

STORMWATER MANAGEMENT REPORT
216 & 221 CHANDLER STREET
WORCESTER, MASSACHUSETTS
November 5, 2024

Prepared for:
POLAR VIEWS, LLC
89 WEST MAIN STREET UNIT 101
NORTHBOROUGH, MASSACHUSETTS 01532

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Project Number:
G-698
Worcester, Massachusetts

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DRAINAGE NARRATIVE

Design Methods and Objectives

The following drainage analysis has been prepared in accordance with the most current rules and regulations of the City of Worcester, Massachusetts. Watershed areas were calculated for both the pre-development and post-development conditions. Existing and proposed ground cover conditions as well as terrain slopes were evaluated. Based upon the increased peak runoff from pre-development to the post development, storm water management systems were designed to attenuate the post development peak flows and runoff to be less than or equal to the pre-development rates of runoff. These calculations were performed using Hydrocad Stormwater Modeling Software for determining peak runoff and sizing detention/infiltration facilities for the 2, 10, 25 and 100 year storm event frequencies. Runoff hydrographs are calculated using the SCS Runoff equation and the SCS unitless hydrograph.

Existing Site Conditions

The existing site conditions were analyzed to determine tributary site runoff areas, flow patterns, slopes, impervious areas, open space including lawn areas, as well as existing soil types. The drainage area that was analyzed includes the site at 216 Chandler Street to be redeveloped. The existing study area includes a former mixed used building, and limited amounts of bituminous concrete and pavement lawn area. The total tributary drainage area is 6,354 sq.ft (0.15 acres). The total impervious area in the predevelopment condition is 6,193 sq.ft. (0.14 ac). The existing slopes on site range from 1-2%. The site currently drains towards Mason Street.

Existing soils located on site were determined to be Urban land. Urban land does not have a separate hydrologic group but was conservatively assigned Group C based on the disturbed nature of existing soils in the area.

Proposed Site Conditions

In the post development condition, the property is proposed to be redeveloped with a mixed used building consisting of 21 residential units and 2,920 sq.ft. of commercial space. The total impervious area in the post development condition is 5,041 sq.ft. (0.12 acres). This is a reduction of 1,152 sq.ft. in the existing conditions. The total percentage of impervious area in the post development condition is 79.3%. The remaining portion of the site area is to be lawn or landscaped.

The proposed site drainage consists of one subcatchment area "Subcatchment P1". This runoff is directed toward Mason Street as it does in the existing condition.

The proposed drainage design for this development of this site meets or exceeds all requirements by the City of Worcester and the Department of Environmental Protection to the maximum extent practical. As the calculations demonstrate the proposed drainage design provides attenuation of peak rates and volumes of runoff. Water quality will be improved in conjunction with this project by removing 1,200 sq.ft. of impervious area at 221 Chandler Street and replacing it with grass and landscaping. Drainage design as proposed will improve the quality of runoff that currently exists on this site.

