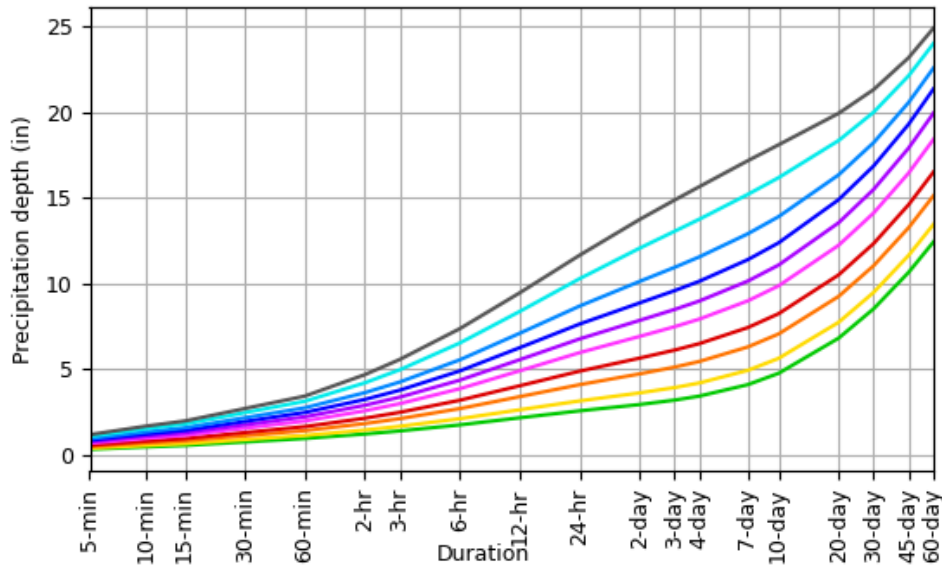
Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**

PDS-based depth-duration-frequency (DDF) curves

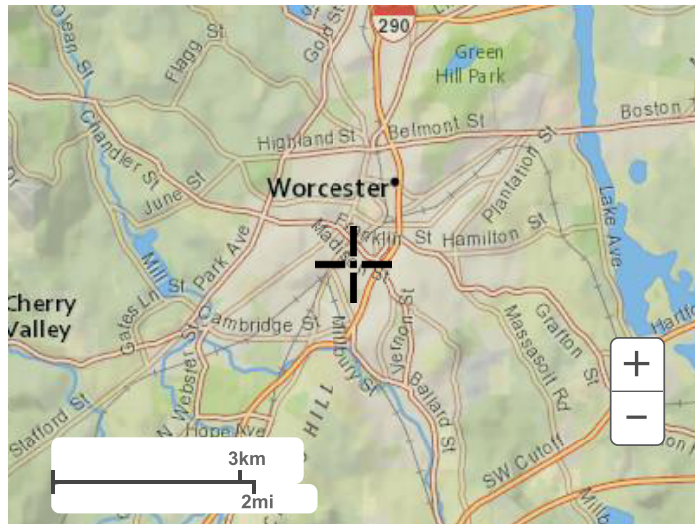
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[Back to Top](#)

