



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

MassDEP File Number

Document Transaction Number

City/Town

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



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

199 Havre Street

a. Street Address

East Boston

b. City/Town

02128

c. Zip Code

Latitude and Longitude:

1090

f. Assessors Map/Plat Number

42.3744539

d. Latitude

-71.0361946

e. Longitude

Parcel ID#0106234000

g. Parcel /Lot Number

2. Applicant:

Ilya

a. First Name

Zvenigorodskiy

b. Last Name

199 Havre Street Realty Trust

c. Organization

226 Harvard Street

d. Street Address

Brookline

e. City/Town

MA

f. State

02446

g. Zip Code

860-833-4081

h. Phone Number

i. Fax Number

ilya@riseboston.com

j. Email Address

3. Property owner (required if different from applicant):

Check if more than one owner

Yevgeny

a. First Name

Bernshtein

b. Last Name

199 Havre Street Realty Trust

c. Organization

226 Harvard Street

d. Street Address

Brookline

e. City/Town

MA

f. State

02446

g. Zip Code

978-689-5773

h. Phone Number

i. Fax Number

gene@riseboston.com

j. Email address

4. Representative (if any):

a. First Name

b. Last Name

c. Company

d. Street Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

\$1112.50

a. Total Fee Paid

\$512.50

b. State Fee Paid

\$600.00

c. City/Town Fee Paid



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A. General Information (continued)

6. General Project Description:

To demolish distressed single family home and build a six unit building with five parking spots. The building has been approved by zoning, community and mayor's office. The new construction will improve drainage on the site.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- 1. Single Family Home
- 2. Residential Subdivision
- 3. Commercial/Industrial
- 4. Dock/Pier
- 5. Utilities
- 6. Coastal engineering Structure
- 7. Agriculture (e.g., cranberries, forestry)
- 8. Transportation
- 9. Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. Yes No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

suffolk

a. County

58901

c. Book

b. Certificate # (if registered land)

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- 1. Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- 2. Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Bank	1. linear feet _____	2. linear feet _____
b. <input type="checkbox"/> Bordering Vegetated Wetland	1. square feet _____	2. square feet _____
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. square feet _____	2. square feet _____
	3. cubic yards dredged _____	

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. <input type="checkbox"/> Bordering Land Subject to Flooding	1. square feet _____	2. square feet _____
	3. cubic feet of flood storage lost _____	4. cubic feet replaced _____
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet _____	
	2. cubic feet of flood storage lost _____	3. cubic feet replaced _____

f. Riverfront Area
 1. Name of Waterway (if available) - **specify coastal or inland** _____

2. Width of Riverfront Area (check one):

- 25 ft. - Designated Densely Developed Areas only
- 100 ft. - New agricultural projects only
- 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? Yes No

6. Was the lot where the activity is proposed created prior to August 1, 1996? Yes No

3. Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	_____	
	1. square feet	

	2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	_____	_____
	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	_____	_____
	1. square feet	2. cubic yards dune nourishment
	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	_____	
	1. linear feet	
g. <input type="checkbox"/> Rocky Intertidal Shores	_____	
	1. square feet	
h. <input type="checkbox"/> Salt Marshes	_____	_____
	1. square feet	2. sq ft restoration, rehab., creation
i. <input type="checkbox"/> Land Under Salt Ponds	_____	
	1. square feet	

	2. cubic yards dredged	
j. <input type="checkbox"/> Land Containing Shellfish	_____	
	1. square feet	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	

	1. cubic yards dredged	
i. <input checked="" type="checkbox"/> Land Subject to Coastal Storm Flowage	2270	
	1. square feet	

4. Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings



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C. Other Applicable Standards and Requirements

- This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

- a. Yes No

If yes, include proof of mailing or hand delivery of NOI to:

Natural Heritage and Endangered Species Program
 Division of Fisheries and Wildlife
 1 Rabbit Hill Road
 Westborough, MA 01581

october, 2008

b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); OR complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review*

1. Percentage/acreage of property to be altered:

(a) within wetland Resource Area _____
percentage/acreage

(b) outside Resource Area _____
percentage/acreage

2. Assessor's Map or right-of-way plan of site

2. Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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C. Other Applicable Standards and Requirements (cont'd)

(c) MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/ mesa/ mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

(d) Vegetation cover type map of site

(e) Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/ mesa/ mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. Separate MESA review ongoing. _____ a. NHESP Tracking # _____ b. Date submitted to NHESP

3. Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. Not applicable – project is in inland resource area only b. Yes No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.



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C. Other Applicable Standards and Requirements (cont'd)

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
- a. Yes No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
- b. ACEC _____
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
- a. Yes No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
- a. Yes No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
- a. Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
1. Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
 2. A portion of the site constitutes redevelopment
 3. Proprietary BMPs are included in the Stormwater Management System.
- b. No. Check why the project is exempt:
1. Single-family house
 2. Emergency road repair
 3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

- This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.



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D. Additional Information (cont'd)

3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. List the titles and dates for all plans and other materials submitted with this NOI.

199 Havre Street

a. Plan Title

Hardy + Man Design Group, PC

b. Prepared By

3/22/19

d. Final Revision Date

Chi Y Man

c. Signed and Stamped by

1"=10'

e. Scale

f. Additional Plan or Document Title

g. Date

5. If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. Attach NOI Wetland Fee Transmittal Form

9. Attach Stormwater Report, if needed.

E. Fees

1. Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

4747

2. Municipal Check Number

4147

4. State Check Number

Liss Law

6. Payor name on check: First Name

3/26/2019

3. Check date

3/19/2019

5. Check date

7. Payor name on check: Last Name



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MassDEP File Number _____

Document Transaction Number _____

City/Town _____

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	3/22/19
3. Signature of Property Owner (if different)	3/22/19
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

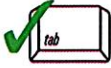
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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



A. Applicant Information

1. Location of Project:

199 Havre Street
 a. Street Address
 East Bostn
 b. City/Town
 \$1112.50
 d. Fee amount

2. Applicant Mailing Address:

Ilya
 a. First Name
 Zvenigorodskiy
 b. Last Name
 199 Havre Street Realty trust
 c. Organization
 226 Harvard St
 d. Mailing Address
 Brookline MA 02446
 e. City/Town f. State g. Zip Code
 860-833-4081 i. Fax Number
 ilya@riseboston.com
 j. Email Address

3. Property Owner (if different):

Yevgeny
 a. First Name
 Bernshtein
 b. Last Name
 199 Havre Street Realty Trust
 c. Organization
 226 Harvard St
 d. Mailing Address
 Brookline MA 02461
 e. City/Town f. State g. Zip Code
 978-689-5773 i. Fax Number
 gene@riseboston.com
 j. Email Address

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

B. Fees

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.



B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
3	1	\$1112.50	\$1112.50

Step 5/Total Project Fee: \$1112.50

Step 6/Fee Payments:

Total Project Fee:	<u>\$1112.50</u>
State share of filing Fee:	<u>\$512.50</u>
City/Town share of filing Fee:	<u>\$600.00</u>
	<u>a. Total Fee from Step 5</u>
	<u>b. 1/2 Total Fee less \$12.50</u>
	<u>c. 1/2 Total Fee plus \$12.50</u>

C. Submittal Requirements

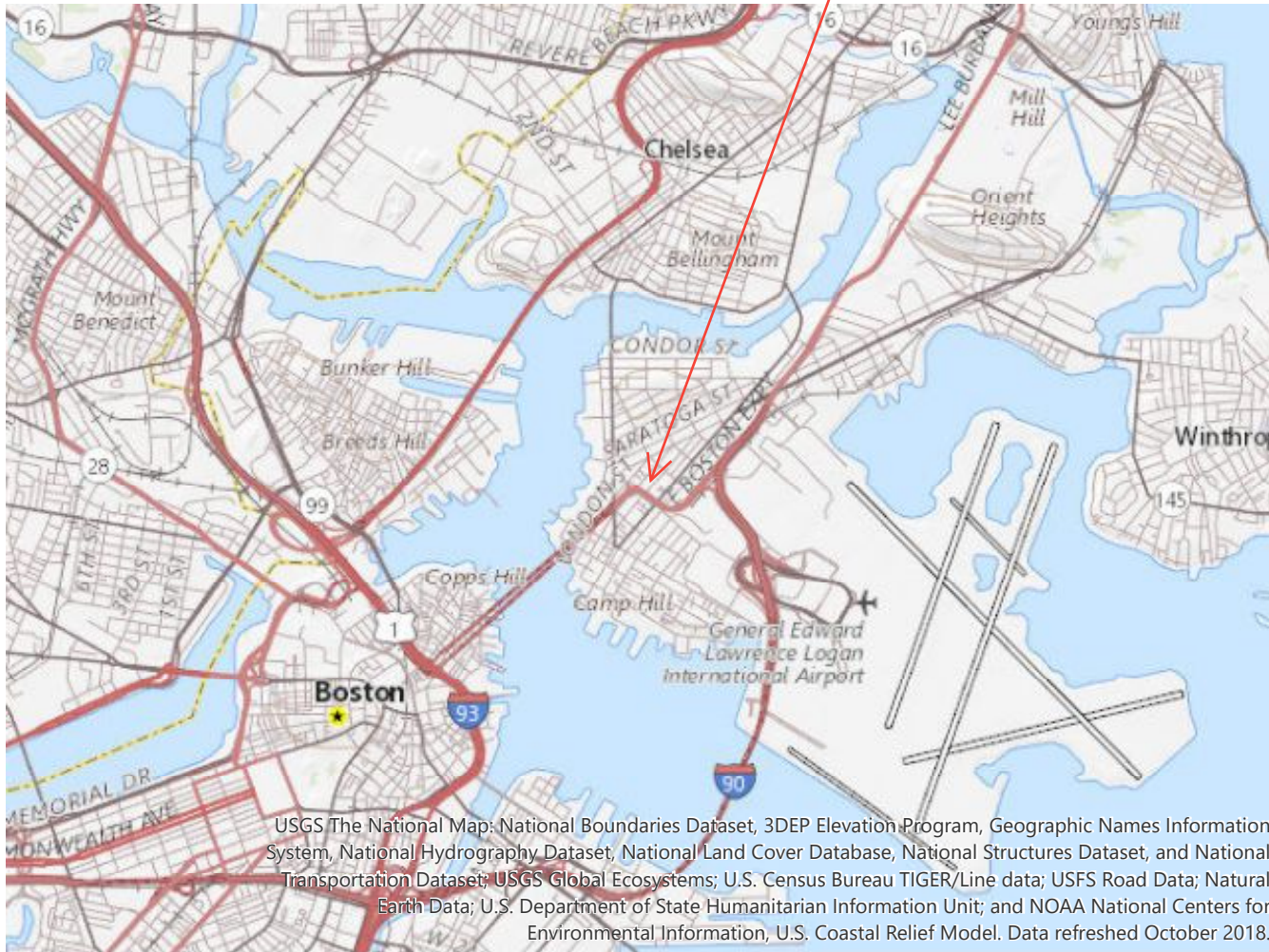
- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
 Box 4062
 Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

LOCUS - 199 HARVE STREET, EAST BOSTON



USGS QUAD MAP EXHIBIT - 199 HARVE STREET, EAST BOSTON, MA

SOURCE: DOWNLOADED FROM USGS WEB
THE NATIONAL MAP TOOL

Boston Planning & Development Agency Climate Resiliency Report Summary



Submitted: 04/02/2019 14:46:10

A.1 - Project Information

Project Name:	199 Havre Street Housing		
Project Address:	199 Havre Street		
Filing Type:	Design / Building Permit (prior to final design approval)		
Filing Contact:	Ilya Zvenigoro dskiy	Rise Realty	ilya@riseboston.com 617-653-3801
Is MEPA approval required?	No	MEPA date:	

A.2 - Project Team

Owner / Developer:	Rise Real Estate - Boston
Architect:	JC Architect PLLC
Engineer:	Hardy + Man Design Group
Sustainability / LEED:	
Permitting:	
Construction Management:	

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Multi-Unit Residential
List the First Floor Uses:	Common Lobby and parking
List any Critical Site Infrastructure and or Building Uses:	

Site and Building:

Site Area (SF):	2500	Building Area (SF):	6634
Building Height (Ft):	39.5	Building Height (Stories):	4
Existing Site Elevation – Low (Ft BCB):	12.46	Existing Site Elevation – High (Ft BCB):	17.46
Proposed Site Elevation – Low (Ft BCB):	16.46	Proposed Site Elevation – High (Ft BCB):	17.56
Proposed First Floor Elevation (Ft BCB):	17.56	Below grade spaces/levels (#):	0

Article 37 Green Building:

LEED Version - Rating System:	LEED Version 4	LEED Certification:	No
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Boston Planning & Development Agency Climate Resiliency Report Summary



Proposed LEED rating: **Certified** Proposed LEED point score (Pts.): **N/A**

Building Envelope:

When reporting R values, differentiate between R discontinuous and R continuous. For example, use “R13” to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

Roof:	49	Exposed Floor :	38
Foundation Wall:	21	Slab Edge (at or below grade):	21
Vertical Above-grade Assemblies (%’s are of total vertical area and together should total 100%):			
Area of Opaque Curtain Wall & Spandrel Assembly:	0	Wall & Spandrel Assembly Value:	0.047
Area of Framed & Insulated / Standard Wall:	91	Wall Value:	21
Area of Vision Window:	6.5	Window Glazing Assembly Value:	0.26
		Window Glazing SHGC:	0.18
Area of Doors:	2.5	Door Assembly Value :	0.24

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined			
Annual Electric (kWh):		Peak Electric (kW):	
Annual Heating (MMbtu/hr):		Peak Heating (MMbtu):	
Annual Cooling (Tons/hr):		Peak Cooling (Tons):	
Energy Use - Below ASHRAE 90.1 - 2013 (%):		Have the local utilities reviewed the building energy performance?:	No
Energy Use - Below Mass. Code (%):		Energy Use Intensity (kBtu/SF):	

Back-up / Emergency Power System

Electrical Generation Output (kW):		Number of Power Units:	
System Type (kW):		Fuel Source:	

Emergency and Critical System Loads (in the event of a service interruption)

Electric (kW):		Heating (MMbtu/hr):	
		Cooling (Tons/hr):	

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City’s goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons): 

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:



Describe building specific passive energy efficiency measures including orientation, massing, building envelop, and systems:



Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:



Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:



Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:



Describe any energy efficiency assistance or support provided or to be provided to the project:



B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2° F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.):
Annual Heating Degree Days:

Temperature Range - High (Deg.):
Annual Cooling Degree Days:

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90° (#):

Days - Above 100° (#):

Number of Heatwaves / Year (#):

Average Duration of Heatwave (Days):

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25”. There is a significant probability that

this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours)

Describe all building and site measures for reducing storm water run-off:

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA Special Flood Hazard Area?

What Zone:

What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)?

Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see [SLR-FHA online map](#))?

If you answered YES to either of the above questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2’ of sea level rise above 2013 tide levels, an additional 2.5” to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project’s Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by

adding 12” of freeboard for buildings, and 24” of freeboard for critical facilities and infrastructure and any ground floor residential units.

What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)?	19.3		
What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)?	19.3	First Floor Elevation (Ft BCB):	17.56
What are the Site Elevations at Building (Ft BCB)?	17.56	What is the Accessible Route Elevation (Ft BCB)?	17.56

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

The building entrance, parking and access meet current street grade at elevation 17.56 BCB. All living area is designed at above elevation 27.39 BCB.

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

While the sea level rise base flood elevation is at 19.3 BCB, the floor is only for entrance lobby and garage parking. All living space will be elevated above SLR-BFE at 27.39 BCB.

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

During a flooding event, the occupants can stay shelter within their units where the living space is 9.8' above flood level.

Describe any strategies that would support rapid recovery after a weather event:

The majority of the mechanical equipment is installed above SER-BFE.

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

The living space is set at 9.8' above SLR-BFE and all major mechanical system equipment will be mounted above the BFE.

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

The living space is set at 9.8' above SLR-BFE and all major mechanical system equipment will be mounted above the BFE. The building will equipped with underground retention to mitigate surface runoff to reduce both peak runoff rate and volume.

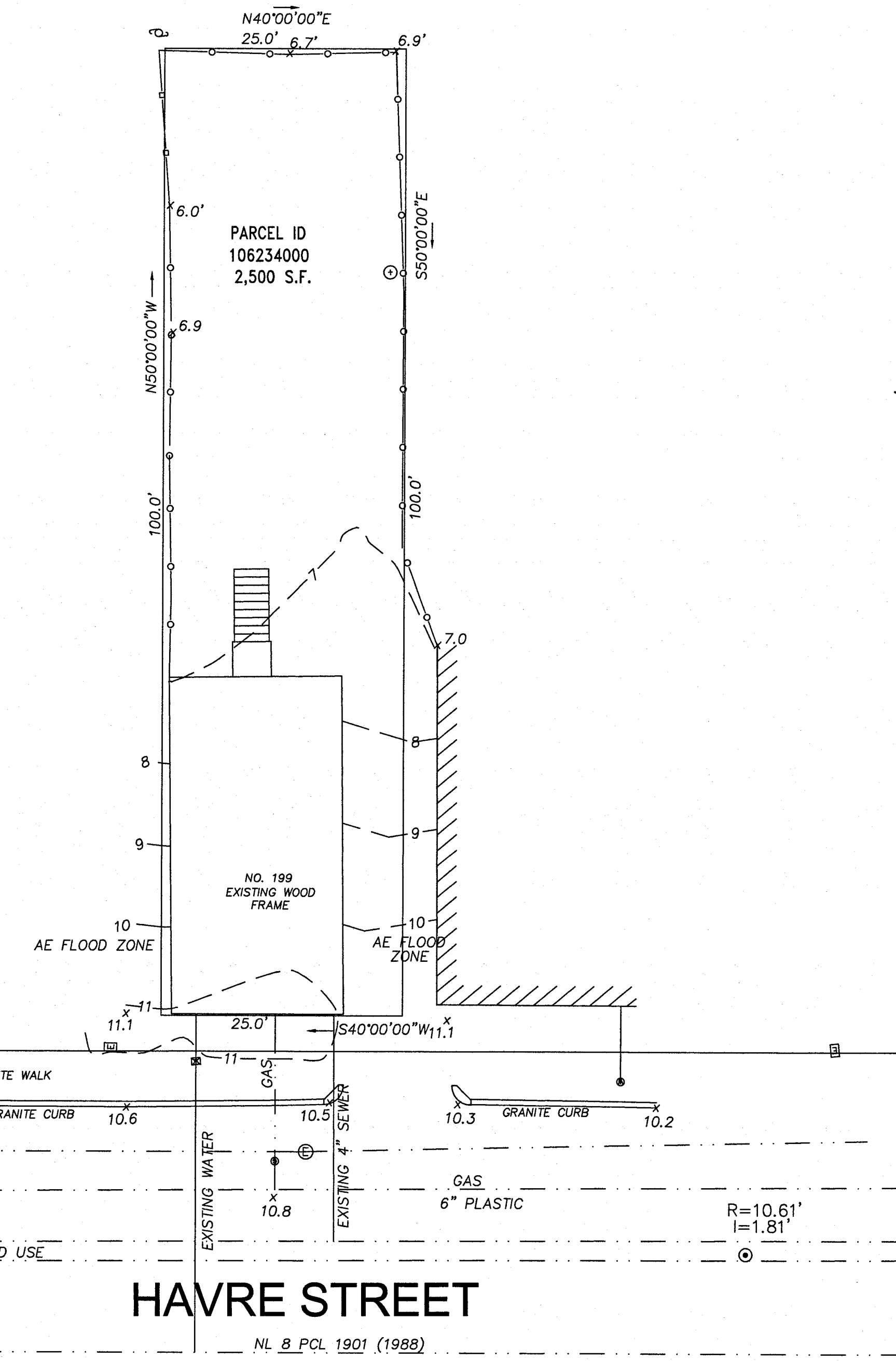
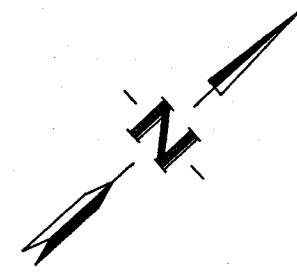
Thank you for completing the Boston Climate Change Checklist!