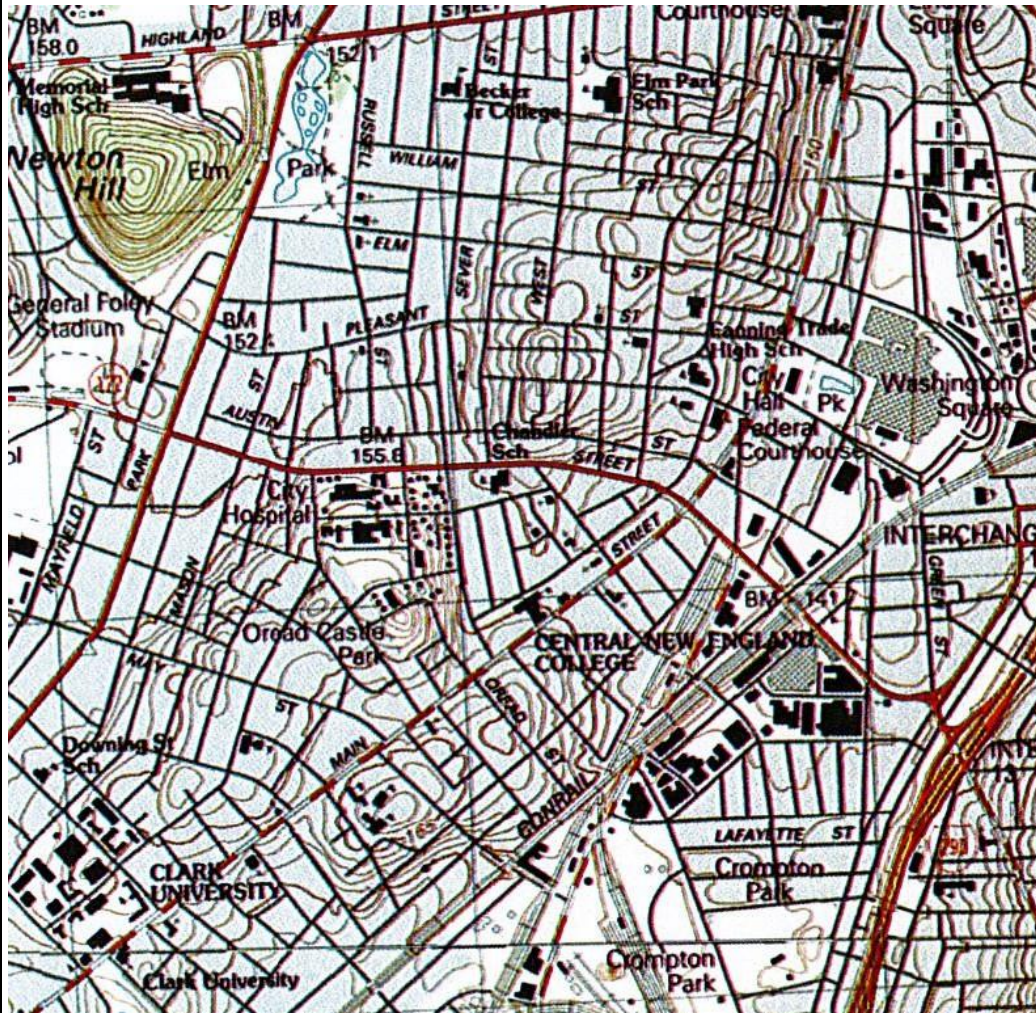
Drainage Analysis Summary

Pre-Development Drainage Reach (1R) – Pre-Development Site Runoff to Mason Street

Post-Development Drainage Reach (1R) – Post-Development Site Runoff to Mason Street

Note: (Peak Flow Rate in cfs)

	<u>2 Year</u>	<u>10 Year</u>	<u>25 Year</u>	<u>100 Year</u>
Storm Intensity	3.77 inches	5.91 inches	7.63 inches	10.50 inches
Pre-Development (1R) To Mason Street	0.52	0.82	1.06	1.47
Post-Development (1R) To Mason Street	0.48	0.79	1.04	1.45
Reduction From Pre-Development to Post-Development				
To Mason Street (1R)	-0.04	-0.03	-0.02	-0.02

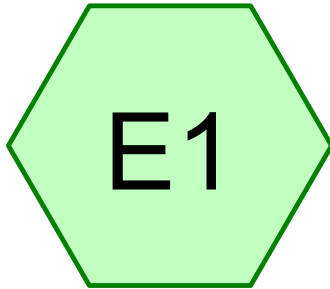


LOCUS PLAN

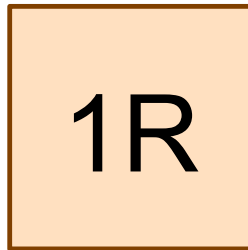
Source: USGS Quadrangles for
Worcester North, MA
7.5 x 15 minute series (metric)
Scale: 1:25,000 or 1" = 2083.33'

216 Chandler Street
Worcester, Massachusetts

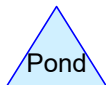
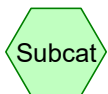
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Existing Site Runoff 216
Chandler St