**Maps & aerials**

**Small scale terrain**



Large scale terrain

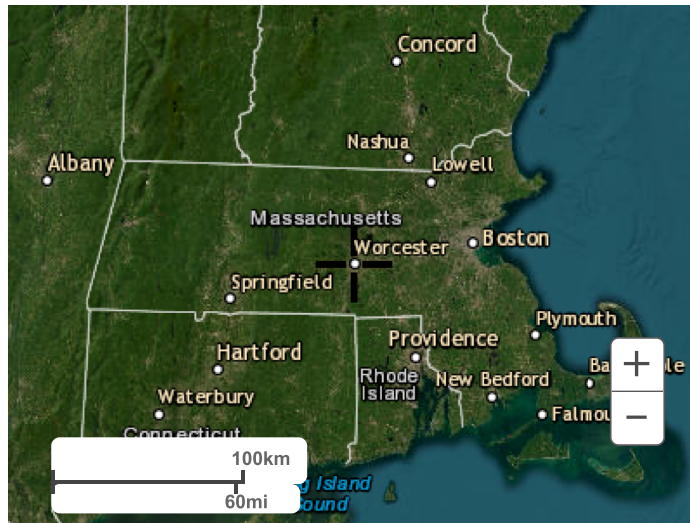


Large scale map



Large scale aerial





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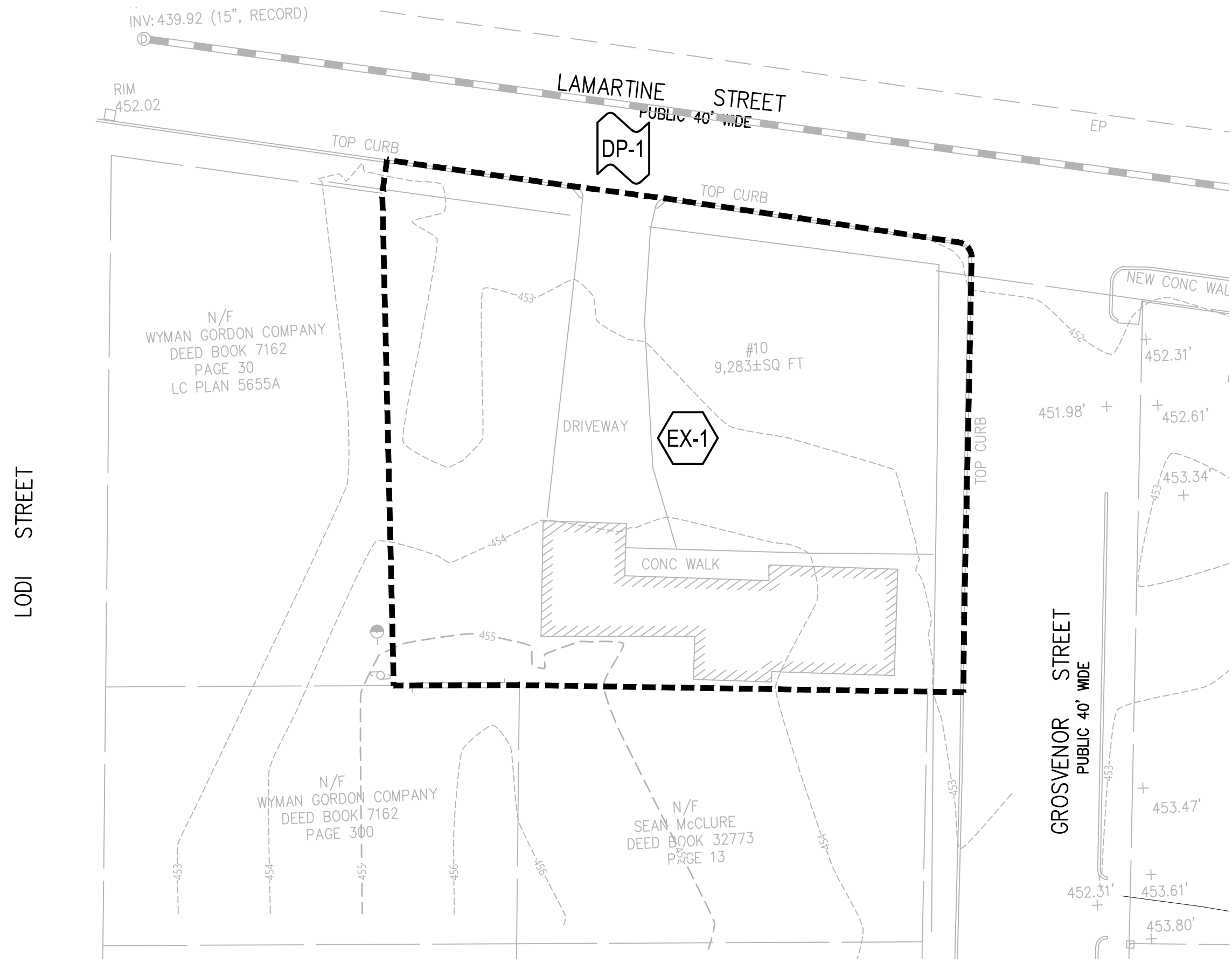
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[US Department of Commerce](#)  
[National Oceanic and Atmospheric Administration](#)  
[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

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**Attachment E: Existing and Proposed Drainage  
Area Figures**



### Legend

**SYMBOLS**

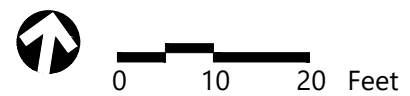
- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND

**LINETYPES**

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SOIL TYPE BOUNDARY
- 100' BUFFER ZONE