Boston Planning & Development Agency
Climate Resiliency Report Summary



For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

REFERENCES:
ELEVATIONS NAVD 1988

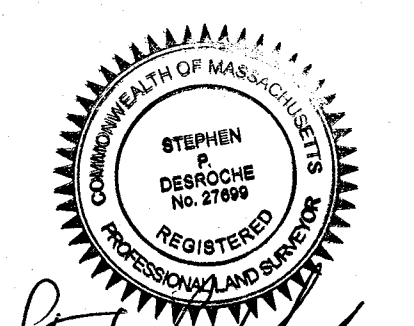


R=11.90'
I=3.9'

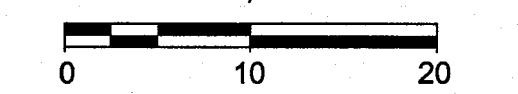
R=10.61'
I=1.81'

HAVRE STREET

NL 8 PCL 1901 (1988)



DATE: 3/22/19

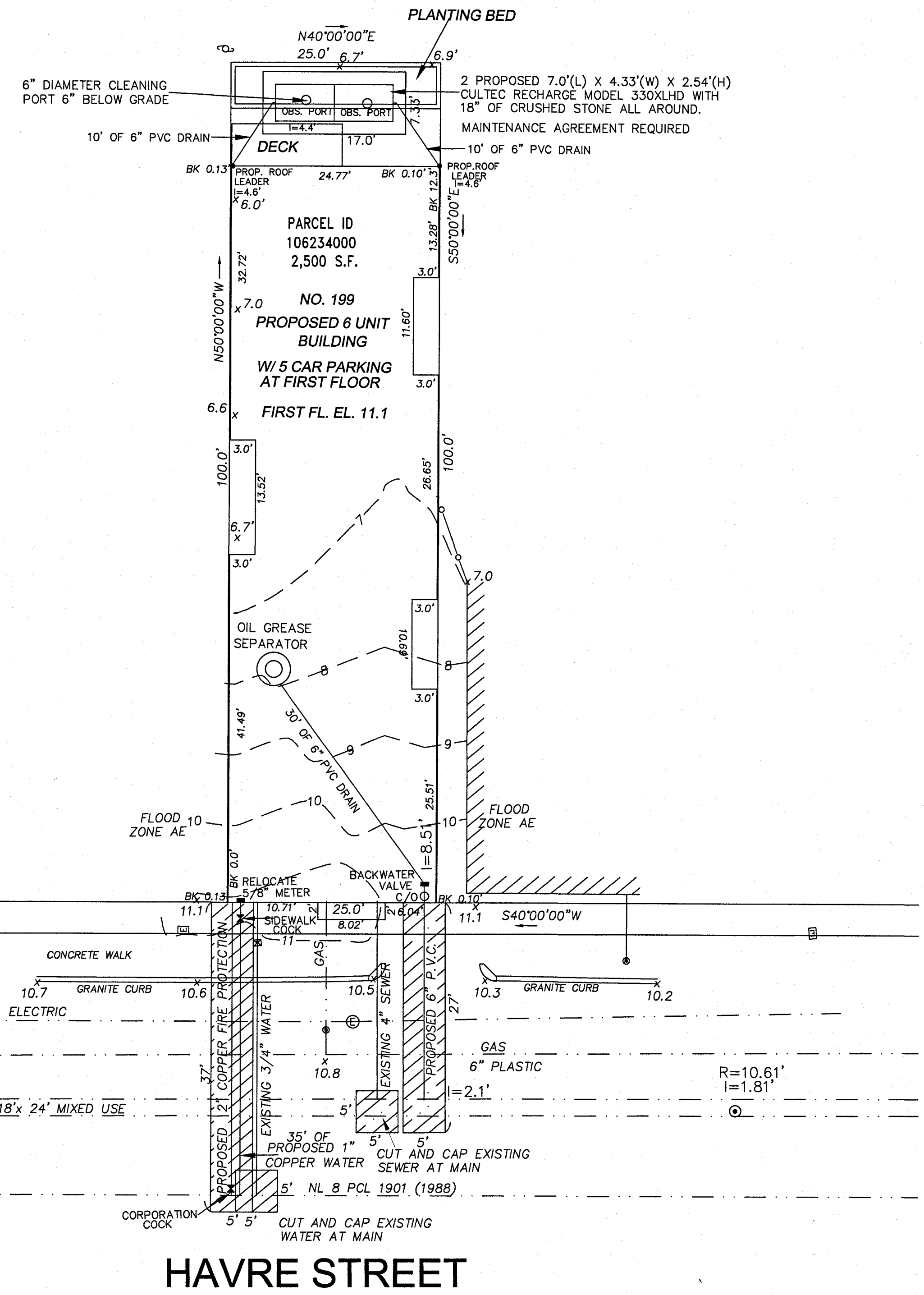
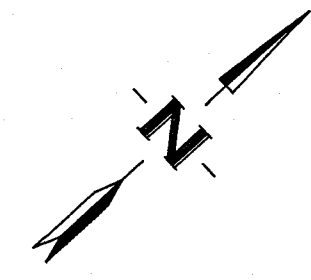


SITE PLAN
EXISTING CONDITIONS
FOR
199 HAVRE STREET
IN
BOSTON, (EAST) MASS.

NEPONSET VALLEY SURVEY ASSOC., INC.
95 WHITE STREET
QUINCY, MA 02269
TEL. 617-472-4867

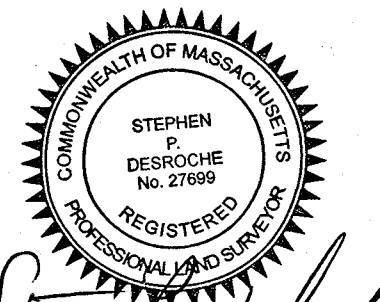
SCALE: 1"=10'
DATE: JANUARY 21, 2019

REFERENCES:
ELEVATIONS NAVD 1988



R=11.90'
I=3.9'

R=10.61'
I=1.81'



Stephen P. Desroche
PROFESSIONAL LAND SURVEYOR

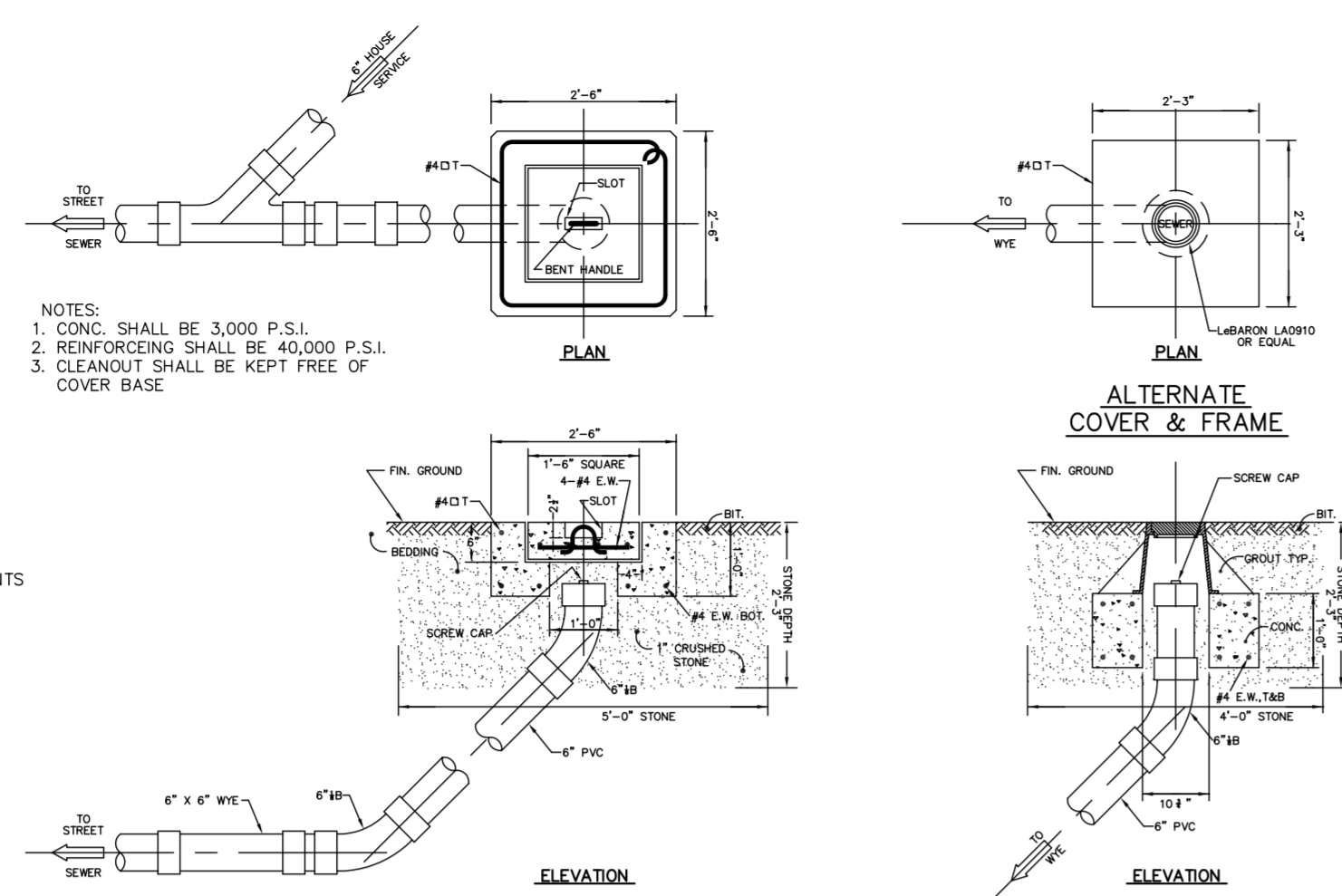
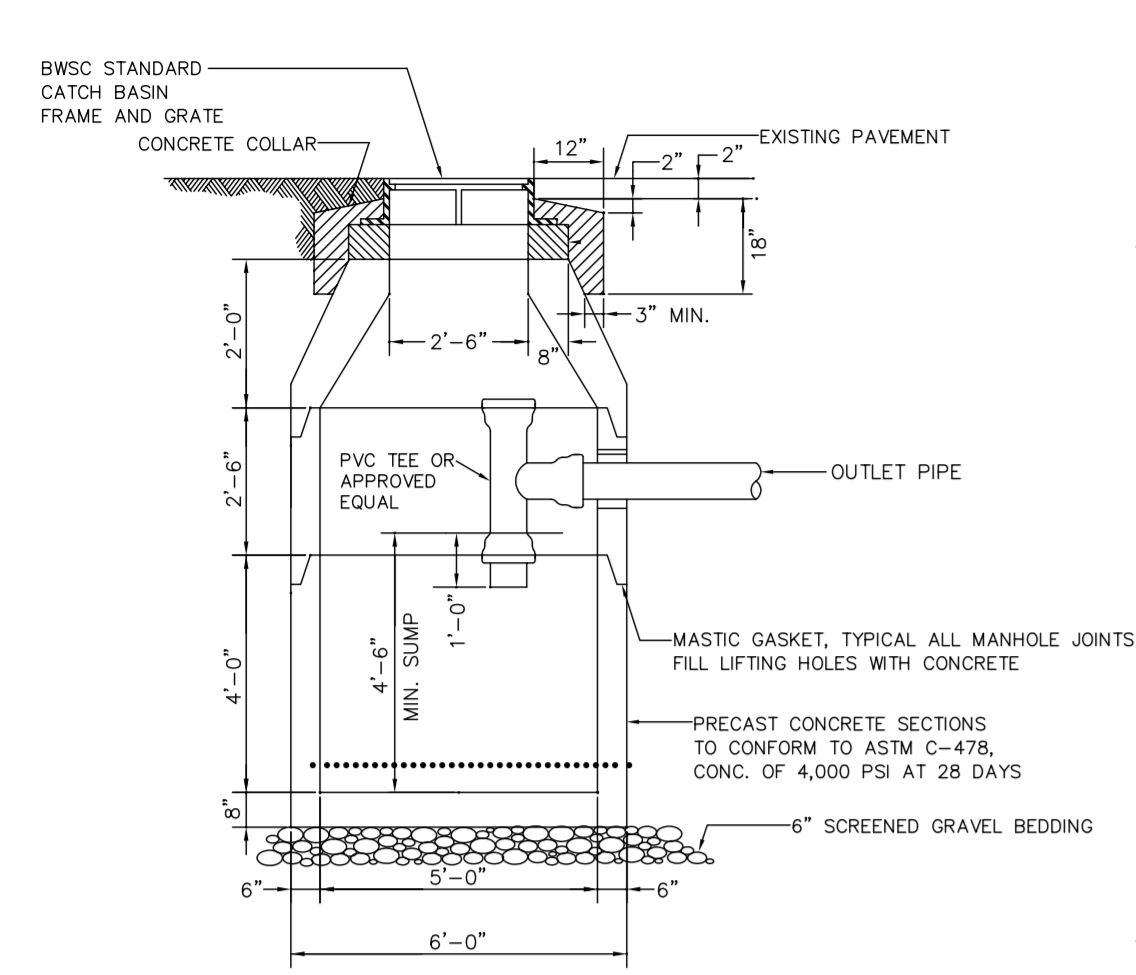
DATE: 3/22/19
0 10 20

PROPOSED BUILDING
FOR
199 HAVRE STREET
IN
BOSTON, (EAST) MASS.

NEPONSET VALLEY SURVEY ASSOC., INC.
95 WHITE STREET
QUINCY, MA 02269
TEL. 617-472-4867

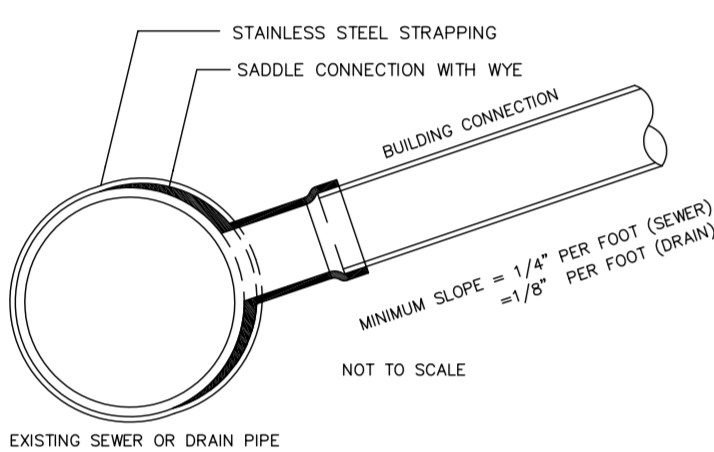
SCALE: 1"=10'
DATE: JANUARY 21, 2019

CATCH BASIN WITH OIL TRAP OUTLET
BOSTON WATER AND SEWER COMMISSION



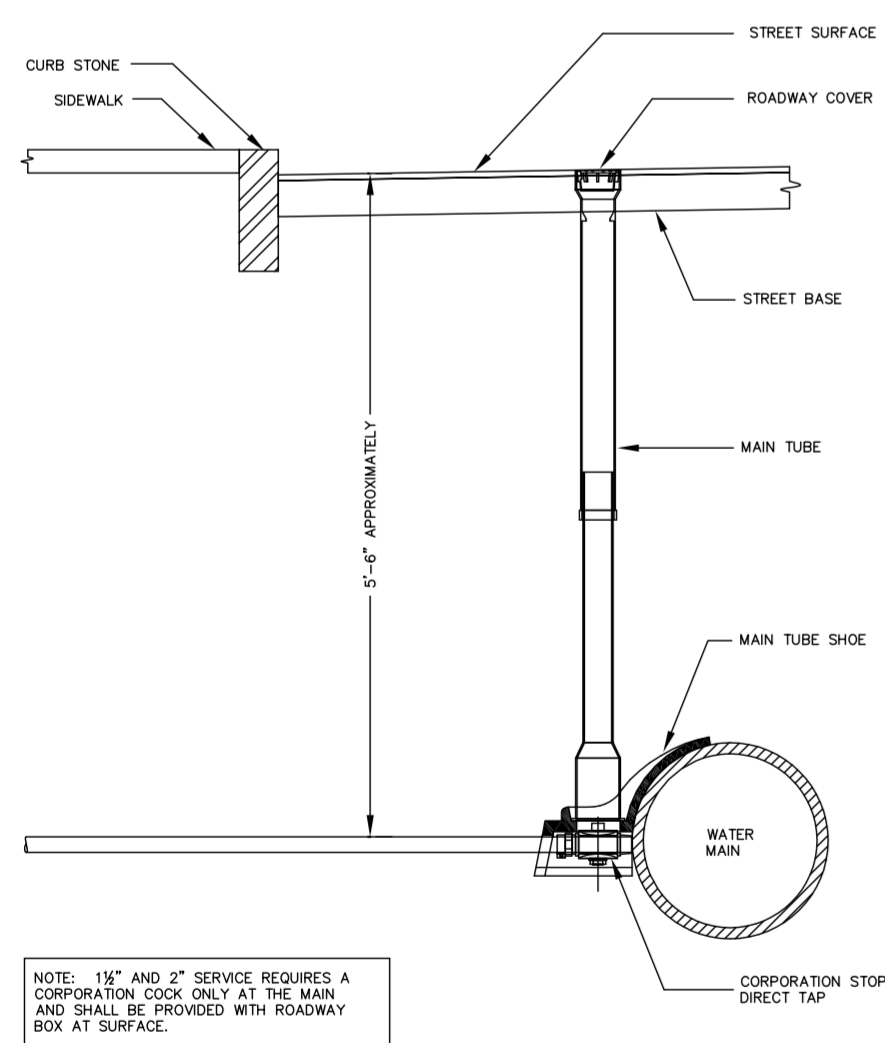
SEWER AND DRAIN CLEANOUT DETAILS
NO SCALE

NOTE: USE THIS DETAIL ONLY IF EXISTING WYE BRANCH IS NOT FOUND IN THE FIELD.