Mason Street



Routing Diagram for G-698-PRE

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G-698-PRE

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.142	98	Impervious (E1)
0.004	74	Lawn, Good, HSG C (E1)
0.146	97	TOTAL AREA

G-698-PRE

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.004	HSG C	E1
0.000	HSG D	
0.142	Other	E1
0.146		TOTAL AREA

G-698-PRE

Type III 24-hr 2-YR Rainfall=3.77"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff 216 Runoff Area=6,354 sf 97.47% Impervious Runoff Depth>3.21"
Flow Length=50' Tc=6.0 min CN=97 Runoff=0.52 cfs 0.039 af

Reach 1R: Mason Street

Inflow=0.52 cfs 0.039 af
Outflow=0.52 cfs 0.039 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.039 af Average Runoff Depth = 3.21"
2.53% Pervious = 0.004 ac 97.47% Impervious = 0.142 ac

Summary for Subcatchment E1: Existing Site Runoff 216 Chandler St

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR Rainfall=3.77"

	Area (sf)	CN	Description
*	6,193	98	Impervious
*	161	74	Lawn, Good, HSG C
	6,354	97	Weighted Average
	161		2.53% Pervious Area
	6,193		97.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 97.47% Impervious, Inflow Depth > 3.21" for 2-YR event
 Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.039 af
 Outflow = 0.52 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

G-698-PRE

Type III 24-hr 10-YR Rainfall=5.91"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff 216 Runoff Area=6,354 sf 97.47% Impervious Runoff Depth>5.17"
Flow Length=50' Tc=6.0 min CN=97 Runoff=0.82 cfs 0.063 af

Reach 1R: Mason Street

Inflow=0.82 cfs 0.063 af
Outflow=0.82 cfs 0.063 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.063 af Average Runoff Depth = 5.17"
2.53% Pervious = 0.004 ac 97.47% Impervious = 0.142 ac

Summary for Subcatchment E1: Existing Site Runoff 216 Chandler St

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.063 af, Depth> 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=5.91"

	Area (sf)	CN	Description
*	6,193	98	Impervious
*	161	74	Lawn, Good, HSG C
	6,354	97	Weighted Average
	161		2.53% Pervious Area
	6,193		97.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 97.47% Impervious, Inflow Depth > 5.17" for 10-YR event

Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.063 af

Outflow = 0.82 cfs @ 12.09 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

G-698-PRE

Type III 24-hr 25-YR Rainfall=7.63"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff 216 Runoff Area=6,354 sf 97.47% Impervious Runoff Depth>6.74"
Flow Length=50' Tc=6.0 min CN=97 Runoff=1.06 cfs 0.082 af

Reach 1R: Mason Street

Inflow=1.06 cfs 0.082 af
Outflow=1.06 cfs 0.082 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.082 af Average Runoff Depth = 6.74"
2.53% Pervious = 0.004 ac 97.47% Impervious = 0.142 ac

Summary for Subcatchment E1: Existing Site Runoff 216 Chandler St

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.082 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-YR Rainfall=7.63"

	Area (sf)	CN	Description
*	6,193	98	Impervious
*	161	74	Lawn, Good, HSG C
	6,354	97	Weighted Average
	161		2.53% Pervious Area
	6,193		97.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 97.47% Impervious, Inflow Depth > 6.74" for 25-YR event

Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.082 af

Outflow = 1.06 cfs @ 12.09 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

G-698-PRE

Type III 24-hr 100-YR Rainfall=10.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff 216 Runoff Area=6,354 sf 97.47% Impervious Runoff Depth>9.35"
Flow Length=50' Tc=6.0 min CN=97 Runoff=1.47 cfs 0.114 af

Reach 1R: Mason Street

Inflow=1.47 cfs 0.114 af
Outflow=1.47 cfs 0.114 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.114 af Average Runoff Depth = 9.35"
2.53% Pervious = 0.004 ac 97.47% Impervious = 0.142 ac

Summary for Subcatchment E1: Existing Site Runoff 216 Chandler St

Runoff = 1.47 cfs @ 12.09 hrs, Volume= 0.114 af, Depth> 9.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR Rainfall=10.50"