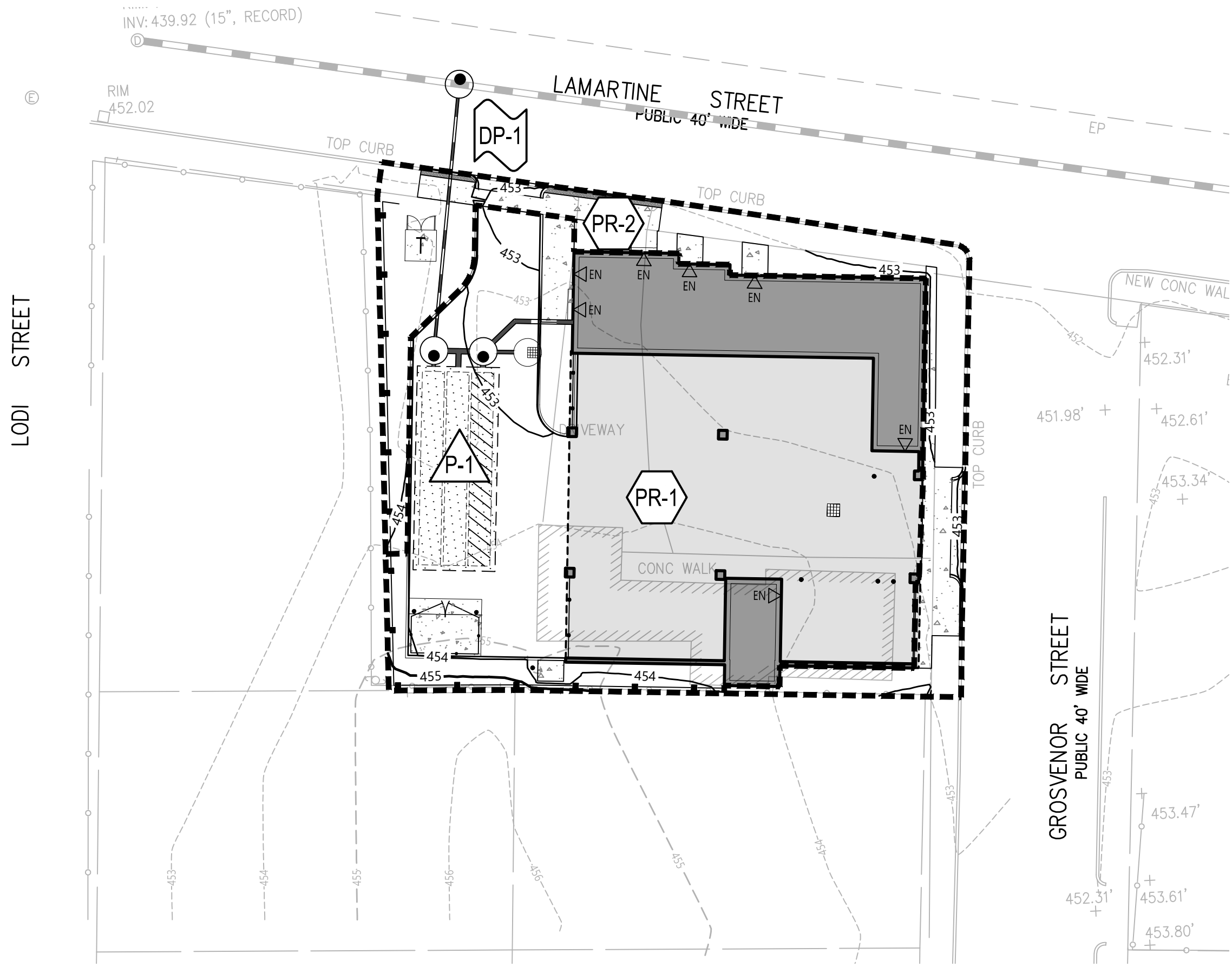
**SCS SOIL CLASSIFICATIONS**

- 602 URBAN LAND



Existing Drainage Conditions  
 10 Grosvenor Street  
 Worcester, MA

**Figure 1**  
 07/11/2024



### Legend

SYMBOLS

- X
DESIGN POINT
- X
DRAINAGE AREA DESIGNATION
- X
POND

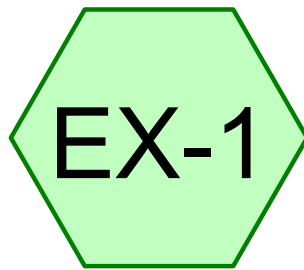
LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- 100' BUFFER ZONE



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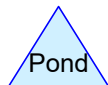
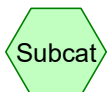
**Attachment F: Existing HydroCAD Report**