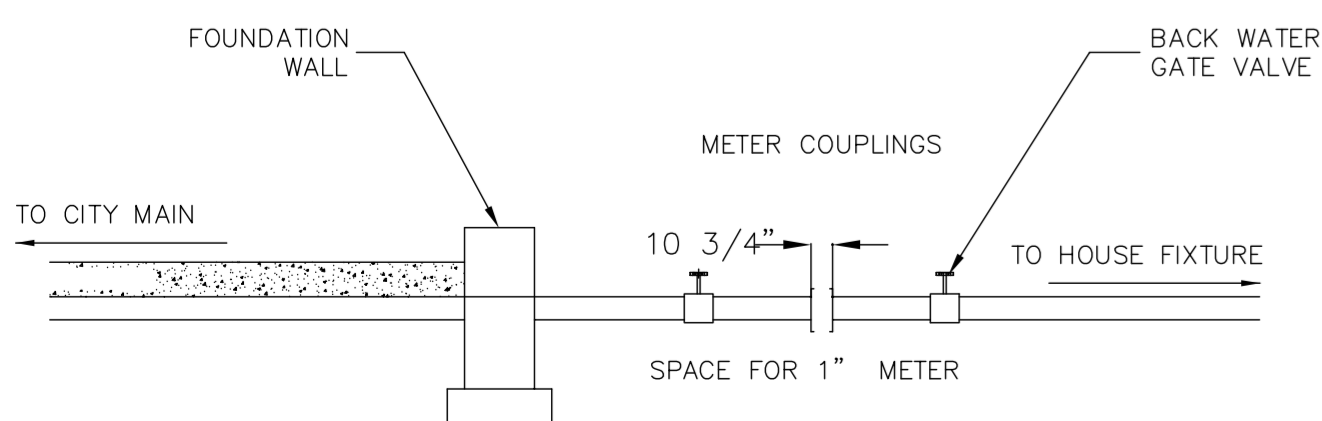


NOTES:
1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRIPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
3. FULL WYE CONNECTION FITTINGS MAY BE USED.
4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.
6. TO BE USED IF AN EXISTING WYE IS NOT FOUND.

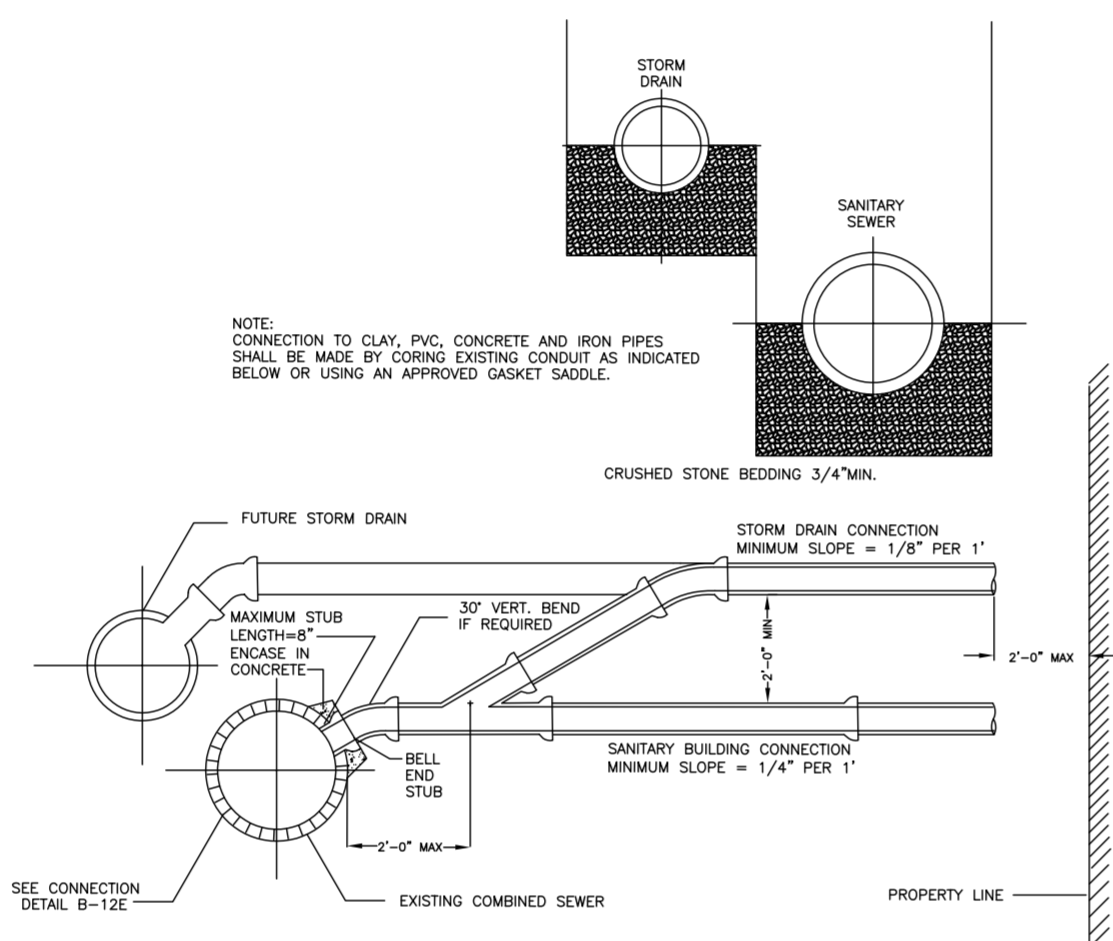
SEWER CONNECTION DETAIL
NOT TO SCALE



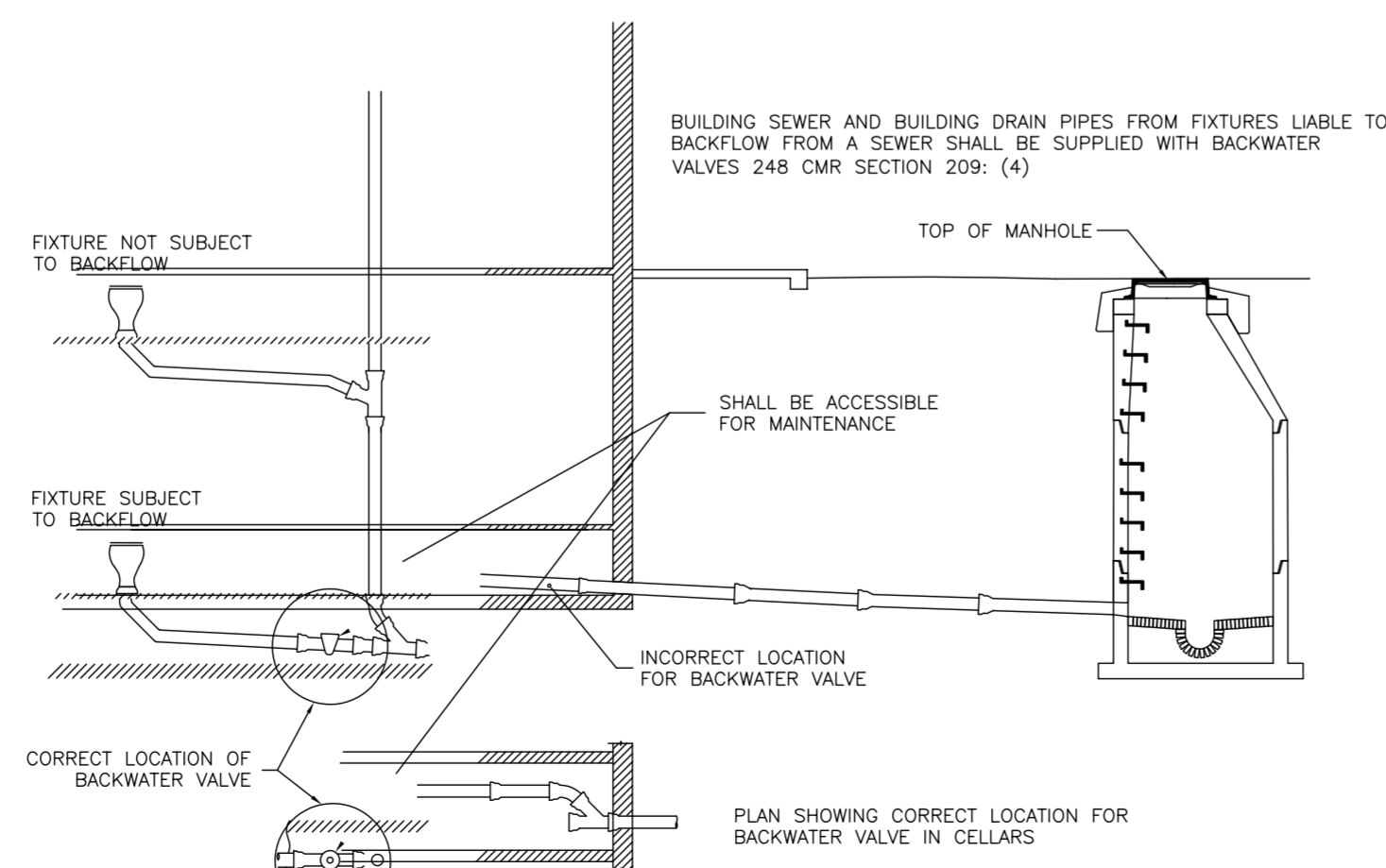
1 1/2" TO 2" WATER CONNECTION DETAIL
NOT TO SCALE



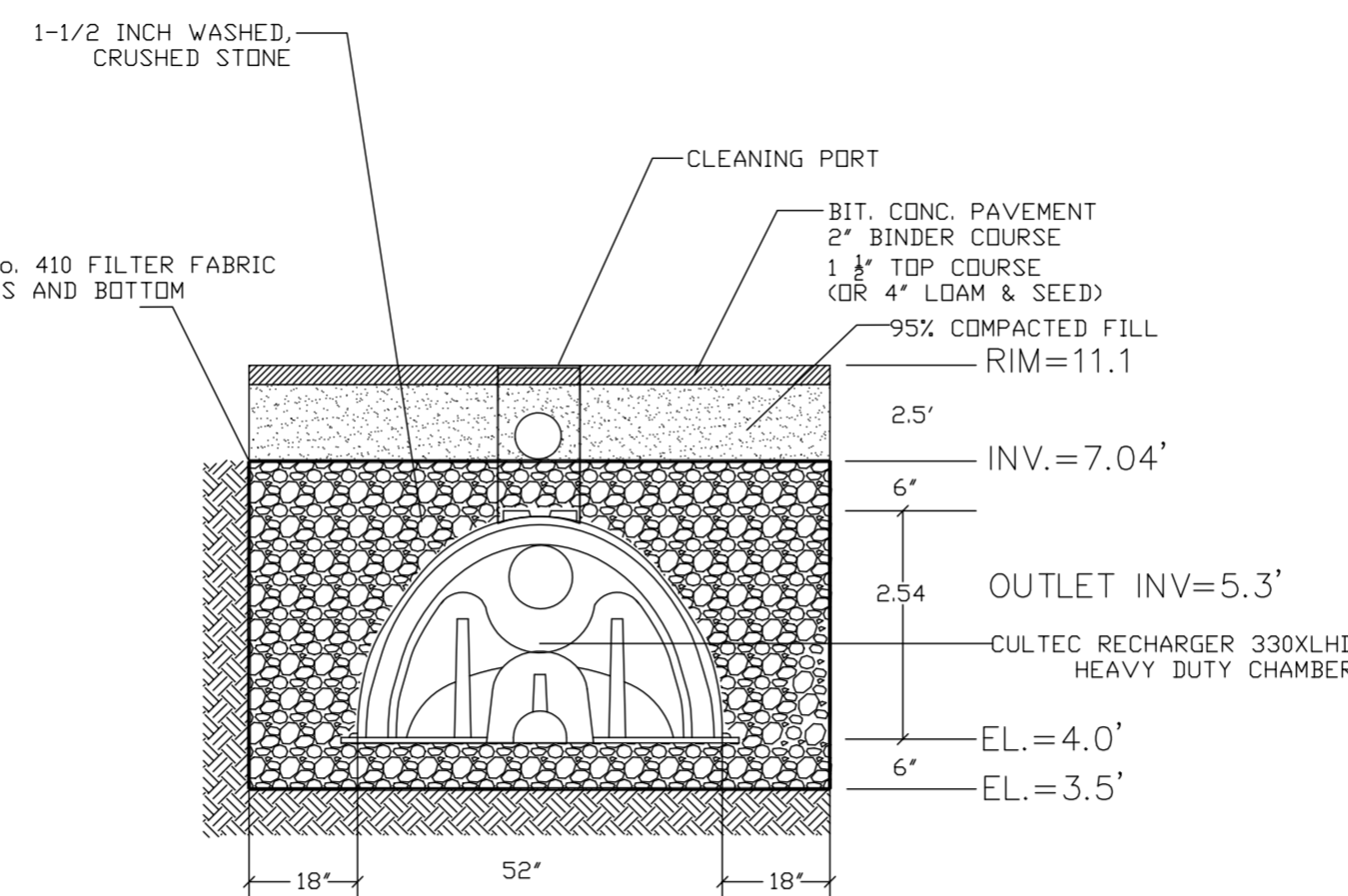
METER SPACING DETAIL
NOT TO SCALE



TYPICAL CONNECTION TO EXISTING COMBINED SEWER
SCALE: NOT TO SCALE



BACKWATER FLOW VALVE DETAIL (DRAIN & SEWER LATERAL)
NOT TO SCALE



GENERAL NOTES:
RECHARGER 330XLHD BY CULTEC, INC. OF BROOKFIELD, CT.
ALL RECHARGER 330XLHD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
ALL RECHARGER 330XLHD HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.

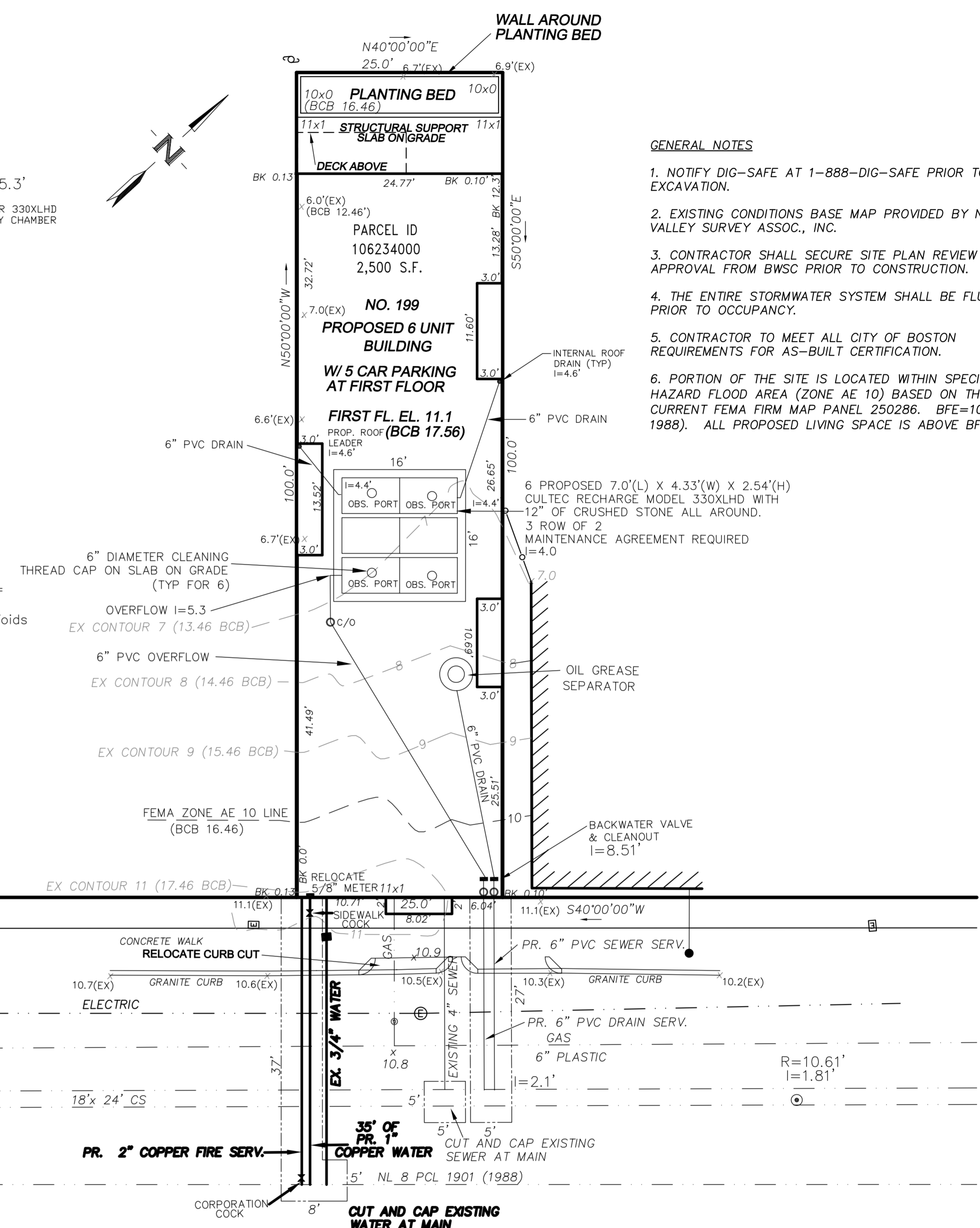
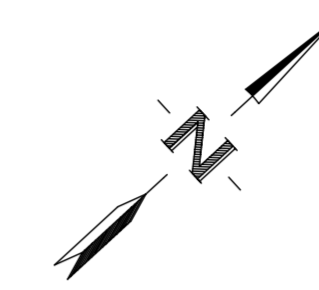
CULTEC RECHARGER 330XLHD CHAMBER SYSTEM
TYPICAL CROSS SECTION DETAIL

STORMWATER CALCULATIONS

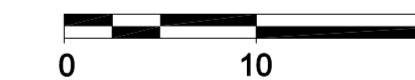
TOTAL IMPERVIOUS AREA = 2,193 S.F.
TOTAL REQUIRED INFILTRATION VOLUME = 2,193 S.F. X 1/12 = 182.8 C.F.
6 Chambers x 52.2 cf + 1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage
1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Void = 432.8 cf Stone Storage
Chamber Storage + Stone Storage = 779.2 cf

EROSION CONTROL NOTES:

- 1) PRIOR TO COMMENCING EARTH DISTURBANCE, INSTALL AND STAKE FILTER SOCK AND MAINTAIN THROUGHOUT ALL CONSTRUCTION.
- 2) ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
- 3) ALL MATERIALS AND STOCKPILES SHALL BE STORED ON UPLAND AREAS. STOCKPILES SHALL BE SURROUNDED BY FILTER SOCK, SHALL HAVE SIDE SLOPES NO GREATER THAN 30% AND SHALL BE SEEDED OR STABILIZED IF LEFT UNDISTURBED FOR TWO WEEKS OR MORE.
- 4) SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED AND MAINTAINED PRIOR TO ANY EVENTS AND PROMPTLY AFTER EACH RAINFALL.
- 5) ANY SLOPE STEEPER THAN 3:1 SHALL BE EQUIPPED WITH JUTE MESH SLOPE STABILIZATION.
- 6) ALL CATCH BASINS SHALL BE PROVIDED WITH FILTER SOCK DIKES UNTIL BASE COURSE IS IN PLACE.
- 7) FILTER SOCK FILLER MATERIAL SHALL BE COMPOSTED MULCH.
- 8) CONTRACTOR TO PROVIDE A STABILIZED STONE LINE CONSTRUCTION ENTRANCE FOR CONSTRUCTION EQUIPMENTS TO ENTRANCE/EGRESS THE SITE.
- 9) CONTRACTOR TO PROVIDE DUST CONTROL AND TO PREVENT WIND BLOWN DEBRIS THROUGH-OUT THE CONSTRUCTION PERIOD.