	Area (sf)	CN	Description
*	6,193	98	Impervious
*	161	74	Lawn, Good, HSG C
	6,354	97	Weighted Average
	161		2.53% Pervious Area
	6,193		97.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

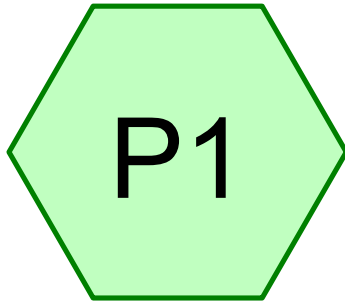
Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 97.47% Impervious, Inflow Depth > 9.35" for 100-YR event

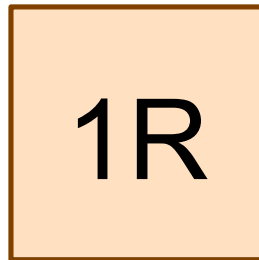
Inflow = 1.47 cfs @ 12.09 hrs, Volume= 0.114 af

Outflow = 1.47 cfs @ 12.09 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

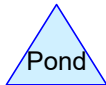
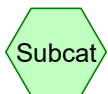
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Proposed Site Runoff
216 Chandler St



Mason Street



Routing Diagram for G-698-POST

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G-698-POST

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.116	98	Impervious (P1)
0.030	74	Lawn, Good, HSG C (P1)
0.146	93	TOTAL AREA

G-698-POST

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.030	HSG C	P1
0.000	HSG D	
0.116	Other	P1
0.146		TOTAL AREA

G-698-POST

Type III 24-hr 2-YR Rainfall=3.77"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Site Runoff Runoff Area=6,354 sf 79.34% Impervious Runoff Depth>2.83"
Flow Length=50' Tc=6.0 min CN=93 Runoff=0.48 cfs 0.034 af

Reach 1R: Mason Street Inflow=0.48 cfs 0.034 af
Outflow=0.48 cfs 0.034 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.034 af Average Runoff Depth = 2.83"
20.66% Pervious = 0.030 ac 79.34% Impervious = 0.116 ac

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Type III 24-hr 2-YR Rainfall=3.77"

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Summary for Subcatchment P1: Proposed Site Runoff 216 Chandler St

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.77"

	Area (sf)	CN	Description
*	5,041	98	Impervious
*	1,313	74	Lawn, Good, HSG C
	6,354	93	Weighted Average
	1,313		20.66% Pervious Area
	5,041		79.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 79.34% Impervious, Inflow Depth > 2.83" for 2-YR event

Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af

Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-YR Rainfall=5.91"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Site Runoff Runoff Area=6,354 sf 79.34% Impervious Runoff Depth>4.81"
Flow Length=50' Tc=6.0 min CN=93 Runoff=0.79 cfs 0.058 af

Reach 1R: Mason Street Inflow=0.79 cfs 0.058 af
Outflow=0.79 cfs 0.058 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.058 af Average Runoff Depth = 4.81"
20.66% Pervious = 0.030 ac 79.34% Impervious = 0.116 ac

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Type III 24-hr 10-YR Rainfall=5.91"

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Summary for Subcatchment P1: Proposed Site Runoff 216 Chandler St

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.91"

	Area (sf)	CN	Description
*	5,041	98	Impervious
*	1,313	74	Lawn, Good, HSG C
	6,354	93	Weighted Average
	1,313		20.66% Pervious Area
	5,041		79.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 79.34% Impervious, Inflow Depth > 4.81" for 10-YR event

Inflow = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af

Outflow = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25-YR Rainfall=7.63"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Site Runoff Runoff Area=6,354 sf 79.34% Impervious Runoff Depth>6.39"
Flow Length=50' Tc=6.0 min CN=93 Runoff=1.04 cfs 0.078 af

Reach 1R: Mason Street

Inflow=1.04 cfs 0.078 af
Outflow=1.04 cfs 0.078 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.078 af Average Runoff Depth = 6.39"
20.66% Pervious = 0.030 ac 79.34% Impervious = 0.116 ac

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Type III 24-hr 25-YR Rainfall=7.63"