Subcat EX-1



## Drainage System in Lamartine Street



# EX-HydroCAD

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## Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.17	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
3	100-Year	Type III 24-hr		Default	24.00	1	7.65	2

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## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.158	61	>75% Grass cover, Good, HSG B (EX-1)
0.055	98	Paved parking, HSG B (EX-1)
0.030	98	Unconnected roofs, HSG B (EX-1)
<b>0.242</b>	<b>74</b>	<b>TOTAL AREA</b>



**EX-HydroCAD**

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Type III 24-hr 2-Year Rainfall=3.17"

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Page 4

**Summary for Subcatchment EX-1: Subcat EX-1**

Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.021 af, Depth&gt; 1.02"

Routed to Link DP1 : Drainage System in Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.17"

Area (sf)	CN	Description
*	0	, HSG B
6,861	61	>75% Grass cover, Good, HSG B
2,385	98	Paved parking, HSG B
1,301	98	Unconnected roofs, HSG B
10,547	74	Weighted Average
6,862		65.05% Pervious Area
3,686		34.95% Impervious Area
1,301		35.29% Unconnected

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

**Summary for Link DP1: Drainage System in Lamartine Street**

Inflow Area = 0.242 ac, 34.95% Impervious, Inflow Depth > 1.02" for 2-Year event  
Inflow = 0.28 cfs @ 12.08 hrs, Volume= 0.021 af  
Primary = 0.28 cfs @ 12.08 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**EX-HydroCAD**

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 6

**Summary for Subcatchment EX-1: Subcat EX-1**

Runoff = 0.67 cfs @ 12.08 hrs, Volume= 0.046 af, Depth> 2.28"

Routed to Link DP1 : Drainage System in Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
*	0	, HSG B
6,861	61	>75% Grass cover, Good, HSG B
2,385	98	Paved parking, HSG B
1,301	98	Unconnected roofs, HSG B
10,547	74	Weighted Average
6,862		65.05% Pervious Area
3,686		34.95% Impervious Area
1,301		35.29% Unconnected

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

**Summary for Link DP1: Drainage System in Lamartine Street**

Inflow Area = 0.242 ac, 34.95% Impervious, Inflow Depth > 2.28" for 10-Year event  
Inflow = 0.67 cfs @ 12.08 hrs, Volume= 0.046 af  
Primary = 0.67 cfs @ 12.08 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**EX-HydroCAD**

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Type III 24-hr 100-Year Rainfall=7.65"

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**Summary for Subcatchment EX-1: Subcat EX-1**

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.093 af, Depth> 4.61"

Routed to Link DP1 : Drainage System in Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.65"

Area (sf)	CN	Description
*	0	, HSG B
6,861	61	>75% Grass cover, Good, HSG B
2,385	98	Paved parking, HSG B
1,301	98	Unconnected roofs, HSG B
10,547	74	Weighted Average
6,862		65.05% Pervious Area
3,686		34.95% Impervious Area
1,301		35.29% Unconnected

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

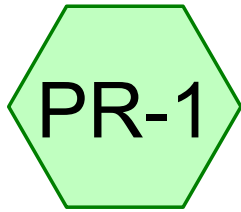
**Summary for Link DP1: Drainage System in Lamartine Street**

Inflow Area = 0.242 ac, 34.95% Impervious, Inflow Depth > 4.61" for 100-Year event  
Inflow = 1.36 cfs @ 12.07 hrs, Volume= 0.093 af  
Primary = 1.36 cfs @ 12.07 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

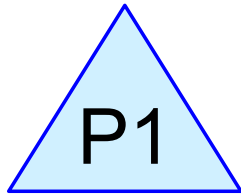
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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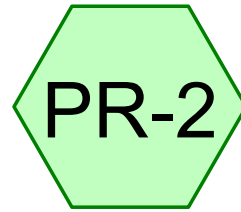
## **Attachment G: Proposed HydroCAD Report**



Subcat PR-1



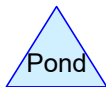
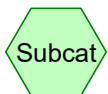
Subsurface Infiltration  
Basin



Subcat PR-2



Lamartine Street





**PR-HydroCAD**

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**Rainfall Events Listing**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.17	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
3	100-Year	Type III 24-hr		Default	24.00	1	7.65	2

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Page 3

## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	, HSG B (PR-2)
0.032	61	>75% Grass cover, Good, HSG B (PR-1, PR-2)
0.090	98	Paved parking, HSG B (PR-1, PR-2)
0.120	98	Unconnected roofs, HSG B (PR-1, PR-2)
<b>0.242</b>	<b>93</b>	<b>TOTAL AREA</b>