HAVRE STREET



DATUM REFERENCES:

Elevations shown are on NAVD 1988
Convert NAVD 88 to BCB, +6.46'



CHI Y. MAN, PE
P.E. LIC.# 45441
DATE: 4-2-2019

HARDY + MAN DESIGN GROUP, PC
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
NOI Site Plan

SHEET
C-1

PROPOSED BUILDING
FOR
199 HAVRE STREET
IN
BOSTON, (EAST) MASS.

NEPONSET VALLEY SURVEY ASSOC., INC.
95 WHITE STREET
QUINCY, MA 02269
TEL. 617-472-4887

SCALE: 1"=10'
DATE: FEBRUARY 26, 2019
REVISED: 3/8/2019
REVISED: 3/22/2019
REVISED: 4/2/2019

GENERAL NOTES

1. NOTIFY DIG-SAFE AT 1-888-DIG-SAFE PRIOR TO EXCAVATION.
2. EXISTING CONDITIONS BASE MAP PROVIDED BY NEPONSET VALLEY SURVEY ASSOC., INC.
3. CONTRACTOR SHALL SECURE SITE PLAN REVIEW APPROVAL FROM BWSC PRIOR TO CONSTRUCTION.
4. THE ENTIRE STORMWATER SYSTEM SHALL BE FLUSHED PRIOR TO OCCUPANCY.
5. CONTRACTOR TO MEET ALL CITY OF BOSTON REQUIREMENTS FOR AS-BUILT CERTIFICATION.
6. PORTION OF THE SITE IS LOCATED WITHIN SPECIAL HAZARD FLOOD AREA (ZONE AE 10) BASED ON THE MOST CURRENT FEMA FIRM MAP PANEL 250286. BFE=10 (NAVD 1988). ALL PROPOSED LIVING SPACE IS ABOVE BFE 10.

Drainage Report

For:

199 Havre Street
Boston, MA

Prepared For:
Rise Realty
226 Harvard Street
Brookline, MA

Prepared By:



Hardy + Man Design Group, PC
1285 Washington Street
Weymouth, MA 02189

February 28, 2019



3-5-2019

Existing Site Conditions

The existing site is a 2,500 SF parcel of land located at 199 Havre Street between Marion Street and George R. Visconti Road in the Central Square area of East Boston. The parcel currently contains a three-story multi-family residence and a parking area which will be demolished.

The topography of the site slopes toward the northwest from an approximate elevation of 11 feet (NAVD 88 datum) along Havre Street to an approximate elevation of 6 feet toward the back of the site. No stormwater controls exist on the site and the topography directs the stormwater to the northwest.

A portion of the site is within FEMA Flood Zone AE 10. The flooding in the area is due to coastal storm flowage. The subject site is a coastal community that super high tide will cause flooding up to the elevation of 10, NAVD 1988.

A geotechnical report summarizes the existing site soil conditions. Test borings performed indicate that the site is primarily fill until a depth of about 12.5 feet, at which the soil is primarily sand.

Methodology

This drainage analysis will utilize TR-55 drainage guidelines which is an industry standard for urban hydrology small watersheds. The accompanying calculations analyze the increase in runoff from the proposed site development under a 24-hour 6.8-inch rain event, which is approximate to a 100-year storm event. Calculations were also performed for 25-year, 10-year, and 2-year storm events.

Proposed Conditions

The applicant proposes the construction of a four-story six-unit residential building. Five parking spaces will be located under the building. The building units share a driveway entrance from Havre Street. The first floor of the building is designed to be elevated above the FEMA Zone AE flooding elevation of 10 NAVD of 1988.

The proposed impervious coverage on the site will increase from 1,246 SF to 2,200 SF, resulting in 954 SF of new impervious area. Runoff from the proposed roof will be routed into (6) 330XLHD Cultec chambers. The proposed chambers and surrounding stone will provide a total of 779.2 cubic feet of storage and were sized designed to match existing peak flowrates for the 2-year, 10-year, 25-year, and 100-year rainfall events.

The following table depicts the peak runoff rates and volumes for the existing and proposed conditions for each storm event.

Peak Discharge Rates (cfs)

	2-year	10-year	25-year	100-year
Existing Conditions	0.14	0.22	0.27	0.35
Proposed Conditions	0.01	0.08	0.19	0.33

Runoff Volume (af)

	2-year	10-year	25-year	100-year
Existing Conditions	0.010	0.015	0.019	0.025
Proposed Conditions	0.001	0.006	0.010	0.015

The proposed infiltration system was also designed to infiltrate the required recharge volume within 72 hours.

Erosion and Sedimentation Control Measures

Erosion control measures to be employed include a staked “Filter Sock” erosion control barrier as depicted in the site plan. The barrier shall be inspected daily and be kept in place until such time that disturbed areas are re-vegetated or paved and are no longer a potential source of siltation.

Conclusion

The stormwater management system will reduce the stormwater runoff flowrate by providing an on-site infiltration system. This system is composed of (6) 330XLHD Cultec chambers and has been sized to reduce existing peak flowrates and runoff volumes for the 2-year, 10-year, 25-year, and 100-year rainfall events.

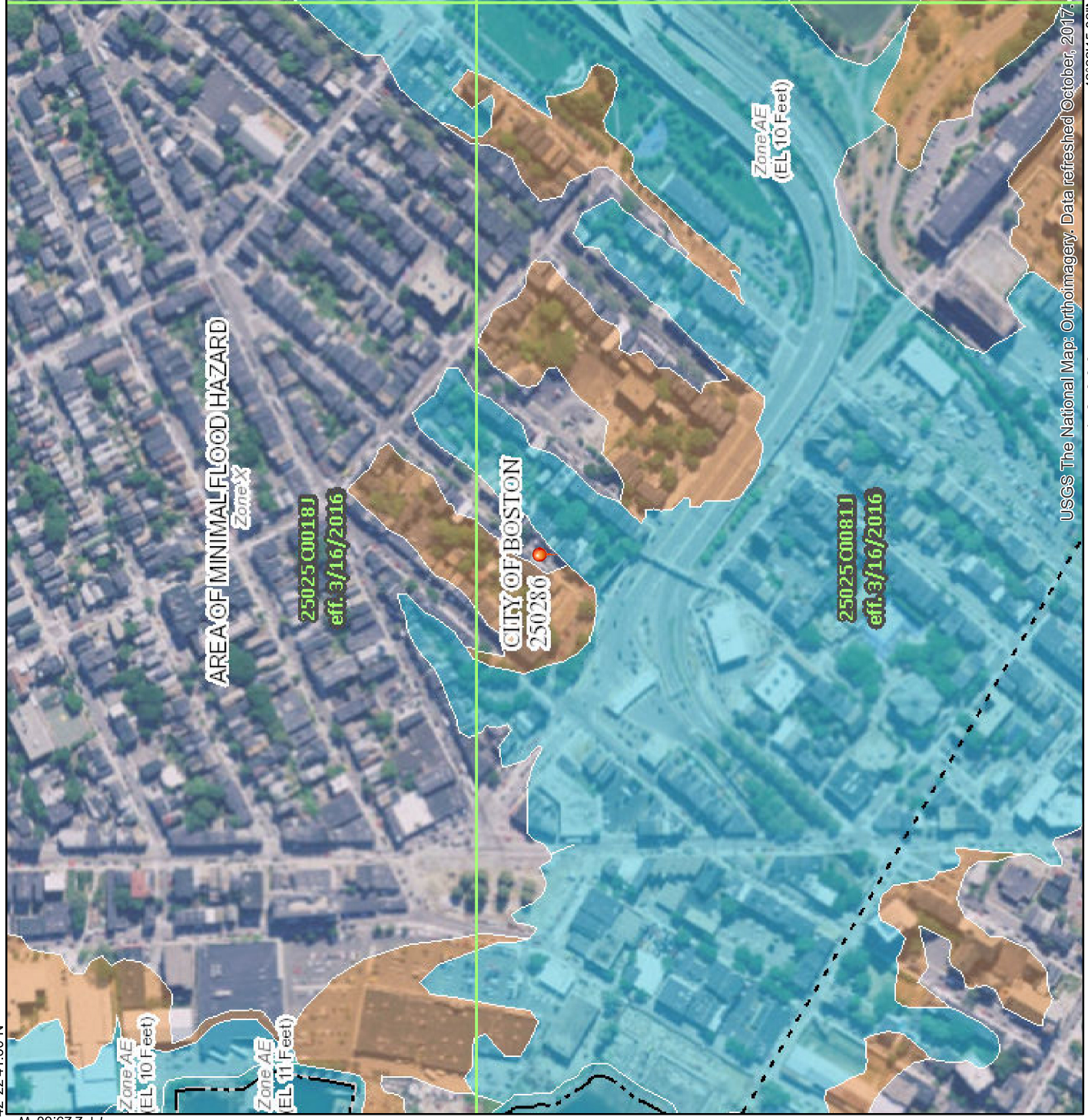
During construction, the proposed erosion control measures protect sedimentation from construction activities from migrating from the site onto the public street and abutting properties.

The proposed stormwater management and erosion control design of the proposed development will meet the City of Boston Stormwater Ordinance.

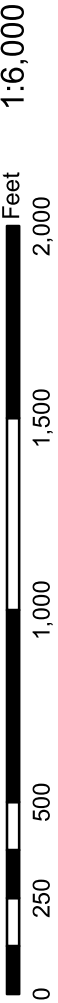
National Flood Hazard Layer FIRMette



42°22'41.60"N
71°2'29.60"W



USGS The National Map: Orthoimagery. Data refreshed October, 2017.
42°22'15.02"N
71°1'52.14"W



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, A99
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **3/5/2019 at 12:59:13 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Infiltration Structure Sizing Calculations

100-year storm = 6.8 inches

Cultec 330XLHD Volume = 52.2 cf

Volume of Infiltration Systems

6 Chambers x 52.2 cf + 1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Voids = 432.8 cf Stone Storage

Chamber Storage + Stone Storage = 779.2 cf

Massachusetts Stormwater Standards - Required Recharge Volume

$R_v = F \times \text{Impervious Area}$

Where:

R_v = Required Recharged Volume

F = Target Depth Factor, for Type C Soils = 0.25 inches

Impervious Area = 2,200 sf

$R_v = 0.25 \text{ inches} \times 1 \text{ ft}/12 \text{ inches} \times 2,200 \text{ sf} = \underline{45.8 \text{ cf}}$

Time to Infiltrate – Static Method

Time to Infiltrate = $R_v / (K \times \text{Bottom of Stone Area} \times n)$

Where

R_v = Required Recharged Volume = 45.8 cf

K = Rawls Rate (per Table 2.3.3 in the Mass Stormwater Handbook) = 0.27 in/hr for Silt Loam

n = stone voids = 0.40

Bottom of stone area = 18.5 ft x 17 ft = 314.5 sf

Time to Infiltrate = $45.8 \text{ cf} / (0.27 \text{ in/hr} \times 1 \text{ ft}/12 \text{ inches} \times 314.5 \text{ sf} \times 0.40) = \underline{16.1 \text{ hours}}$

16.1 hours < 72 hours : Meets Standard

Stormwater Operation and Maintenance Plan

199 Havre
East Boston, MA
February 18, 2019

Stormwater Management System Owner:

Property Owner

The following Operation and Maintenance Plan is intended as a guide for maintaining the structural and non-structural BMP's post-construction. In order to document maintenance activities, the attached maintenance log should be kept on site. A minimum of two years' worth of records should be up to date and available for review and inspection, if requested by City officials. The transfer of ownership (e.g. from developer to condo association) also includes the transfer of the maintenance obligation to the new owners. In order to ensure the proposed stormwater management system continues to function as designed and to prevent any adverse impacts down-gradient, proper maintenance is required. This maintenance plan shall be recorded at the Norfolk Registry of Deeds.

Operation and Maintenance Plan During Construction

All erosion and sediment control measures must be in place prior to any disturbance.

Inlet Protection: catch basins shall be protected from siltation during construction through the use of siltation fabric. The siltation fabric must be installed under the catch basin grates and the grates must be secured to prevent untreated seepage. The fabric should be inspected daily and immediately after a rainstorm. Sediment deposits must be removed promptly and fabric must be repaired as necessary.

Perimeter Silt Protection: A "Silt Sock" (or approved equal) perimeter fence must be installed around the perimeter of work limits and material stockpiles. Installation shall be in accordance with manufacturer specifications and attached details. Silt fence shall be inspected daily. Trapped sediments shall be removed and repairs shall be made promptly.

Operation and Maintenance Activities

Infiltration Basin Inspection and Cleaning: The subsurface infiltration basin does not require regular maintenance if pretreatment devices since only roof flows are connected to it. The system has inspection ports that should be inspected when the other on-site stormwater devices are inspected. If sediment build-up within the retention system is

found during inspection, the sediment shall be removed by vacuumed method through the inspection ports.

Snow and Ice: During winter snow season, snow shall be mechanically removed. Snow shall be stock pile at the landscape areas on-site where it can naturally melt. Snow melt runoff can then be slowly infiltrated into the ground or treated by the stormwater management system. If excessive snow encountered, the excessive snow shall be removed by a private contractor for off-site disposal. At no time snow shall be pushed off site to the public right of way of abutting lands.



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.

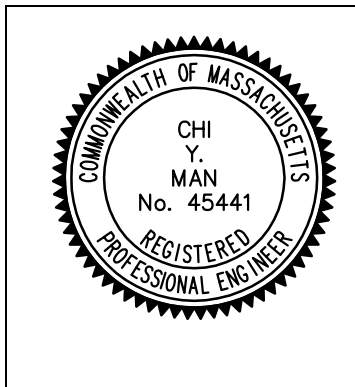
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



3-5-2019

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): Infiltration

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)

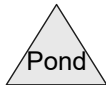
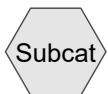
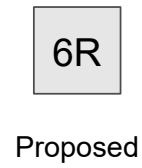
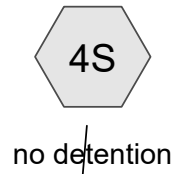
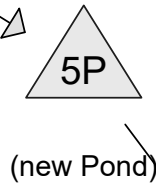
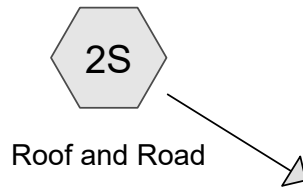
- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and 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.