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Summary for Subcatchment P1: Proposed Site Runoff 216 Chandler St

Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 6.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=7.63"

	Area (sf)	CN	Description
*	5,041	98	Impervious
*	1,313	74	Lawn, Good, HSG C
	6,354	93	Weighted Average
	1,313		20.66% Pervious Area
	5,041		79.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 79.34% Impervious, Inflow Depth > 6.39" for 25-YR event

Inflow = 1.04 cfs @ 12.09 hrs, Volume= 0.078 af

Outflow = 1.04 cfs @ 12.09 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 100-YR Rainfall=10.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Site Runoff Runoff Area=6,354 sf 79.34% Impervious Runoff Depth>9.03"
Flow Length=50' Tc=6.0 min CN=93 Runoff=1.45 cfs 0.110 af

Reach 1R: Mason Street Inflow=1.45 cfs 0.110 af
Outflow=1.45 cfs 0.110 af

Total Runoff Area = 0.146 ac Runoff Volume = 0.110 af Average Runoff Depth = 9.03"
20.66% Pervious = 0.030 ac 79.34% Impervious = 0.116 ac

G-698-POST

Type III 24-hr 100-YR Rainfall=10.50"

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Summary for Subcatchment P1: Proposed Site Runoff 216 Chandler St

Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.110 af, Depth> 9.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=10.50"

	Area (sf)	CN	Description
*	5,041	98	Impervious
*	1,313	74	Lawn, Good, HSG C
	6,354	93	Weighted Average
	1,313		20.66% Pervious Area
	5,041		79.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50		0.14		Direct Entry, Segment 1

Summary for Reach 1R: Mason Street

Inflow Area = 0.146 ac, 79.34% Impervious, Inflow Depth > 9.03" for 100-YR event

Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.110 af

Outflow = 1.45 cfs @ 12.09 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

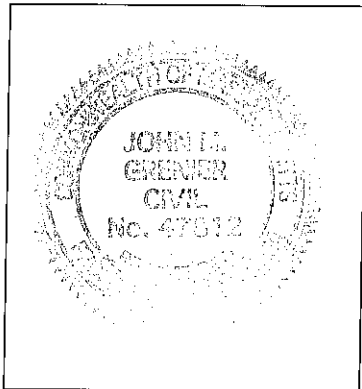
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



John L. Greiner
Signature and Date

Checklist

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

Standard 4: Water Quality

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

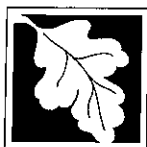
- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the 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

Checklist (continued)

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

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

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

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 9: Operation and Maintenance Plan

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

Standard 10: Prohibition of Illicit Discharges

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

STORMWATER MANAGEMENT CALCULATIONS

	Existing	Proposed	Change
Pavement/Walks:	393 sq.ft. /0.009 ac.	482 sq.ft. /0.011 ac.	+89 sq.ft. /0.002 a
Building:	<u>5,800 sq.ft. /0.133 ac.</u>	<u>4,559 sq.ft. /0.105 ac.</u>	<u>-1,241 sq.ft. /0.028 ac.</u>
Total	6,193 sq.ft. /0.142 ac.	5,041 sq.ft. /0.116 ac	-1,152 sq.ft. /0.026 ac

Standard #3: Recharge to Groundwater

Recharge not possible due to lack of available space on site to provide recharge.

Drawdown within 72 hours

N/A – Not Applicable

Standard #4: Water Quality

N/A – limited proposed pavement at 216 Chandler Street and net reduction in pavement proposed at 221 Chandler Street as part of this project

STORMWATER NARRATIVE

Design Methods and Objectives

The design of this redevelopment has been prepared in accordance with Stormwater Management Standards to the maximum extent practical as outlined in the Stormwater Management Handbook. In particular, the site has been designed to ensure:

1. No new stormwater conveyances will discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. There are no new stormwater conveyances proposed as part of this redevelopment
2. Stormwater management systems are designed so that the post-development peak discharge rates does not exceed pre-development peak discharge rates. Drainage calculations demonstrate that the peak rate of runoff is reduced in the post development condition through a reduction in impervious area.
3. On-site recharge is not practical for this redevelopment due to lack of available on-site area. Loss of annual recharge to ground water is minimized by reducing the amount of impervious area in the post development conditions.
4. This standard is not applicable due to limited amount of new pavement proposed on site.
5. The use of the site for a mixed use residential and retail building is not a risk for producing higher pollutant loads.
6. The site is not in a critical area.
7. This project is a redevelopment and stormwater management guidelines are met to the maximum extent practical.
8. For construction related activities, an operation and maintenance plan has been incorporated into the Stormwater Management Report to ensure that a protocol for runoff control is in place prior to any construction activities.
9. The operation and maintenance plan as provided provides a protocol to ensure that the stormwater management system will function as designed.
10. A signed illicit discharges statement has been included in the Stormwater Management Report.

Project: **G-698**
 Location: **Worcester, Massachusetts**

By: **DCT**
 Chkd: **JMG**

Date: **11/5/2024**
 Date: **11/5/2024**

Catchment Watershed Areas

Design Storm: **25** year

WA: **bldg**

	Area (Ac)		C		AxC		
Paved:	0.10	x	0.9	=	0.09	Overland Flow Time:	5 min.
Dense grass:		x		=		Intensity:	7.6 in/hr
<hr/>							
TOTAL:	0.10	x	0.90	=	0.09	Flow (Q=AxCxi):	0.7 cfs

WA:

	Area (Ac)		C		AxC		
Paved:		x				Overland Flow Time:	min.
Dense grass:		x				Intensity:	in/hr
<hr/>							
TOTAL:		x		=		Flow (Q=AxCxi):	cfs

WA:

	Area (Ac)		C		AxC		
Paved:		x				Overland Flow Time:	min.
Dense grass:		x				Intensity:	in/hr
<hr/>							
TOTAL:		x		=		Flow (Q=AxCxi):	cfs

WA:

	Area (Ac)		C		AxC		
Paved:		x				Overland Flow Time:	min.
Dense grass:		x				Intensity:	in/hr
<hr/>							
TOTAL:		x		=		Flow (Q=AxCxi):	cfs

WA:

	Area (Ac)		C		AxC		
Paved:		x				Overland Flow Time:	min.
Dense grass:		x				Intensity:	in/hr
<hr/>							
TOTAL:		x		=		Flow (Q=AxCxi):	cfs

J.M. GRENIER ASSOCIATES

PIPE HYDRAULICS

DESIGN STORM: 25 yr.

STREET OR PROPERTY	LOCATION		AREA (Acres)		C	Cx	FLOW TIME		RAINFALL INTENSITY (i)	FLOW ACTUAL Q _A =CxAx <i>i</i>	DESIGN										STATEMENT				
	FROM	TO	INCREMENTAL (A)	TOTAL (A)			TO INLET (Min)	IN PIPE T=(L/V _F)/60 (Min)			RIM ELEV UPPER END (Ft)	INV ELEV UPPER END (Ft)	RIM ELEV LOWER END (Ft)	INV ELEV LOWER END (Ft)	PIPE SIZE (Inches)	PIPE TYPE	PIPE LENGTH (Ft)	PIPE SLOPE (Ft/Ft)	n	VEL _{FULL} $V_F = (1.49/n)(R^{2/3})(S^{1/2})$	FLOW _{FULL} Q _F =V _F xA	VEL _{ACTUAL} V _A =(Q _A /Q _F)*V _F	FREEFLOW OR SUBMERGED		
Property	BLDG	Ex. DHM	0.10		0.90	0.09	5.0	0.1	7.6	0.7		486.45	494.06	485.89	8	PVC	28	0.020	0.013	4.9	1.7	4.6	FREEFLOW		

PROJECT _____
LOCATION _____
JOB NO. _____
FILE NO. _____

CALC BY _____
DATE _____
CHKD BY _____
DATE _____

OPERATION AND MAINTENANCE PLAN

216 Chandler Street, Worcester

November 5, 2024

The following are operation and maintenance instructions for both construction and post-development stormwater controls. The goal of these plans is to ensure that the stormwater system, as designed, will function properly during construction and for the future of the site. The developer of the parcel is Polar Views, LLC. Daniel Yarnie is the contact for this project and can be contacted at the following number: (774) 303-9860.