**PR-HydroCAD**

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Type III 24-hr 2-Year Rainfall=3.17"

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**Summary for Subcatchment PR-1: Subcat PR-1**

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.041 af, Depth> 2.61"

Routed to Pond P1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.17"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.013	61	>75% Grass cover, Good, HSG B
0.054	98	Paved parking, HSG B
0.120	98	Unconnected roofs, HSG B
0.186	95	Weighted Average
0.013		6.90% Pervious Area
0.173		93.10% Impervious Area
0.120		68.98% Unconnected

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

**PR-HydroCAD**

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Type III 24-hr 2-Year Rainfall=3.17"

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**Summary for Subcatchment PR-2: Subcat PR-2**

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 0.008 af, Depth> 1.73"

Routed to Link DP1 : Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.17"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.019	61	>75% Grass cover, Good, HSG B
0.037	98	Paved parking, HSG B
0.000	98	Unconnected roofs, HSG B
0.056	85	Weighted Average
0.019		34.39% Pervious Area
0.037		65.61% Impervious Area
0.000		0.29% Unconnected

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

**Summary for Pond P1: Subsurface Infiltration Basin**

Inflow Area = 0.186 ac, 93.10% Impervious, Inflow Depth > 2.61" for 2-Year event  
 Inflow = 0.56 cfs @ 12.07 hrs, Volume= 0.041 af  
 Outflow = 0.18 cfs @ 12.34 hrs, Volume= 0.033 af, Atten= 67%, Lag= 16.3 min  
 Discarded = 0.01 cfs @ 9.27 hrs, Volume= 0.020 af  
 Primary = 0.17 cfs @ 12.34 hrs, Volume= 0.013 af  
 Routed to Link DP1 : Lamartine Street

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 449.46' @ 12.34 hrs Surf.Area= 618 sf Storage= 668 cf

Plug-Flow detention time= 167.3 min calculated for 0.033 af (83% of inflow)  
 Center-of-Mass det. time= 97.8 min ( 877.7 - 779.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	447.80'	589 cf	<b>15.75'W x 39.22'L x 3.50'H Field A</b> 2,162 cf Overall - 689 cf Embedded = 1,473 cf x 40.0% Voids
#2A	448.30'	689 cf	<b>ADS_StormTech SC-740 +Cap</b> x 15 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 15 Chambers in 3 Rows
		1,278 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	<b>6.0" Round Culvert</b> L= 60.0' Ke= 0.700 Inlet / Outlet Invert= 449.00' / 449.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf
#2	Discarded	447.80'	<b>1.020 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 9.27 hrs HW=447.84' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.17 cfs @ 12.34 hrs HW=449.46' (Free Discharge)  
 ↑**1=Culvert** (Barrel Controls 0.17 cfs @ 1.17 fps)

**Pond P1: Subsurface Infiltration Basin - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

15 Chambers x 45.9 cf = 689.1 cf Chamber Storage

2,161.8 cf Field - 689.1 cf Chambers = 1,472.7 cf Stone x 40.0% Voids = 589.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,278.2 cf = 0.029 af

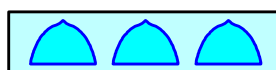
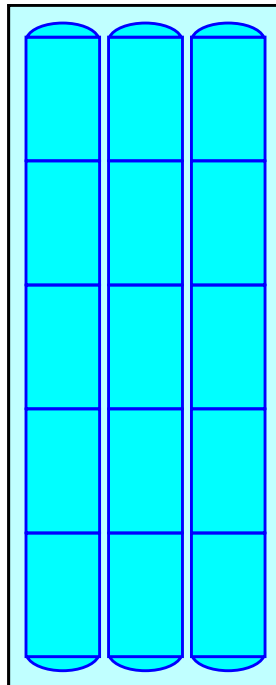
Overall Storage Efficiency = 59.1%

Overall System Size = 39.22' x 15.75' x 3.50'

15 Chambers

80.1 cy Field

54.5 cy Stone



**Summary for Link DP1: Lamartine Street**

Inflow Area = 0.242 ac, 86.76% Impervious, Inflow Depth > 1.07" for 2-Year event  
Inflow = 0.22 cfs @ 12.31 hrs, Volume= 0.022 af  
Primary = 0.22 cfs @ 12.31 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**PR-HydroCAD**

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Type III 24-hr 10-Year Rainfall=4.90"

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**Summary for Subcatchment PR-1: Subcat PR-1**

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 0.067 af, Depth> 4.32"