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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.029	98	(6S)
0.036	74	>75% Grass cover, Good, HSG C (4S, 6S)
0.051	98	Roofs, HSG C (2S)
0.115	91	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.086	HSG C	2S, 4S, 6S
0.000	HSG D	
0.029	Other	6S
0.115		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.029	0.029		6S
0.000	0.000	0.036	0.000	0.000	0.036	>75% Grass cover, Good	4S, 6S
0.000	0.000	0.051	0.000	0.000	0.051	Roofs	2S
0.000	0.000	0.086	0.000	0.029	0.115	TOTAL AREA	

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 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 2S: Roof and Road Runoff Area=2,200 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=98 Runoff=0.17 cfs 0.013 af

Subcatchment 4S: no detention Runoff Area=300 sf 0.00% Impervious Runoff Depth=1.17"
Tc=5.0 min CN=74 Runoff=0.01 cfs 0.001 af

Subcatchment 6S: Existing Runoff Area=2,500 sf 49.84% Impervious Runoff Depth=2.01"
Tc=5.0 min CN=86 Runoff=0.14 cfs 0.010 af

Reach 6R: Proposed Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Pond 5P: (new Pond) Peak Elev=5.33' Storage=0.008 af Inflow=0.17 cfs 0.013 af
Discarded=0.00 cfs 0.013 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.013 af

Total Runoff Area = 0.115 ac Runoff Volume = 0.024 af Average Runoff Depth = 2.47"
31.08% Pervious = 0.036 ac 68.92% Impervious = 0.079 ac

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Summary for Subcatchment 2S: Roof and Road

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.013 af, Depth= 3.17"

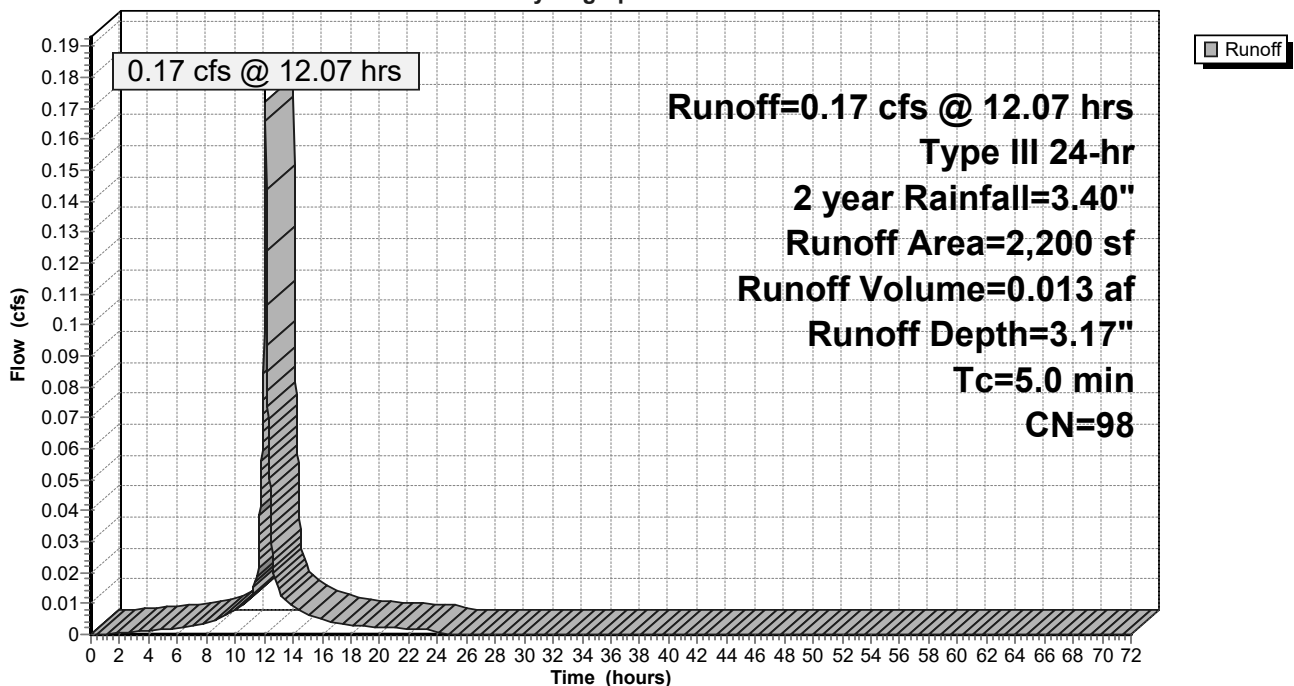
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.40"

Area (sf)	CN	Description
2,200	98	Roofs, HSG C
2,200		100.00% Impervious Area

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

Subcatchment 2S: Roof and Road

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 2 year Rainfall=3.40"*

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Hydrograph for Subcatchment 2S: Roof and Road

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.40	3.17	0.00
1.00	0.03	0.00	0.00	53.00	3.40	3.17	0.00
2.00	0.07	0.00	0.00	54.00	3.40	3.17	0.00
3.00	0.10	0.02	0.00	55.00	3.40	3.17	0.00
4.00	0.15	0.04	0.00	56.00	3.40	3.17	0.00
5.00	0.19	0.06	0.00	57.00	3.40	3.17	0.00
6.00	0.24	0.10	0.00	58.00	3.40	3.17	0.00
7.00	0.31	0.15	0.00	59.00	3.40	3.17	0.00
8.00	0.39	0.22	0.00	60.00	3.40	3.17	0.00
9.00	0.50	0.31	0.01	61.00	3.40	3.17	0.00
10.00	0.64	0.45	0.01	62.00	3.40	3.17	0.00
11.00	0.85	0.65	0.01	63.00	3.40	3.17	0.00
12.00	1.70	1.48	0.12	64.00	3.40	3.17	0.00
13.00	2.55	2.32	0.01	65.00	3.40	3.17	0.00
14.00	2.76	2.53	0.01	66.00	3.40	3.17	0.00
15.00	2.90	2.67	0.01	67.00	3.40	3.17	0.00
16.00	3.01	2.78	0.00	68.00	3.40	3.17	0.00
17.00	3.09	2.86	0.00	69.00	3.40	3.17	0.00
18.00	3.16	2.92	0.00	70.00	3.40	3.17	0.00
19.00	3.21	2.97	0.00	71.00	3.40	3.17	0.00
20.00	3.25	3.02	0.00	72.00	3.40	3.17	0.00
21.00	3.30	3.06	0.00				
22.00	3.33	3.10	0.00				
23.00	3.37	3.14	0.00				
24.00	3.40	3.17	0.00				
25.00	3.40	3.17	0.00				
26.00	3.40	3.17	0.00				
27.00	3.40	3.17	0.00				
28.00	3.40	3.17	0.00				
29.00	3.40	3.17	0.00				
30.00	3.40	3.17	0.00				
31.00	3.40	3.17	0.00				
32.00	3.40	3.17	0.00				
33.00	3.40	3.17	0.00				
34.00	3.40	3.17	0.00				
35.00	3.40	3.17	0.00				
36.00	3.40	3.17	0.00				
37.00	3.40	3.17	0.00				
38.00	3.40	3.17	0.00				
39.00	3.40	3.17	0.00				
40.00	3.40	3.17	0.00				
41.00	3.40	3.17	0.00				
42.00	3.40	3.17	0.00				
43.00	3.40	3.17	0.00				
44.00	3.40	3.17	0.00				
45.00	3.40	3.17	0.00				
46.00	3.40	3.17	0.00				
47.00	3.40	3.17	0.00				
48.00	3.40	3.17	0.00				
49.00	3.40	3.17	0.00				
50.00	3.40	3.17	0.00				
51.00	3.40	3.17	0.00				

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Summary for Subcatchment 4S: no detention

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 1.17"

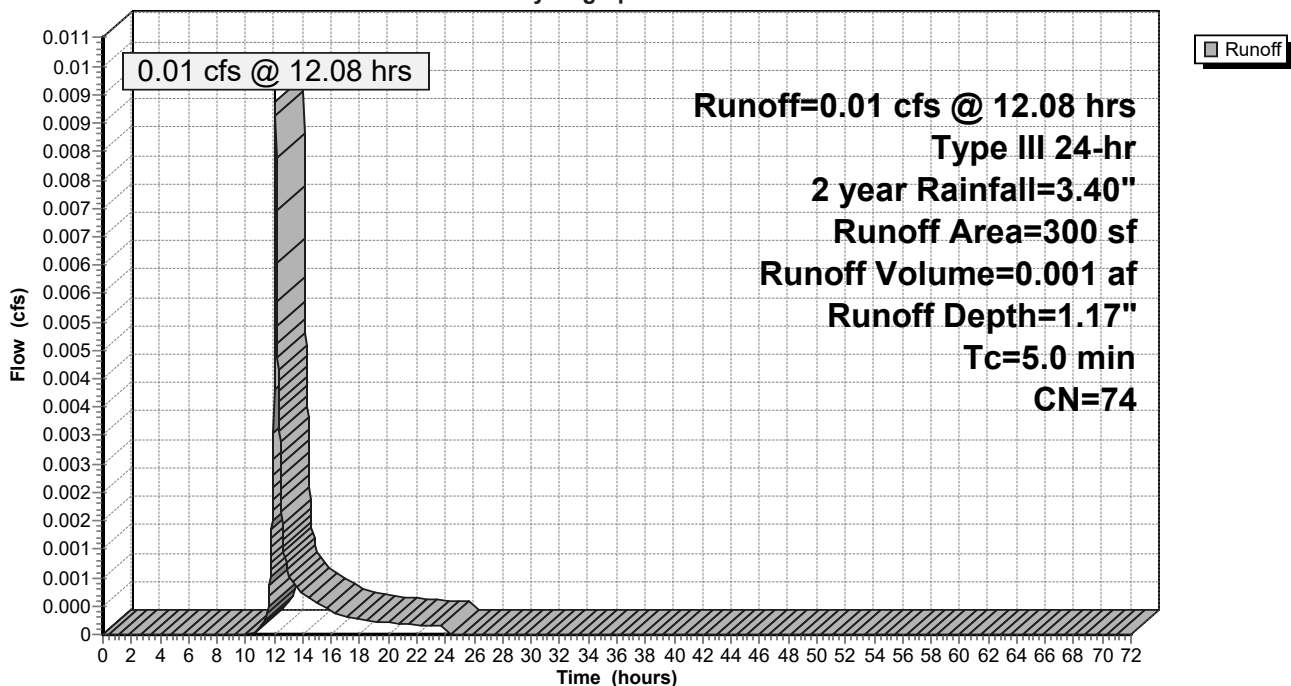
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.40"

Area (sf)	CN	Description
300	74	>75% Grass cover, Good, HSG C
300		100.00% Pervious Area

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

Subcatchment 4S: no detention

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 2 year Rainfall=3.40"*

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Hydrograph for Subcatchment 4S: no detention

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.40	1.17	0.00
1.00	0.03	0.00	0.00	53.00	3.40	1.17	0.00
2.00	0.07	0.00	0.00	54.00	3.40	1.17	0.00
3.00	0.10	0.00	0.00	55.00	3.40	1.17	0.00
4.00	0.15	0.00	0.00	56.00	3.40	1.17	0.00
5.00	0.19	0.00	0.00	57.00	3.40	1.17	0.00
6.00	0.24	0.00	0.00	58.00	3.40	1.17	0.00
7.00	0.31	0.00	0.00	59.00	3.40	1.17	0.00
8.00	0.39	0.00	0.00	60.00	3.40	1.17	0.00
9.00	0.50	0.00	0.00	61.00	3.40	1.17	0.00
10.00	0.64	0.00	0.00	62.00	3.40	1.17	0.00
11.00	0.85	0.01	0.00	63.00	3.40	1.17	0.00
12.00	1.70	0.22	0.01	64.00	3.40	1.17	0.00
13.00	2.55	0.64	0.00	65.00	3.40	1.17	0.00
14.00	2.76	0.76	0.00	66.00	3.40	1.17	0.00
15.00	2.90	0.85	0.00	67.00	3.40	1.17	0.00
16.00	3.01	0.92	0.00	68.00	3.40	1.17	0.00
17.00	3.09	0.97	0.00	69.00	3.40	1.17	0.00
18.00	3.16	1.01	0.00	70.00	3.40	1.17	0.00
19.00	3.21	1.04	0.00	71.00	3.40	1.17	0.00
20.00	3.25	1.07	0.00	72.00	3.40	1.17	0.00
21.00	3.30	1.10	0.00				
22.00	3.33	1.13	0.00				
23.00	3.37	1.15	0.00				
24.00	3.40	1.17	0.00				
25.00	3.40	1.17	0.00				
26.00	3.40	1.17	0.00				
27.00	3.40	1.17	0.00				
28.00	3.40	1.17	0.00				
29.00	3.40	1.17	0.00				
30.00	3.40	1.17	0.00				
31.00	3.40	1.17	0.00				
32.00	3.40	1.17	0.00				
33.00	3.40	1.17	0.00				
34.00	3.40	1.17	0.00				
35.00	3.40	1.17	0.00				
36.00	3.40	1.17	0.00				
37.00	3.40	1.17	0.00				
38.00	3.40	1.17	0.00				
39.00	3.40	1.17	0.00				
40.00	3.40	1.17	0.00				
41.00	3.40	1.17	0.00				
42.00	3.40	1.17	0.00				
43.00	3.40	1.17	0.00				
44.00	3.40	1.17	0.00				
45.00	3.40	1.17	0.00				
46.00	3.40	1.17	0.00				
47.00	3.40	1.17	0.00				
48.00	3.40	1.17	0.00				
49.00	3.40	1.17	0.00				
50.00	3.40	1.17	0.00				
51.00	3.40	1.17	0.00				

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Summary for Subcatchment 6S: Existing

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 2.01"

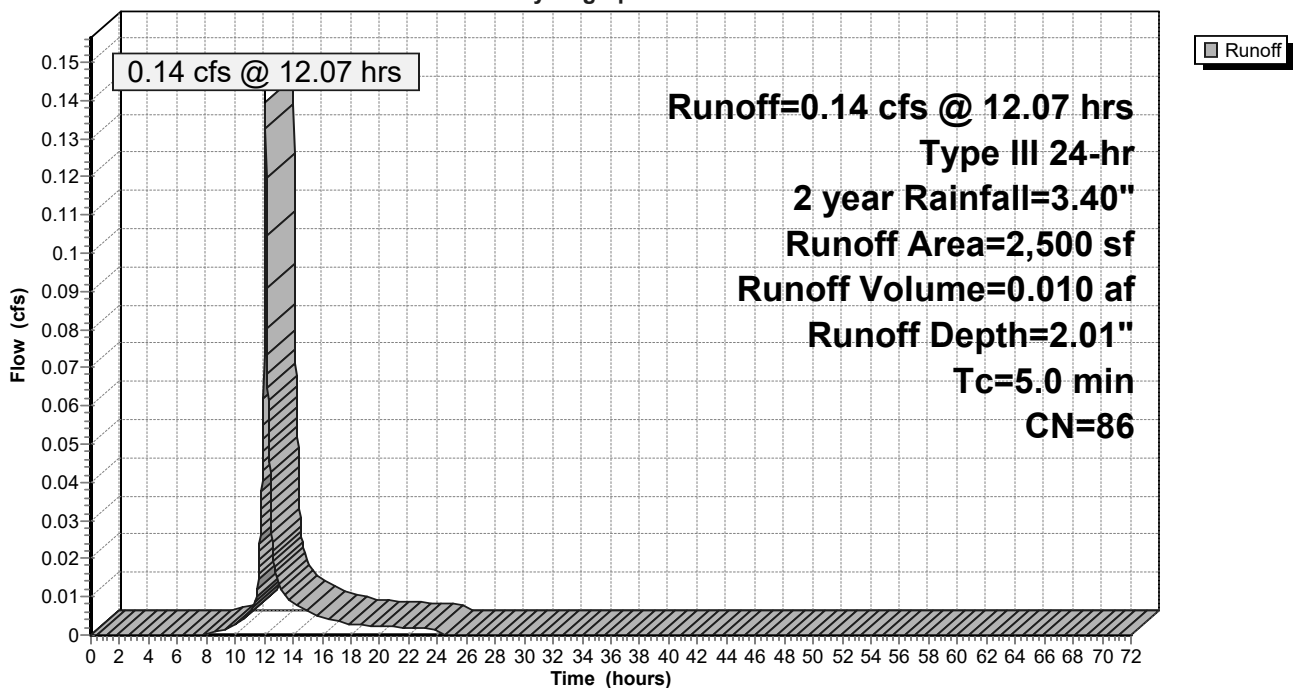
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.40"

	Area (sf)	CN	Description
*	1,246	98	
	1,254	74	>75% Grass cover, Good, HSG C
	2,500	86	Weighted Average
	1,254		50.16% Pervious Area
	1,246		49.84% Impervious Area

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

Subcatchment 6S: Existing

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 2 year Rainfall=3.40"*

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Hydrograph for Subcatchment 6S: Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.40	2.01	0.00
1.00	0.03	0.00	0.00	53.00	3.40	2.01	0.00
2.00	0.07	0.00	0.00	54.00	3.40	2.01	0.00
3.00	0.10	0.00	0.00	55.00	3.40	2.01	0.00
4.00	0.15	0.00	0.00	56.00	3.40	2.01	0.00
5.00	0.19	0.00	0.00	57.00	3.40	2.01	0.00
6.00	0.24	0.00	0.00	58.00	3.40	2.01	0.00
7.00	0.31	0.00	0.00	59.00	3.40	2.01	0.00
8.00	0.39	0.00	0.00	60.00	3.40	2.01	0.00
9.00	0.50	0.02	0.00	61.00	3.40	2.01	0.00
10.00	0.64	0.05	0.00	62.00	3.40	2.01	0.00
11.00	0.85	0.13	0.01	63.00	3.40	2.01	0.00
12.00	1.70	0.63	0.09	64.00	3.40	2.01	0.00
13.00	2.55	1.28	0.01	65.00	3.40	2.01	0.00
14.00	2.76	1.46	0.01	66.00	3.40	2.01	0.00
15.00	2.90	1.58	0.01	67.00	3.40	2.01	0.00
16.00	3.01	1.67	0.00	68.00	3.40	2.01	0.00
17.00	3.09	1.74	0.00	69.00	3.40	2.01	0.00
18.00	3.16	1.80	0.00	70.00	3.40	2.01	0.00
19.00	3.21	1.84	0.00	71.00	3.40	2.01	0.00
20.00	3.25	1.88	0.00	72.00	3.40	2.01	0.00
21.00	3.30	1.92	0.00				
22.00	3.33	1.95	0.00				
23.00	3.37	1.98	0.00				
24.00	3.40	2.01	0.00				
25.00	3.40	2.01	0.00				
26.00	3.40	2.01	0.00				
27.00	3.40	2.01	0.00				
28.00	3.40	2.01	0.00				
29.00	3.40	2.01	0.00				
30.00	3.40	2.01	0.00				
31.00	3.40	2.01	0.00				
32.00	3.40	2.01	0.00				
33.00	3.40	2.01	0.00				
34.00	3.40	2.01	0.00				
35.00	3.40	2.01	0.00				
36.00	3.40	2.01	0.00				
37.00	3.40	2.01	0.00				
38.00	3.40	2.01	0.00				
39.00	3.40	2.01	0.00				
40.00	3.40	2.01	0.00				
41.00	3.40	2.01	0.00				
42.00	3.40	2.01	0.00				
43.00	3.40	2.01	0.00				
44.00	3.40	2.01	0.00				
45.00	3.40	2.01	0.00				
46.00	3.40	2.01	0.00				
47.00	3.40	2.01	0.00				
48.00	3.40	2.01	0.00				
49.00	3.40	2.01	0.00				
50.00	3.40	2.01	0.00				
51.00	3.40	2.01	0.00				

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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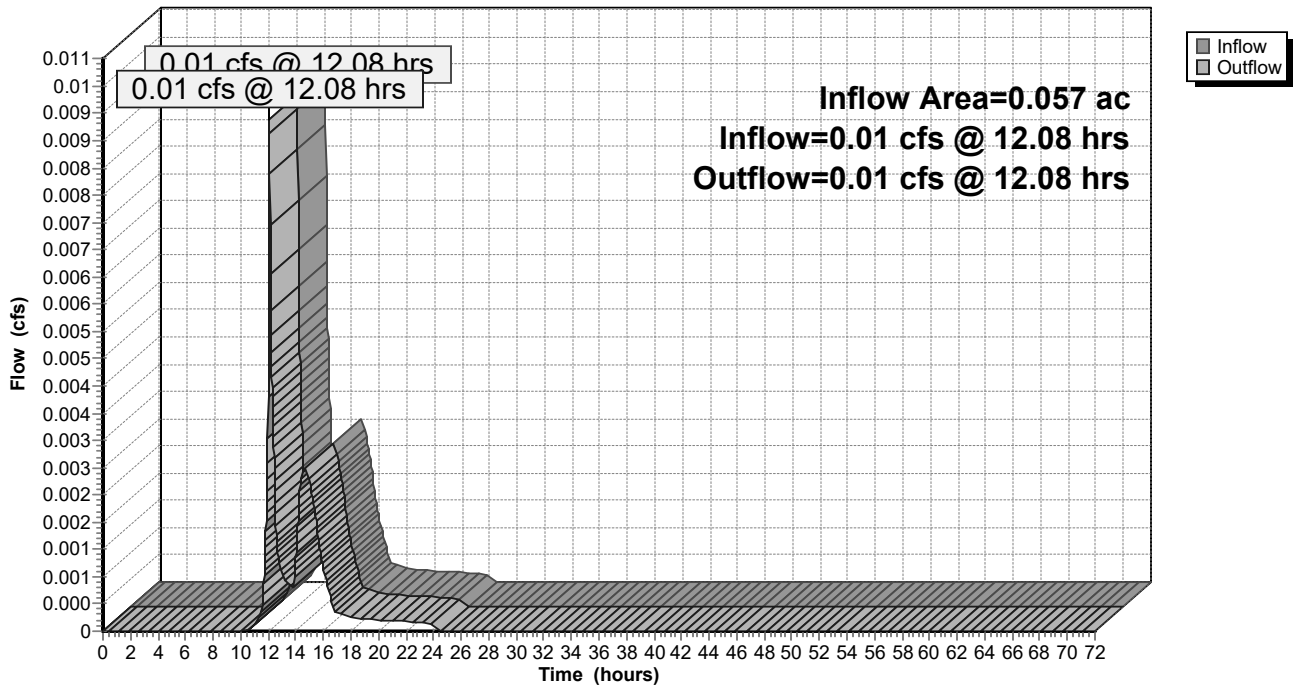
Summary for Reach 6R: Proposed