Construction Operation and Maintenance Plan:

1. All erosion and sediment control devices installed prior to construction shall be inspected on a daily basis. Any deficiencies in the siltation fence shall be corrected immediately. Any accumulated silt shall be removed manually from the silt fence. Silt barrier should be inspected daily to ensure that there is no accumulation of sediments.
2. The most important aspects of controlling erosion and sedimentation are limiting the extent of disturbance and stabilizing surfaces as soon as possible. Of secondary importance in erosion control is limiting the size and length of the tributary drainage area within the work site and drainage structures. These fundamental principles shall be the key factor in the control of erosion on the site.
3. All disturbed surfaces shall be stabilized a minimum of 14 days after construction in any portion of the site has ceased or is temporarily halted unless additional construction is intended to be initiated within 21 days.
4. Hydroseeding and hay mulching shall be performed immediately after construction to minimize erosion damage. Newly seeded slopes shall be inspected every two weeks for the first few months to ensure that revegetation has occurred. Repairs and reseeded shall be performed immediately as the need arises.
5. At no time shall silt laden water be allowed to enter sensitive areas (wetlands, and off-site areas). Any runoff from disturbed surfaces shall be directed through settling basins and erosion control barriers prior to entering any sensitive areas.
6. At the completion of construction all areas are to be loamed and seeded to ensure that the site is stabilized.

Post Development Operation and Maintenance Plan:

1. Seeding and repairs shall be performed as required. Sediment and debris shall be removed at least once a year, typically in early spring prior to the commencement of the growing season.
2. A contract with a licensed hauler shall be in place for maintenance of drainage structures to ensure the long term performance of the drainage system.
3. The driveways shall not be treated with sand.
4. The contractor will be responsible for the maintenance of all drainage structures and until such time as the site work is complete. The maintenance will then be the responsibility of the property owners.

LONG TERM POLLUTION PREVENTION PLAN

216 Chandler Street, Worcester

November 5, 2024

This plan was developed in compliance with the Massachusetts Department of Environmental Protection Stormwater Requirements

Good Housekeeping

The proposed site is designed to maintain high quality water treatment for all runoff. A general maintenance plan has been prepared and will be followed in a strict and complete manner as required.

Spill Prevention Plan

No hazardous materials will be stored on site. However the flowing spill prevention plan will be incorporated into the Long Term Pollution Prevention Plan

1. Manufacturers recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures and location of the information and cleanup supplies.
2. Materials and equipment necessary for spill cleanup will be kept in the materials storage area. Equipment and materials will include, but is not limited to, brooms dust pans, mops, rags, gloves, sand and trash containers specifically for this purpose.
3. All spills will be cleaned up immediately after discovery.
4. The spill area will be kept will ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
5. Spills of toxic or hazardous material will be reported, regardless of size, to the Massachusetts Department of Environmental Protection (888) 304-1133
6. Should a spill occur, the spill prevention plan will be adjusted to include measures to prevent another spill and to cleanup the spill should another occur. A description of the spill along with the causes and cleanup measures will be included in the updated pollution prevention plan.
7. The construction superintendant responsible for daily operation on the site will be the spill prevention and cleanup coordinator. The superintendant will designate at least three site personnel to receive spill prevention cleanup training. The names of the responsible spill personnel will be posted in the material storage area.

Construction Sequencing

1. Selectively cut trees and clear brush to be chipped and hauled off site. Note that the site is in the Asian Longhorned Beetle (ALB) regulated area.
2. Stake location of and install erosion control barrier as delineated on site plan.
3. Strip top and subsoil as necessary in work area. Stockpile material on southern portion of lot for backfilling purposes at completion of construction.
4. Form and pour foundation for new building
5. Construct building and install utilities.
6. Install finish pavement, curbing and landscaping.