Routed to Pond P1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.013	61	>75% Grass cover, Good, HSG B
0.054	98	Paved parking, HSG B
0.120	98	Unconnected roofs, HSG B
0.186	95	Weighted Average
0.013		6.90% Pervious Area
0.173		93.10% Impervious Area
0.120		68.98% Unconnected

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



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Type III 24-hr 10-Year Rainfall=4.90"

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**Summary for Subcatchment PR-2: Subcat PR-2**

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.015 af, Depth> 3.27"  
Routed to Link DP1 : Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.019	61	>75% Grass cover, Good, HSG B
0.037	98	Paved parking, HSG B
0.000	98	Unconnected roofs, HSG B
0.056	85	Weighted Average
0.019		34.39% Pervious Area
0.037		65.61% Impervious Area
0.000		0.29% Unconnected

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

**Summary for Pond P1: Subsurface Infiltration Basin**

Inflow Area = 0.186 ac, 93.10% Impervious, Inflow Depth > 4.32" for 10-Year event  
 Inflow = 0.90 cfs @ 12.07 hrs, Volume= 0.067 af  
 Outflow = 0.49 cfs @ 12.18 hrs, Volume= 0.058 af, Atten= 46%, Lag= 6.7 min  
 Discarded = 0.01 cfs @ 7.76 hrs, Volume= 0.022 af  
 Primary = 0.47 cfs @ 12.18 hrs, Volume= 0.035 af  
 Routed to Link DP1 : Lamartine Street

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 450.07' @ 12.18 hrs Surf.Area= 618 sf Storage= 921 cf

Plug-Flow detention time= 114.9 min calculated for 0.058 af (86% of inflow)  
 Center-of-Mass det. time= 54.2 min ( 821.5 - 767.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	447.80'	589 cf	<b>15.75'W x 39.22'L x 3.50'H Field A</b> 2,162 cf Overall - 689 cf Embedded = 1,473 cf x 40.0% Voids
#2A	448.30'	689 cf	<b>ADS_StormTech SC-740 +Cap</b> x 15 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 15 Chambers in 3 Rows
		1,278 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	<b>6.0" Round Culvert</b> L= 60.0' Ke= 0.700 Inlet / Outlet Invert= 449.00' / 449.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf
#2	Discarded	447.80'	<b>1.020 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 7.76 hrs HW=447.84' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.47 cfs @ 12.18 hrs HW=450.07' (Free Discharge)  
 ↑**1=Culvert** (Barrel Controls 0.47 cfs @ 2.40 fps)

**Pond P1: Subsurface Infiltration Basin - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

15 Chambers x 45.9 cf = 689.1 cf Chamber Storage

2,161.8 cf Field - 689.1 cf Chambers = 1,472.7 cf Stone x 40.0% Voids = 589.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,278.2 cf = 0.029 af

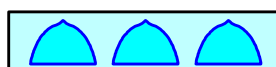
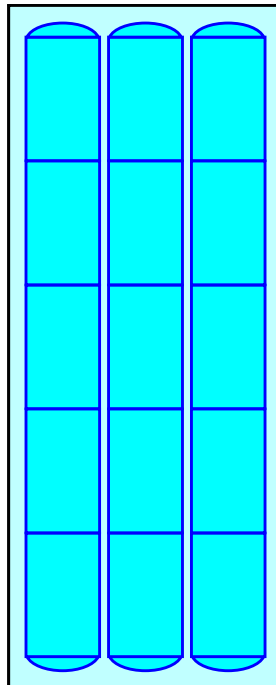
Overall Storage Efficiency = 59.1%

Overall System Size = 39.22' x 15.75' x 3.50'

15 Chambers

80.1 cy Field

54.5 cy Stone



**Summary for Link DP1: Lamartine Street**

Inflow Area = 0.242 ac, 86.76% Impervious, Inflow Depth > 2.51" for 10-Year event  
Inflow = 0.63 cfs @ 12.12 hrs, Volume= 0.051 af  
Primary = 0.63 cfs @ 12.12 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100-Year Rainfall=7.65"

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**Summary for Subcatchment PR-1: Subcat PR-1**

Runoff = 1.43 cfs @ 12.07 hrs, Volume= 0.109 af, Depth> 7.05"  
Routed to Pond P1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.65"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.013	61	>75% Grass cover, Good, HSG B
0.054	98	Paved parking, HSG B
0.120	98	Unconnected roofs, HSG B
0.186	95	Weighted Average
0.013		6.90% Pervious Area
0.173		93.10% Impervious Area
0.120		68.98% Unconnected