Inflow Area = 0.057 ac, 88.00% Impervious, Inflow Depth = 0.21" for 2 year event
Inflow = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af
Outflow = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Reach 6R: Proposed

Hydrograph



Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Hydrograph for Reach 6R: Proposed

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.00		0.00
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.01		0.01	64.00	0.00		0.00
13.00	0.00		0.00	65.00	0.00		0.00
14.00	0.00		0.00	66.00	0.00		0.00
15.00	0.00		0.00	67.00	0.00		0.00
16.00	0.00		0.00	68.00	0.00		0.00
17.00	0.00		0.00	69.00	0.00		0.00
18.00	0.00		0.00	70.00	0.00		0.00
19.00	0.00		0.00	71.00	0.00		0.00
20.00	0.00		0.00	72.00	0.00		0.00
21.00	0.00		0.00				
22.00	0.00		0.00				
23.00	0.00		0.00				
24.00	0.00		0.00				
25.00	0.00		0.00				
26.00	0.00		0.00				
27.00	0.00		0.00				
28.00	0.00		0.00				
29.00	0.00		0.00				
30.00	0.00		0.00				
31.00	0.00		0.00				
32.00	0.00		0.00				
33.00	0.00		0.00				
34.00	0.00		0.00				
35.00	0.00		0.00				
36.00	0.00		0.00				
37.00	0.00		0.00				
38.00	0.00		0.00				
39.00	0.00		0.00				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Summary for Pond 5P: (new Pond)

Inflow Area = 0.051 ac, 100.00% Impervious, Inflow Depth = 3.17" for 2 year event
 Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.013 af
 Outflow = 0.01 cfs @ 14.67 hrs, Volume= 0.013 af, Atten= 96%, Lag= 155.8 min
 Discarded = 0.00 cfs @ 14.67 hrs, Volume= 0.013 af
 Primary = 0.00 cfs @ 14.67 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
 Peak Elev= 5.33' @ 14.67 hrs Surf.Area= 0.007 ac Storage= 0.008 af

Plug-Flow detention time= 814.2 min calculated for 0.013 af (100% of inflow)
 Center-of-Mass det. time= 814.4 min (1,568.7 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.50'	0.010 af	17.00'W x 18.50'L x 4.54'H Field A 0.033 af Overall - 0.008 af Embedded = 0.025 af x 40.0% Voids
#2A	4.00'	0.008 af	Cultec R-330XLHD x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.018 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	5.30'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	3.50'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1.50'

Discarded OutFlow Max=0.00 cfs @ 14.67 hrs HW=5.33' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 14.67 hrs HW=5.33' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.55 fps)

Havre Street 199 East Boston

Type III 24-hr 2 year Rainfall=3.40"

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Pond 5P: (new Pond) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length

3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 18.0" Side Stone x 2 = 17.00' Base Width

6.0" Base + 30.5" Chamber Height + 18.0" Cover = 4.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Voids = 432.8 cf Stone Storage

Chamber Storage + Stone Storage = 779.2 cf = 0.018 af

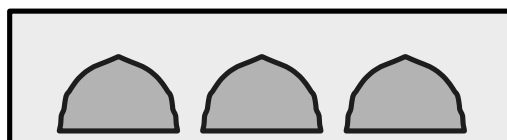
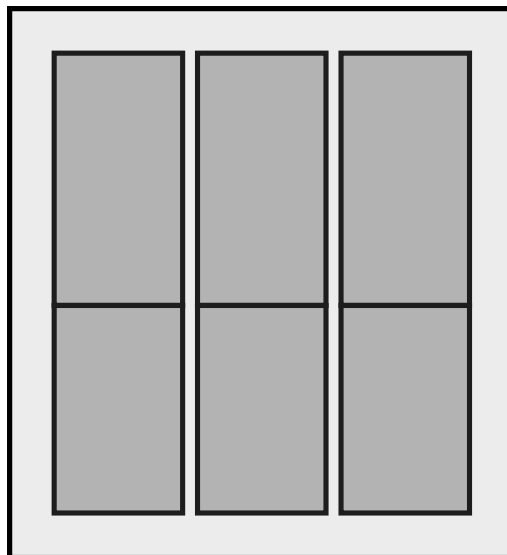
Overall Storage Efficiency = 54.6%

Overall System Size = 18.50' x 17.00' x 4.54'

6 Chambers

52.9 cy Field

40.1 cy Stone



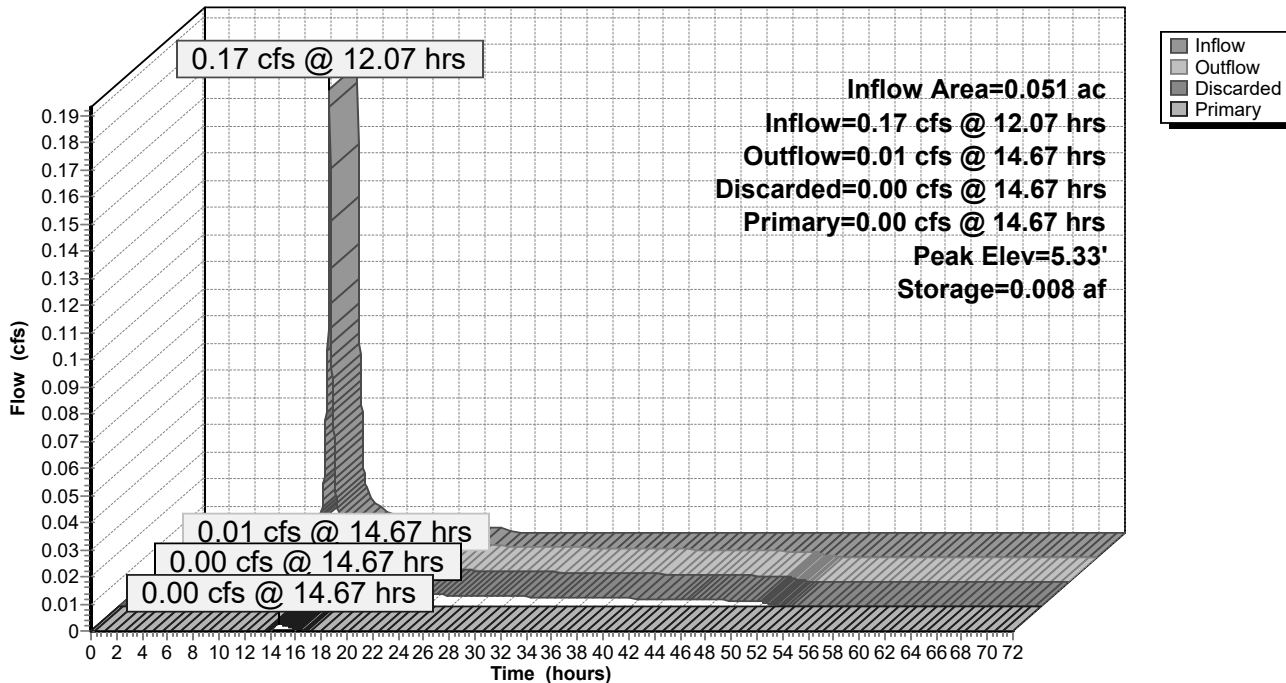
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Pond 5P: (new Pond)

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 2 year Rainfall=3.40"*

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Hydrograph for Pond 5P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	3.50	0.00	0.00	0.00
2.00	0.00	0.000	3.50	0.00	0.00	0.00
4.00	0.00	0.000	3.52	0.00	0.00	0.00
6.00	0.00	0.000	3.54	0.00	0.00	0.00
8.00	0.00	0.000	3.59	0.00	0.00	0.00
10.00	0.01	0.001	3.79	0.00	0.00	0.00
12.00	0.12	0.004	4.44	0.00	0.00	0.00
14.00	0.01	0.008	5.31	0.01	0.00	0.00
16.00	0.00	0.008	5.31	0.01	0.00	0.00
18.00	0.00	0.008	5.27	0.00	0.00	0.00
20.00	0.00	0.008	5.20	0.00	0.00	0.00
22.00	0.00	0.007	5.12	0.00	0.00	0.00
24.00	0.00	0.007	5.03	0.00	0.00	0.00
26.00	0.00	0.006	4.90	0.00	0.00	0.00
28.00	0.00	0.006	4.77	0.00	0.00	0.00
30.00	0.00	0.005	4.65	0.00	0.00	0.00
32.00	0.00	0.004	4.54	0.00	0.00	0.00
34.00	0.00	0.004	4.43	0.00	0.00	0.00
36.00	0.00	0.003	4.33	0.00	0.00	0.00
38.00	0.00	0.003	4.23	0.00	0.00	0.00
40.00	0.00	0.002	4.14	0.00	0.00	0.00
42.00	0.00	0.002	4.06	0.00	0.00	0.00
44.00	0.00	0.001	3.95	0.00	0.00	0.00
46.00	0.00	0.001	3.81	0.00	0.00	0.00
48.00	0.00	0.001	3.67	0.00	0.00	0.00
50.00	0.00	0.000	3.55	0.00	0.00	0.00
52.00	0.00	0.000	3.50	0.00	0.00	0.00
54.00	0.00	0.000	3.50	0.00	0.00	0.00
56.00	0.00	0.000	3.50	0.00	0.00	0.00
58.00	0.00	0.000	3.50	0.00	0.00	0.00
60.00	0.00	0.000	3.50	0.00	0.00	0.00
62.00	0.00	0.000	3.50	0.00	0.00	0.00
64.00	0.00	0.000	3.50	0.00	0.00	0.00
66.00	0.00	0.000	3.50	0.00	0.00	0.00
68.00	0.00	0.000	3.50	0.00	0.00	0.00
70.00	0.00	0.000	3.50	0.00	0.00	0.00
72.00	0.00	0.000	3.50	0.00	0.00	0.00

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 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 2S: Roof and Road Runoff Area=2,200 sf 100.00% Impervious Runoff Depth=4.46"
Tc=5.0 min CN=98 Runoff=0.24 cfs 0.019 af

Subcatchment 4S: no detention Runoff Area=300 sf 0.00% Impervious Runoff Depth=2.13"
Tc=5.0 min CN=74 Runoff=0.02 cfs 0.001 af

Subcatchment 6S: Existing Runoff Area=2,500 sf 49.84% Impervious Runoff Depth=3.19"
Tc=5.0 min CN=86 Runoff=0.22 cfs 0.015 af

Reach 6R: Proposed Inflow=0.08 cfs 0.006 af
Outflow=0.08 cfs 0.006 af

Pond 5P: (new Pond) Peak Elev=5.46' Storage=0.009 af Inflow=0.24 cfs 0.019 af
Discarded=0.01 cfs 0.014 af Primary=0.08 cfs 0.005 af Outflow=0.08 cfs 0.019 af

Total Runoff Area = 0.115 ac Runoff Volume = 0.035 af Average Runoff Depth = 3.69"
31.08% Pervious = 0.036 ac 68.92% Impervious = 0.079 ac

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Summary for Subcatchment 2S: Roof and Road

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 4.46"

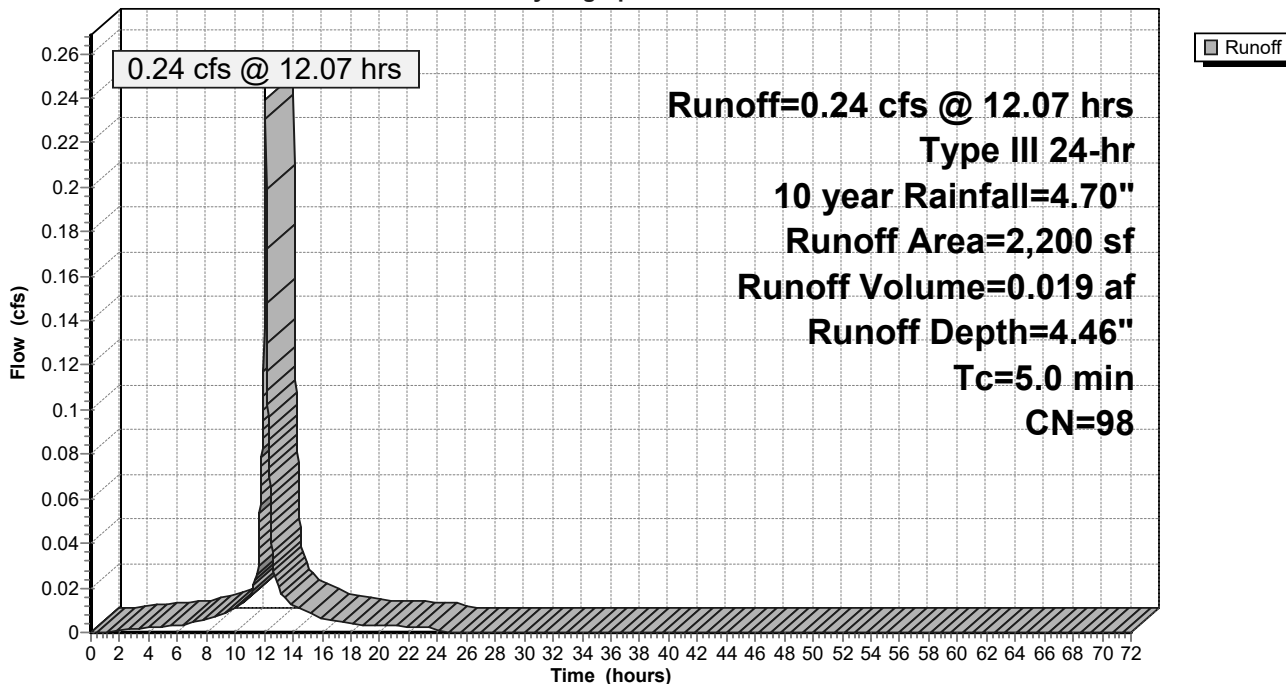
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
2,200	98	Roofs, HSG C
2,200		100.00% Impervious Area

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

Subcatchment 2S: Roof and Road

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 10 year Rainfall=4.70"*

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Hydrograph for Subcatchment 2S: Roof and Road

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.70	4.46	0.00
1.00	0.05	0.00	0.00	53.00	4.70	4.46	0.00
2.00	0.09	0.01	0.00	54.00	4.70	4.46	0.00
3.00	0.14	0.03	0.00	55.00	4.70	4.46	0.00
4.00	0.20	0.07	0.00	56.00	4.70	4.46	0.00
5.00	0.27	0.12	0.00	57.00	4.70	4.46	0.00
6.00	0.34	0.18	0.00	58.00	4.70	4.46	0.00
7.00	0.43	0.25	0.00	59.00	4.70	4.46	0.00
8.00	0.54	0.35	0.01	60.00	4.70	4.46	0.00
9.00	0.69	0.49	0.01	61.00	4.70	4.46	0.00
10.00	0.89	0.68	0.01	62.00	4.70	4.46	0.00
11.00	1.18	0.96	0.02	63.00	4.70	4.46	0.00
12.00	2.35	2.12	0.16	64.00	4.70	4.46	0.00
13.00	3.52	3.29	0.02	65.00	4.70	4.46	0.00
14.00	3.81	3.58	0.01	66.00	4.70	4.46	0.00
15.00	4.01	3.78	0.01	67.00	4.70	4.46	0.00
16.00	4.16	3.93	0.01	68.00	4.70	4.46	0.00
17.00	4.27	4.04	0.01	69.00	4.70	4.46	0.00
18.00	4.36	4.13	0.00	70.00	4.70	4.46	0.00
19.00	4.43	4.20	0.00	71.00	4.70	4.46	0.00
20.00	4.50	4.26	0.00	72.00	4.70	4.46	0.00
21.00	4.56	4.32	0.00				
22.00	4.61	4.37	0.00				
23.00	4.66	4.42	0.00				
24.00	4.70	4.46	0.00				
25.00	4.70	4.46	0.00				
26.00	4.70	4.46	0.00				
27.00	4.70	4.46	0.00				
28.00	4.70	4.46	0.00				
29.00	4.70	4.46	0.00				
30.00	4.70	4.46	0.00				
31.00	4.70	4.46	0.00				
32.00	4.70	4.46	0.00				
33.00	4.70	4.46	0.00				
34.00	4.70	4.46	0.00				
35.00	4.70	4.46	0.00				
36.00	4.70	4.46	0.00				
37.00	4.70	4.46	0.00				
38.00	4.70	4.46	0.00				
39.00	4.70	4.46	0.00				
40.00	4.70	4.46	0.00				
41.00	4.70	4.46	0.00				
42.00	4.70	4.46	0.00				
43.00	4.70	4.46	0.00				
44.00	4.70	4.46	0.00				
45.00	4.70	4.46	0.00				
46.00	4.70	4.46	0.00				
47.00	4.70	4.46	0.00				
48.00	4.70	4.46	0.00				
49.00	4.70	4.46	0.00				
50.00	4.70	4.46	0.00				
51.00	4.70	4.46	0.00				

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Summary for Subcatchment 4S: no detention

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 2.13"