Construction Inspection & Maintenance Schedule

1. Hay bales and silt fence shall be inspected weekly and after storm events for damage and excessive silting. Damaged fence shall be replaced immediately.
2. Temporary construction entrance shall be inspected weekly and after heavy storm events or heavy use. The entrance shall be maintained in a condition that will prevent sediment tracking offsite. All sediment tracked onto Mason or Chandler Streets shall be swept up immediately
3. Stockpiled sediment shall be mulched if they are to remain for more than three weeks. The stockpiles shall be inspected weekly and after storm events for erosion damage. Additional mulch shall be added if needed.
4. Loamed and seeded area shall be inspected after final grading for areas that need to be reseeded or restabilized.
5. Temporary diversion swales shall be inspected weekly and after storm events for erosion damage and excessive silting. Silt shall be removed if necessary. Any erosion damage shall be repaired immediately.
6. The temporary construction basin shall be inspected weekly and after storm events for erosion damage and excessive silting.

Stormwater BMP Maintenance

A full BMP maintenance plan has been prepared (see Operation & Maintenance Plan) in order to ensure that the stormwater management system will function properly and as designed.

Landscape and Lawn Maintenance

Routine mowing and associated maintenance of all landscape features will occur weekly or as needed to prevent excessive growth of vegetation on site. Grass clippings and leaf litter shall not be blown into or disposed of in storm drainage systems or wetland resource areas.

Fertilizers, Herbicides & Pesticides

Fertilizer, herbicide & pesticide use will be limited to that typically associated with lawns. Use of slow release phosphorus fertilizers or no use of fertilizers is encouraged. All fertilizer, herbicide & pesticide use will comply with local, state and federal requirements.

Solid Waste Maintenance

Solid waste is handled on site and will comply with all local, state and federal requirements.

Pet Waste

Pet waste shall be properly disposed of in a timely manner to prevent pollution of onsite stormwater management facilities and down-gradient areas.

Snow Disposal

Snow disposal shall not be directed toward wetland resource areas.

Winter Salt & Sand Use

All winter salt and/or sand will comply with all local, state and federal requirements.

Training of Staff

All personnel on site will be briefed on all requirements for implementing the Long Term Pollution Prevention Plan

Emergency Contact for Long Term Pollution Prevention Plan

Daniel Yarnie
Polar Views, LLC
89 West Main Street Unit 101
Northborough, MA 01532

ILLCIT DISCHARGE COMPLIANCE STATEMENT

216 Chandler Street, Worcester

November 5, 2024

Responsibility:

The owner is responsible for the ultimate compliance with all provisions of the Massachusetts Stormwater Management Policy, the U.S. EPA NPDES Construction General Permit and responsible for identifying and eliminating illicit discharges (as defined by U.S. EPA).

Owner: Daniel Yarnie
89 West Main Street Unit 101
Northborough, MA 01532
(774) 303-9860

Owner's Compliance Statement

To the best of my knowledge, the attached plans, computations and specifications meet the requirements of Standard 10 of the Massachusetts Stormwater Handbook regarding illicit discharges to the stormwater management system and that no detectable illicit discharges exist on the site. All documents and attachments were prepared under my direction and qualified personnel gathered and evaluated the information submitted, to the best of my knowledge.

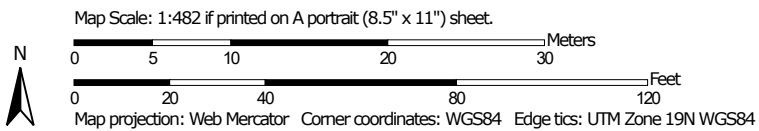
Included with this statement are site plans, drawn to scale, that identify the location of systems for conveying stormwater on the site and show that these systems do not allow the entry of any illicit discharges into the stormwater management system. The plans also show any systems for conveying wastewater and/or groundwater on the site and show there are no connections between stormwater and wastewater systems.

Signature _____

Soil Map—Worcester County, Massachusetts, Northeastern Part



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part
 Survey Area Data: Version 18, Sep 10, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
602	Urban land	1.2	100.0%
Totals for Area of Interest		1.2	100.0%