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

**PR-HydroCAD**

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Type III 24-hr 100-Year Rainfall=7.65"

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**Summary for Subcatchment PR-2: Subcat PR-2**

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.027 af, Depth> 5.87"  
Routed to Link DP1 : Lamartine Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.65"

Area (ac)	CN	Description
* 0.000	0	, HSG B
0.019	61	>75% Grass cover, Good, HSG B
0.037	98	Paved parking, HSG B
0.000	98	Unconnected roofs, HSG B
0.056	85	Weighted Average
0.019		34.39% Pervious Area
0.037		65.61% Impervious Area
0.000		0.29% Unconnected

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

**Summary for Pond P1: Subsurface Infiltration Basin**

Inflow Area = 0.186 ac, 93.10% Impervious, Inflow Depth > 7.05" for 100-Year event  
 Inflow = 1.43 cfs @ 12.07 hrs, Volume= 0.109 af  
 Outflow = 0.80 cfs @ 12.17 hrs, Volume= 0.098 af, Atten= 44%, Lag= 6.2 min  
 Discarded = 0.01 cfs @ 5.74 hrs, Volume= 0.025 af  
 Primary = 0.79 cfs @ 12.17 hrs, Volume= 0.074 af  
 Routed to Link DP1 : Lamartine Street

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 451.11' @ 12.17 hrs Surf.Area= 618 sf Storage= 1,232 cf

Plug-Flow detention time= 88.6 min calculated for 0.098 af (90% of inflow)  
 Center-of-Mass det. time= 39.4 min ( 796.0 - 756.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	447.80'	589 cf	<b>15.75'W x 39.22'L x 3.50'H Field A</b> 2,162 cf Overall - 689 cf Embedded = 1,473 cf x 40.0% Voids
#2A	448.30'	689 cf	<b>ADS_StormTech SC-740 +Cap</b> x 15 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 15 Chambers in 3 Rows
		1,278 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	<b>6.0" Round Culvert</b> L= 60.0' Ke= 0.700 Inlet / Outlet Invert= 449.00' / 449.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf
#2	Discarded	447.80'	<b>1.020 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 5.74 hrs HW=447.84' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.79 cfs @ 12.17 hrs HW=451.11' (Free Discharge)  
 ↑**1=Culvert** (Barrel Controls 0.79 cfs @ 4.02 fps)

**Pond P1: Subsurface Infiltration Basin - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

15 Chambers x 45.9 cf = 689.1 cf Chamber Storage

2,161.8 cf Field - 689.1 cf Chambers = 1,472.7 cf Stone x 40.0% Voids = 589.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,278.2 cf = 0.029 af

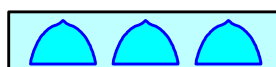
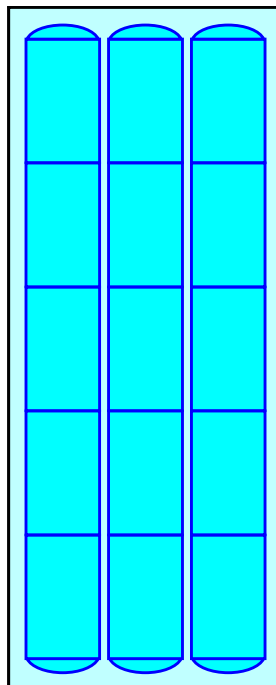
Overall Storage Efficiency = 59.1%

Overall System Size = 39.22' x 15.75' x 3.50'

15 Chambers

80.1 cy Field

54.5 cy Stone





**Summary for Link DP1: Lamartine Street**

Inflow Area = 0.242 ac, 86.76% Impervious, Inflow Depth > 5.02" for 100-Year event  
Inflow = 1.08 cfs @ 12.11 hrs, Volume= 0.101 af  
Primary = 1.08 cfs @ 12.11 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

---

**Attachment H: Recharge and Drawdown  
Calculations**



# Recharge Calculations

Project	<u>Polar Views - 10 Grosvenor</u>	Project #	<u>16406.00</u>
Calculated by	<u>CSH</u>	Date	<u>7/11/2024</u>
Checked by	<u></u>	Date	<u></u>

## REQUIRED RECHARGE VOLUME

Hydrologic Soil Group (HSG)	Area (ft <sup>2</sup> )	Inches of Runoff (in)	Volume (ft <sup>3</sup> )
A	0	0.60	0
B	10,541	0.35	307
C	0	0.25	0
D		0.10	0
<b>TOTAL</b>			<b><u>307</u></b>