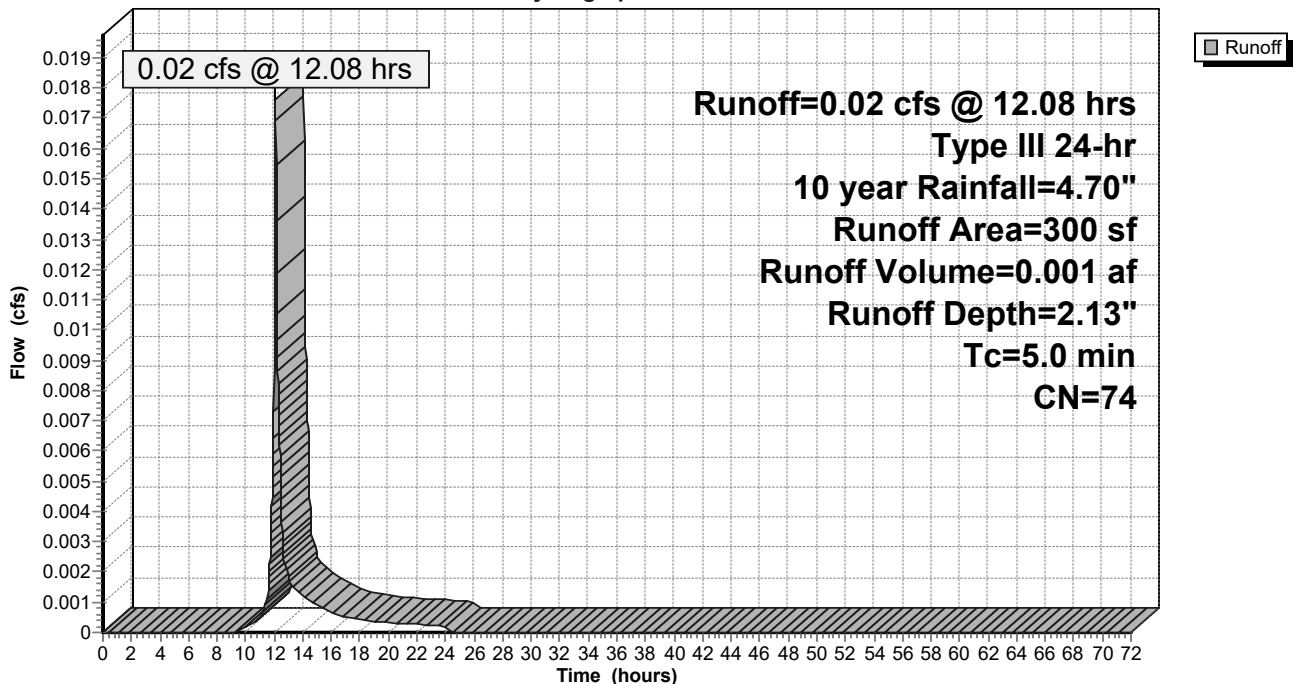
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
300	74	>75% Grass cover, Good, HSG C
300		100.00% Pervious Area

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

Subcatchment 4S: no detention

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 10 year Rainfall=4.70"*

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Hydrograph for Subcatchment 4S: no detention

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.70	2.13	0.00
1.00	0.05	0.00	0.00	53.00	4.70	2.13	0.00
2.00	0.09	0.00	0.00	54.00	4.70	2.13	0.00
3.00	0.14	0.00	0.00	55.00	4.70	2.13	0.00
4.00	0.20	0.00	0.00	56.00	4.70	2.13	0.00
5.00	0.27	0.00	0.00	57.00	4.70	2.13	0.00
6.00	0.34	0.00	0.00	58.00	4.70	2.13	0.00
7.00	0.43	0.00	0.00	59.00	4.70	2.13	0.00
8.00	0.54	0.00	0.00	60.00	4.70	2.13	0.00
9.00	0.69	0.00	0.00	61.00	4.70	2.13	0.00
10.00	0.89	0.01	0.00	62.00	4.70	2.13	0.00
11.00	1.18	0.06	0.00	63.00	4.70	2.13	0.00
12.00	2.35	0.53	0.01	64.00	4.70	2.13	0.00
13.00	3.52	1.26	0.00	65.00	4.70	2.13	0.00
14.00	3.81	1.46	0.00	66.00	4.70	2.13	0.00
15.00	4.01	1.61	0.00	67.00	4.70	2.13	0.00
16.00	4.16	1.72	0.00	68.00	4.70	2.13	0.00
17.00	4.27	1.80	0.00	69.00	4.70	2.13	0.00
18.00	4.36	1.87	0.00	70.00	4.70	2.13	0.00
19.00	4.43	1.92	0.00	71.00	4.70	2.13	0.00
20.00	4.50	1.97	0.00	72.00	4.70	2.13	0.00
21.00	4.56	2.02	0.00				
22.00	4.61	2.06	0.00				
23.00	4.66	2.09	0.00				
24.00	4.70	2.13	0.00				
25.00	4.70	2.13	0.00				
26.00	4.70	2.13	0.00				
27.00	4.70	2.13	0.00				
28.00	4.70	2.13	0.00				
29.00	4.70	2.13	0.00				
30.00	4.70	2.13	0.00				
31.00	4.70	2.13	0.00				
32.00	4.70	2.13	0.00				
33.00	4.70	2.13	0.00				
34.00	4.70	2.13	0.00				
35.00	4.70	2.13	0.00				
36.00	4.70	2.13	0.00				
37.00	4.70	2.13	0.00				
38.00	4.70	2.13	0.00				
39.00	4.70	2.13	0.00				
40.00	4.70	2.13	0.00				
41.00	4.70	2.13	0.00				
42.00	4.70	2.13	0.00				
43.00	4.70	2.13	0.00				
44.00	4.70	2.13	0.00				
45.00	4.70	2.13	0.00				
46.00	4.70	2.13	0.00				
47.00	4.70	2.13	0.00				
48.00	4.70	2.13	0.00				
49.00	4.70	2.13	0.00				
50.00	4.70	2.13	0.00				
51.00	4.70	2.13	0.00				

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Summary for Subcatchment 6S: Existing

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.015 af, Depth= 3.19"

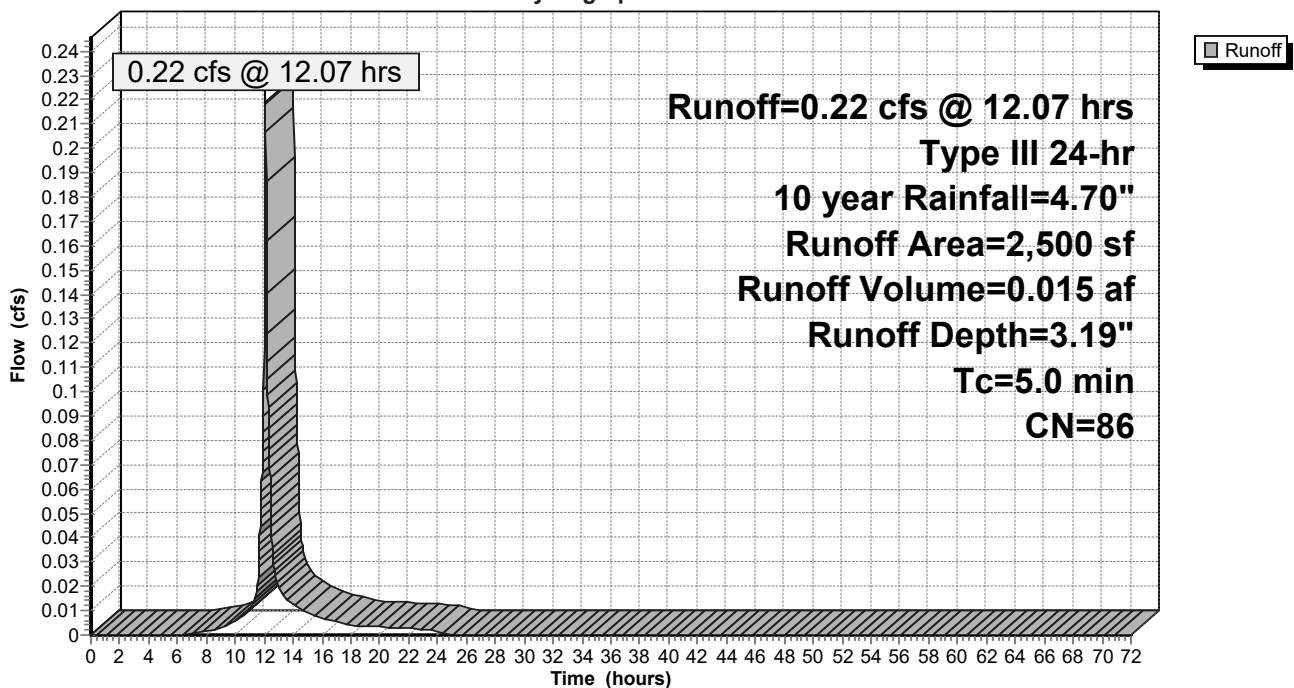
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
*	1,246	98	
	1,254	74	>75% Grass cover, Good, HSG C
	2,500	86	Weighted Average
	1,254		50.16% Pervious Area
	1,246		49.84% Impervious Area

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

Subcatchment 6S: Existing

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 10 year Rainfall=4.70"*

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Hydrograph for Subcatchment 6S: Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.70	3.19	0.00
1.00	0.05	0.00	0.00	53.00	4.70	3.19	0.00
2.00	0.09	0.00	0.00	54.00	4.70	3.19	0.00
3.00	0.14	0.00	0.00	55.00	4.70	3.19	0.00
4.00	0.20	0.00	0.00	56.00	4.70	3.19	0.00
5.00	0.27	0.00	0.00	57.00	4.70	3.19	0.00
6.00	0.34	0.00	0.00	58.00	4.70	3.19	0.00
7.00	0.43	0.01	0.00	59.00	4.70	3.19	0.00
8.00	0.54	0.02	0.00	60.00	4.70	3.19	0.00
9.00	0.69	0.07	0.00	61.00	4.70	3.19	0.00
10.00	0.89	0.14	0.01	62.00	4.70	3.19	0.00
11.00	1.18	0.29	0.01	63.00	4.70	3.19	0.00
12.00	2.35	1.12	0.14	64.00	4.70	3.19	0.00
13.00	3.52	2.12	0.02	65.00	4.70	3.19	0.00
14.00	3.81	2.38	0.01	66.00	4.70	3.19	0.00
15.00	4.01	2.56	0.01	67.00	4.70	3.19	0.00
16.00	4.16	2.70	0.01	68.00	4.70	3.19	0.00
17.00	4.27	2.80	0.01	69.00	4.70	3.19	0.00
18.00	4.36	2.88	0.00	70.00	4.70	3.19	0.00
19.00	4.43	2.94	0.00	71.00	4.70	3.19	0.00
20.00	4.50	3.00	0.00	72.00	4.70	3.19	0.00
21.00	4.56	3.06	0.00				
22.00	4.61	3.10	0.00				
23.00	4.66	3.15	0.00				
24.00	4.70	3.19	0.00				
25.00	4.70	3.19	0.00				
26.00	4.70	3.19	0.00				
27.00	4.70	3.19	0.00				
28.00	4.70	3.19	0.00				
29.00	4.70	3.19	0.00				
30.00	4.70	3.19	0.00				
31.00	4.70	3.19	0.00				
32.00	4.70	3.19	0.00				
33.00	4.70	3.19	0.00				
34.00	4.70	3.19	0.00				
35.00	4.70	3.19	0.00				
36.00	4.70	3.19	0.00				
37.00	4.70	3.19	0.00				
38.00	4.70	3.19	0.00				
39.00	4.70	3.19	0.00				
40.00	4.70	3.19	0.00				
41.00	4.70	3.19	0.00				
42.00	4.70	3.19	0.00				
43.00	4.70	3.19	0.00				
44.00	4.70	3.19	0.00				
45.00	4.70	3.19	0.00				
46.00	4.70	3.19	0.00				
47.00	4.70	3.19	0.00				
48.00	4.70	3.19	0.00				
49.00	4.70	3.19	0.00				
50.00	4.70	3.19	0.00				
51.00	4.70	3.19	0.00				

Havre Street 199 East Boston

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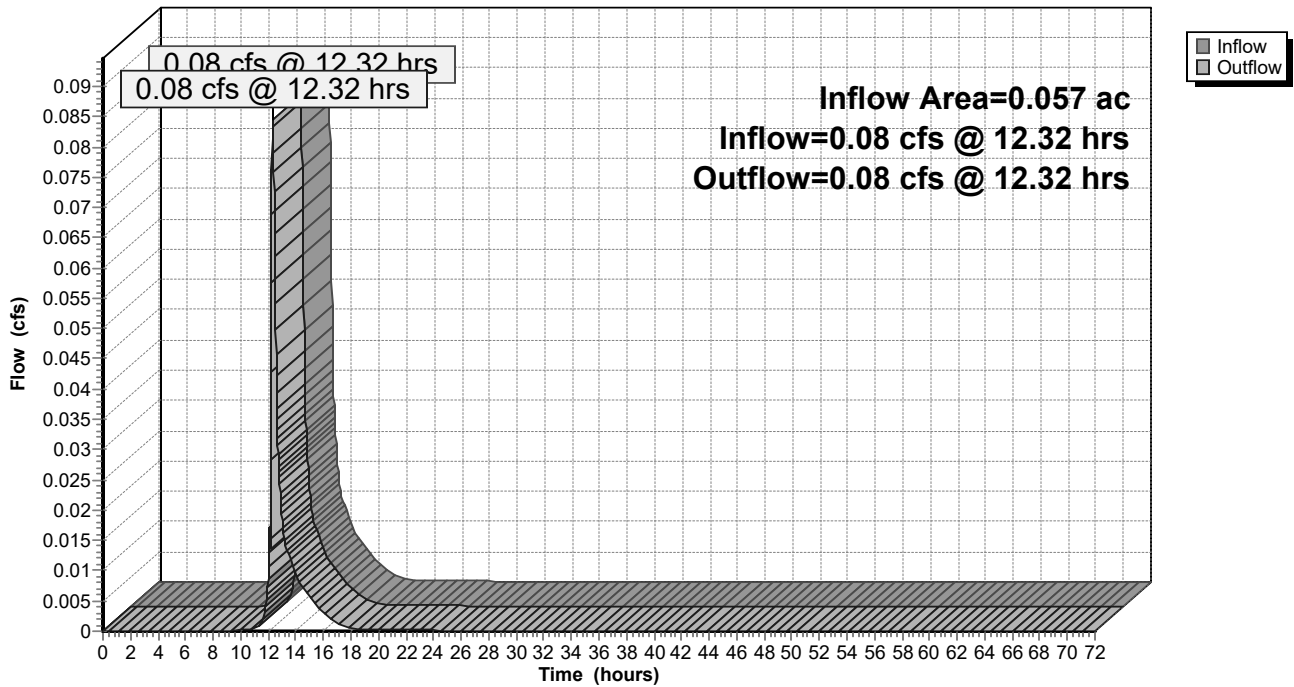
Summary for Reach 6R: Proposed

Inflow Area = 0.057 ac, 88.00% Impervious, Inflow Depth = 1.26" for 10 year event
Inflow = 0.08 cfs @ 12.32 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.32 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Reach 6R: Proposed

Hydrograph



Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Hydrograph for Reach 6R: Proposed

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.00		0.00
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.01		0.01	64.00	0.00		0.00
13.00	0.02		0.02	65.00	0.00		0.00
14.00	0.01		0.01	66.00	0.00		0.00
15.00	0.01		0.01	67.00	0.00		0.00
16.00	0.00		0.00	68.00	0.00		0.00
17.00	0.00		0.00	69.00	0.00		0.00
18.00	0.00		0.00	70.00	0.00		0.00
19.00	0.00		0.00	71.00	0.00		0.00
20.00	0.00		0.00	72.00	0.00		0.00
21.00	0.00		0.00				
22.00	0.00		0.00				
23.00	0.00		0.00				
24.00	0.00		0.00				
25.00	0.00		0.00				
26.00	0.00		0.00				
27.00	0.00		0.00				
28.00	0.00		0.00				
29.00	0.00		0.00				
30.00	0.00		0.00				
31.00	0.00		0.00				
32.00	0.00		0.00				
33.00	0.00		0.00				
34.00	0.00		0.00				
35.00	0.00		0.00				
36.00	0.00		0.00				
37.00	0.00		0.00				
38.00	0.00		0.00				
39.00	0.00		0.00				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Summary for Pond 5P: (new Pond)

Inflow Area = 0.051 ac, 100.00% Impervious, Inflow Depth = 4.46" for 10 year event
 Inflow = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af
 Outflow = 0.08 cfs @ 12.32 hrs, Volume= 0.019 af, Atten= 66%, Lag= 15.1 min
 Discarded = 0.01 cfs @ 12.32 hrs, Volume= 0.014 af
 Primary = 0.08 cfs @ 12.32 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
 Peak Elev= 5.46' @ 12.32 hrs Surf.Area= 0.007 ac Storage= 0.009 af

Plug-Flow detention time= 635.2 min calculated for 0.019 af (100% of inflow)
 Center-of-Mass det. time= 635.6 min (1,383.7 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.50'	0.010 af	17.00'W x 18.50'L x 4.54'H Field A 0.033 af Overall - 0.008 af Embedded = 0.025 af x 40.0% Voids
#2A	4.00'	0.008 af	Cultec R-330XLHD x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.018 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	5.30'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	3.50'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1.50'

Discarded OutFlow Max=0.01 cfs @ 12.32 hrs HW=5.46' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.08 cfs @ 12.32 hrs HW=5.46' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.38 fps)

Havre Street 199 East Boston

Type III 24-hr 10 year Rainfall=4.70"

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Pond 5P: (new Pond) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length

3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 18.0" Side Stone x 2 = 17.00' Base Width

6.0" Base + 30.5" Chamber Height + 18.0" Cover = 4.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Voids = 432.8 cf Stone Storage

Chamber Storage + Stone Storage = 779.2 cf = 0.018 af

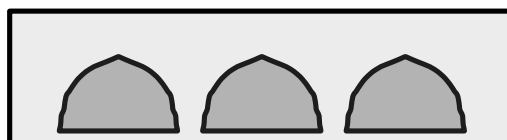
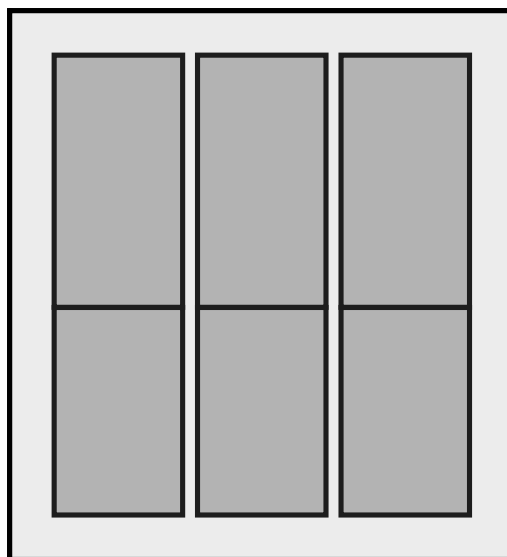
Overall Storage Efficiency = 54.6%

Overall System Size = 18.50' x 17.00' x 4.54'