## CAPTURE AREA ADJUSTMENT

Required Recharge Volume (ft <sup>3</sup> )	307
Total Site Net Impervious Area (ft <sup>2</sup> )	10,541
Total Site Impervious Area Draining to Recharge Facilities (ft <sup>2</sup> )	<u>7,579</u>
Capture Area Adjustment Factor	1.39
<b>Adjusted Required Recharge Volume (ft<sup>3</sup>)</b>	<b><u>428</u></b>

## PROVIDED RECHARGE VOLUME

**BASIN #P1:**  
 Stormtech SC-740  
 Volumes provided below the lowest outlet at elevation: 449.0

Provided Volume:	Bottom Area (ft <sup>2</sup> )	Volume (ft <sup>3</sup> )
	<u>618</u>	<u>458</u>

**Drawdown:**  $(V_{Infiltration}/A_{Bottom})/Rawl's\ Rate$   
 Rawls Recharge Rate: 1.02 (in/hr)  
 Drawdown Time: 8.72 (hours)

## RECHARGE VOLUME SUMMARY

Required Recharge Volume:	<b>428</b>	(ft <sup>3</sup> )
Total Recharge Volume Provided:	<b>458</b>	(ft <sup>3</sup> )

---

## **Attachment I: Water Quality Volumes**



# Water Quality Volume Calculations

Project	Polar Views - 10 Grosvenor	Project #	16406.00
Calculated by	CSH	Date	7/11/2024
Checked by		Date	

**BASIN #P1**

Runoff from subcatchment areas [PR-1](#)

Water Quality Storm Runoff Depth	(in)	<b>0.5</b>
Total Impervious Area	(ft <sup>2</sup> )	<b>7,579</b>

**BASIN WQV:**

<b>Required Volume:</b>	<b>Runoff Depth to be Treated</b>	<b>Required Volume</b>
	(in)	(ft <sup>3</sup> )
	0.5	<b>316</b>

<b>Provided Volume:</b>	<b>Elevation</b>	<b>Area</b>	<b>Cumulative Volume</b>
		(ft <sup>2</sup> )	(ft <sup>3</sup> )
	448.3	431	0
	449.3	431	431
	449.8	431	647
	450.8	431	<b>1,079</b>

*\* Per MassDEP Treatment Requirement*

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**Attachment J: Illicit Discharge Compliance  
Statement**

### **Illicit Discharge Compliance Statement**

I, as Applicant and Applicant's Representative, certify the following as they pertain to the proposed redevelopment at 10 Grosvenor Street, Worcester, Massachusetts:

1. Sanitary sewer and storm drainage structures which were part of the previous development on this site are to be completely removed during the site redevelopment. The design plans submitted with this report have been designed in full compliance with current standards, including proposing separate sanitary sewer and storm drain systems. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges.

#### **Applicant**

Name: Brittany Gesner, PE

Company: VHB

Signature:

---

**Attachment K: TSS Removal Worksheet**





101 Walnut Street  
 Post Office Box 9151  
 Watertown, MA 02471  
 P 617.924.1770

## TSS Removal Calculation Worksheet

Project Name: **Polar Views**  
 Project Number: **16406.00**  
 Location: **10 Grosvenor St**  
 Discharge Point: **DP1**  
 Drainage Area(s): **PR-1**

Sheet: **1 of 1**  
 Date: **11-Jul-2024**  
 Computed by: **MDY**  
 Checked by: \_\_\_\_\_

### 1. Pre-Treatment prior to Infiltration

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	<b>25%</b>	<b>100%</b>	<b>25%</b>	<b>75%</b>
Isolator Row	<b>25%</b>	<b>75%</b>	<b>19%</b>	<b>56%</b>
	<b>0%</b>	<b>56%</b>	<b>0%</b>	<b>56%</b>
<b>Pre-Treatment TSS Removal =</b>				<b>44%</b>

### 2. Total TSS Removal including Pretreatment 1.

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Subsurface Infiltration Structure	<b>80%</b>	<b>100%</b>	<b>80%</b>	<b>20%</b>
	<b>0%</b>	<b>20%</b>	<b>0%</b>	<b>20%</b>
	<b>0%</b>	<b>20%</b>	<b>0%</b>	<b>20%</b>
	<b>0%</b>	<b>20%</b>	<b>0%</b>	<b>20%</b>
<b>Treatment Train TSS Removal =</b>				<b>80%</b>

\* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data.

\*\* Equals remaining load from previous BMP (E)