6 Chambers

52.9 cy Field

40.1 cy Stone



Havre Street 199 East Boston

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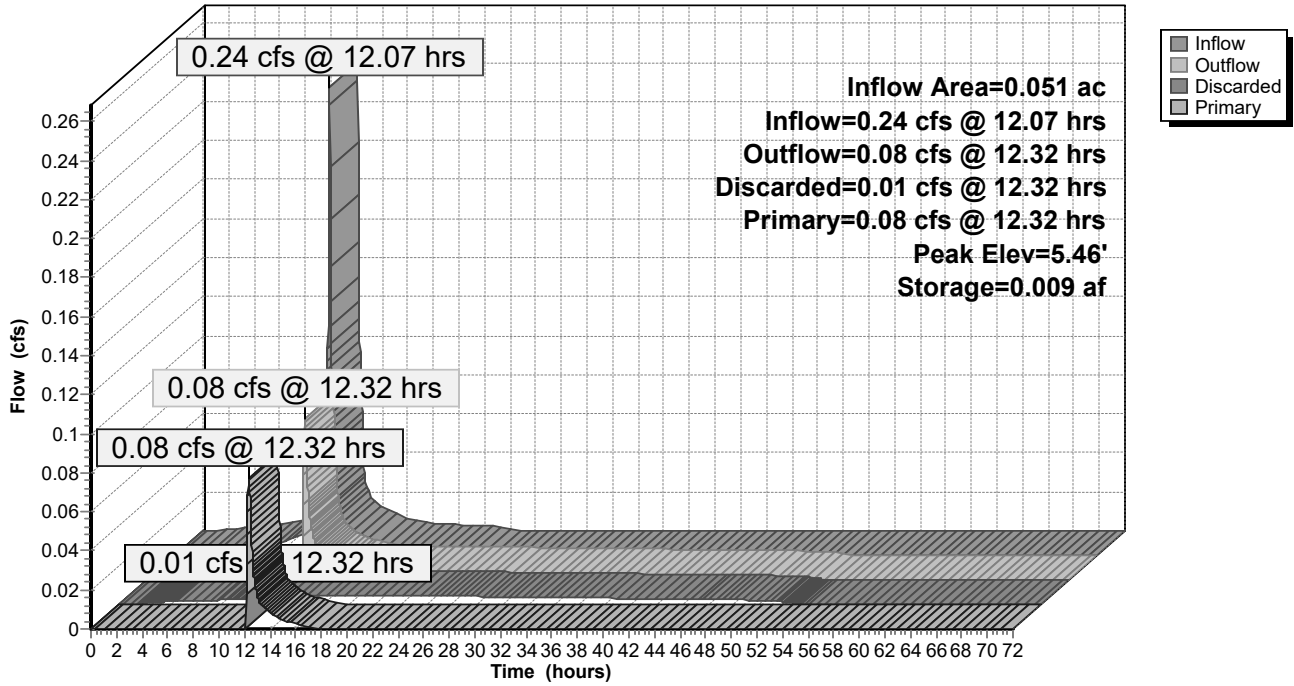
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Pond 5P: (new Pond)

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 10 year Rainfall=4.70"*

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Hydrograph for Pond 5P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	3.50	0.00	0.00	0.00
2.00	0.00	0.000	3.51	0.00	0.00	0.00
4.00	0.00	0.000	3.54	0.00	0.00	0.00
6.00	0.00	0.000	3.57	0.00	0.00	0.00
8.00	0.01	0.001	3.70	0.00	0.00	0.00
10.00	0.01	0.002	4.02	0.00	0.00	0.00
12.00	0.16	0.006	4.82	0.00	0.00	0.00
14.00	0.01	0.009	5.35	0.01	0.00	0.01
16.00	0.01	0.008	5.33	0.01	0.00	0.00
18.00	0.00	0.008	5.30	0.00	0.00	0.00
20.00	0.00	0.008	5.26	0.00	0.00	0.00
22.00	0.00	0.008	5.20	0.00	0.00	0.00
24.00	0.00	0.007	5.13	0.00	0.00	0.00
26.00	0.00	0.007	4.99	0.00	0.00	0.00
28.00	0.00	0.006	4.86	0.00	0.00	0.00
30.00	0.00	0.005	4.73	0.00	0.00	0.00
32.00	0.00	0.005	4.61	0.00	0.00	0.00
34.00	0.00	0.004	4.50	0.00	0.00	0.00
36.00	0.00	0.004	4.40	0.00	0.00	0.00
38.00	0.00	0.003	4.30	0.00	0.00	0.00
40.00	0.00	0.003	4.20	0.00	0.00	0.00
42.00	0.00	0.002	4.11	0.00	0.00	0.00
44.00	0.00	0.002	4.03	0.00	0.00	0.00
46.00	0.00	0.001	3.90	0.00	0.00	0.00
48.00	0.00	0.001	3.76	0.00	0.00	0.00
50.00	0.00	0.000	3.63	0.00	0.00	0.00
52.00	0.00	0.000	3.52	0.00	0.00	0.00
54.00	0.00	0.000	3.50	0.00	0.00	0.00
56.00	0.00	0.000	3.50	0.00	0.00	0.00
58.00	0.00	0.000	3.50	0.00	0.00	0.00
60.00	0.00	0.000	3.50	0.00	0.00	0.00
62.00	0.00	0.000	3.50	0.00	0.00	0.00
64.00	0.00	0.000	3.50	0.00	0.00	0.00
66.00	0.00	0.000	3.50	0.00	0.00	0.00
68.00	0.00	0.000	3.50	0.00	0.00	0.00
70.00	0.00	0.000	3.50	0.00	0.00	0.00
72.00	0.00	0.000	3.50	0.00	0.00	0.00

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 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 2S: Roof and Road Runoff Area=2,200 sf 100.00% Impervious Runoff Depth=5.36"
Tc=5.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment 4S: no detention Runoff Area=300 sf 0.00% Impervious Runoff Depth=2.85"
Tc=5.0 min CN=74 Runoff=0.02 cfs 0.002 af

Subcatchment 6S: Existing Runoff Area=2,500 sf 49.84% Impervious Runoff Depth=4.03"
Tc=5.0 min CN=86 Runoff=0.27 cfs 0.019 af

Reach 6R: Proposed Inflow=0.19 cfs 0.010 af
Outflow=0.19 cfs 0.010 af

Pond 5P: (new Pond) Peak Elev=5.55' Storage=0.010 af Inflow=0.29 cfs 0.023 af
Discarded=0.01 cfs 0.014 af Primary=0.17 cfs 0.008 af Outflow=0.18 cfs 0.023 af

Total Runoff Area = 0.115 ac Runoff Volume = 0.043 af Average Runoff Depth = 4.55"
31.08% Pervious = 0.036 ac 68.92% Impervious = 0.079 ac

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Summary for Subcatchment 2S: Roof and Road

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 5.36"

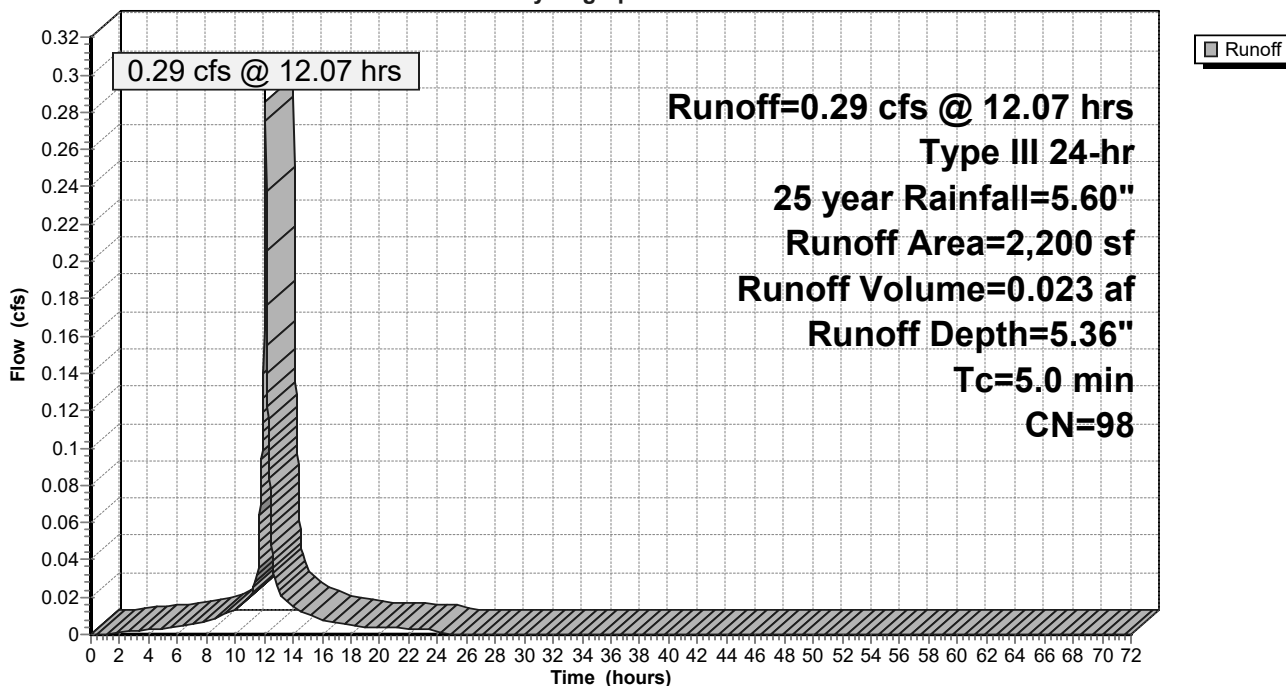
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.60"

Area (sf)	CN	Description
2,200	98	Roofs, HSG C
2,200		100.00% Impervious Area

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

Subcatchment 2S: Roof and Road

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 25 year Rainfall=5.60"*

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Hydrograph for Subcatchment 2S: Roof and Road

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.60	5.36	0.00
1.00	0.06	0.00	0.00	53.00	5.60	5.36	0.00
2.00	0.11	0.02	0.00	54.00	5.60	5.36	0.00
3.00	0.17	0.05	0.00	55.00	5.60	5.36	0.00
4.00	0.24	0.10	0.00	56.00	5.60	5.36	0.00
5.00	0.32	0.16	0.00	57.00	5.60	5.36	0.00
6.00	0.40	0.23	0.00	58.00	5.60	5.36	0.00
7.00	0.51	0.32	0.01	59.00	5.60	5.36	0.00
8.00	0.64	0.45	0.01	60.00	5.60	5.36	0.00
9.00	0.82	0.61	0.01	61.00	5.60	5.36	0.00
10.00	1.06	0.85	0.01	62.00	5.60	5.36	0.00
11.00	1.40	1.18	0.02	63.00	5.60	5.36	0.00
12.00	2.80	2.57	0.19	64.00	5.60	5.36	0.00
13.00	4.20	3.96	0.02	65.00	5.60	5.36	0.00
14.00	4.54	4.31	0.01	66.00	5.60	5.36	0.00
15.00	4.78	4.55	0.01	67.00	5.60	5.36	0.00
16.00	4.96	4.72	0.01	68.00	5.60	5.36	0.00
17.00	5.09	4.86	0.01	69.00	5.60	5.36	0.00
18.00	5.20	4.96	0.00	70.00	5.60	5.36	0.00
19.00	5.28	5.04	0.00	71.00	5.60	5.36	0.00
20.00	5.36	5.12	0.00	72.00	5.60	5.36	0.00
21.00	5.43	5.19	0.00				
22.00	5.49	5.25	0.00				
23.00	5.55	5.31	0.00				
24.00	5.60	5.36	0.00				
25.00	5.60	5.36	0.00				
26.00	5.60	5.36	0.00				
27.00	5.60	5.36	0.00				
28.00	5.60	5.36	0.00				
29.00	5.60	5.36	0.00				
30.00	5.60	5.36	0.00				
31.00	5.60	5.36	0.00				
32.00	5.60	5.36	0.00				
33.00	5.60	5.36	0.00				
34.00	5.60	5.36	0.00				
35.00	5.60	5.36	0.00				
36.00	5.60	5.36	0.00				
37.00	5.60	5.36	0.00				
38.00	5.60	5.36	0.00				
39.00	5.60	5.36	0.00				
40.00	5.60	5.36	0.00				
41.00	5.60	5.36	0.00				
42.00	5.60	5.36	0.00				
43.00	5.60	5.36	0.00				
44.00	5.60	5.36	0.00				
45.00	5.60	5.36	0.00				
46.00	5.60	5.36	0.00				
47.00	5.60	5.36	0.00				
48.00	5.60	5.36	0.00				
49.00	5.60	5.36	0.00				
50.00	5.60	5.36	0.00				
51.00	5.60	5.36	0.00				

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Summary for Subcatchment 4S: no detention

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 2.85"

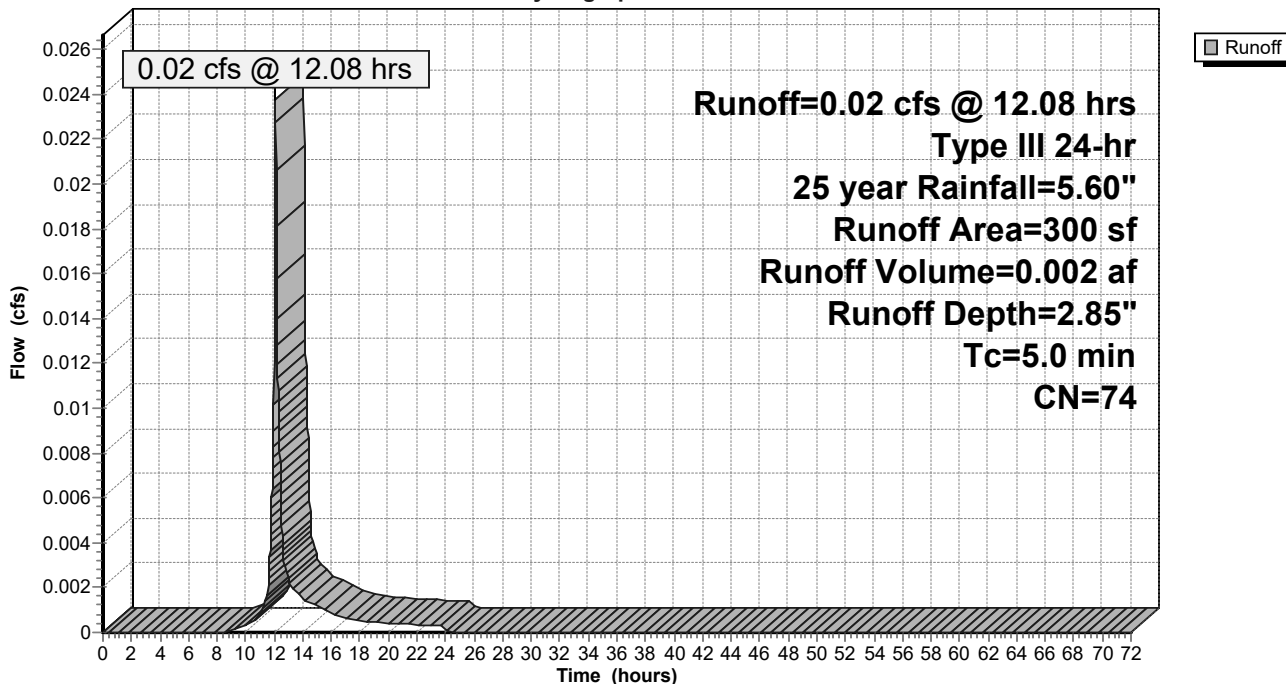
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.60"

Area (sf)	CN	Description
300	74	>75% Grass cover, Good, HSG C
300		100.00% Pervious Area

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

Subcatchment 4S: no detention

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 25 year Rainfall=5.60"*

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Hydrograph for Subcatchment 4S: no detention

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.60	2.85	0.00
1.00	0.06	0.00	0.00	53.00	5.60	2.85	0.00
2.00	0.11	0.00	0.00	54.00	5.60	2.85	0.00
3.00	0.17	0.00	0.00	55.00	5.60	2.85	0.00
4.00	0.24	0.00	0.00	56.00	5.60	2.85	0.00
5.00	0.32	0.00	0.00	57.00	5.60	2.85	0.00
6.00	0.40	0.00	0.00	58.00	5.60	2.85	0.00
7.00	0.51	0.00	0.00	59.00	5.60	2.85	0.00
8.00	0.64	0.00	0.00	60.00	5.60	2.85	0.00
9.00	0.82	0.00	0.00	61.00	5.60	2.85	0.00
10.00	1.06	0.03	0.00	62.00	5.60	2.85	0.00
11.00	1.40	0.12	0.00	63.00	5.60	2.85	0.00
12.00	2.80	0.78	0.01	64.00	5.60	2.85	0.00
13.00	4.20	1.74	0.00	65.00	5.60	2.85	0.00
14.00	4.54	2.00	0.00	66.00	5.60	2.85	0.00
15.00	4.78	2.19	0.00	67.00	5.60	2.85	0.00
16.00	4.96	2.33	0.00	68.00	5.60	2.85	0.00
17.00	5.09	2.44	0.00	69.00	5.60	2.85	0.00
18.00	5.20	2.52	0.00	70.00	5.60	2.85	0.00
19.00	5.28	2.59	0.00	71.00	5.60	2.85	0.00
20.00	5.36	2.65	0.00	72.00	5.60	2.85	0.00
21.00	5.43	2.71	0.00				
22.00	5.49	2.76	0.00				
23.00	5.55	2.81	0.00				
24.00	5.60	2.85	0.00				
25.00	5.60	2.85	0.00				
26.00	5.60	2.85	0.00				
27.00	5.60	2.85	0.00				
28.00	5.60	2.85	0.00				
29.00	5.60	2.85	0.00				
30.00	5.60	2.85	0.00				
31.00	5.60	2.85	0.00				
32.00	5.60	2.85	0.00				
33.00	5.60	2.85	0.00				
34.00	5.60	2.85	0.00				
35.00	5.60	2.85	0.00				
36.00	5.60	2.85	0.00				
37.00	5.60	2.85	0.00				
38.00	5.60	2.85	0.00				
39.00	5.60	2.85	0.00				
40.00	5.60	2.85	0.00				
41.00	5.60	2.85	0.00				
42.00	5.60	2.85	0.00				
43.00	5.60	2.85	0.00				
44.00	5.60	2.85	0.00				
45.00	5.60	2.85	0.00				
46.00	5.60	2.85	0.00				
47.00	5.60	2.85	0.00				
48.00	5.60	2.85	0.00				
49.00	5.60	2.85	0.00				
50.00	5.60	2.85	0.00				
51.00	5.60	2.85	0.00				

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Summary for Subcatchment 6S: Existing

Runoff = 0.27 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 4.03"

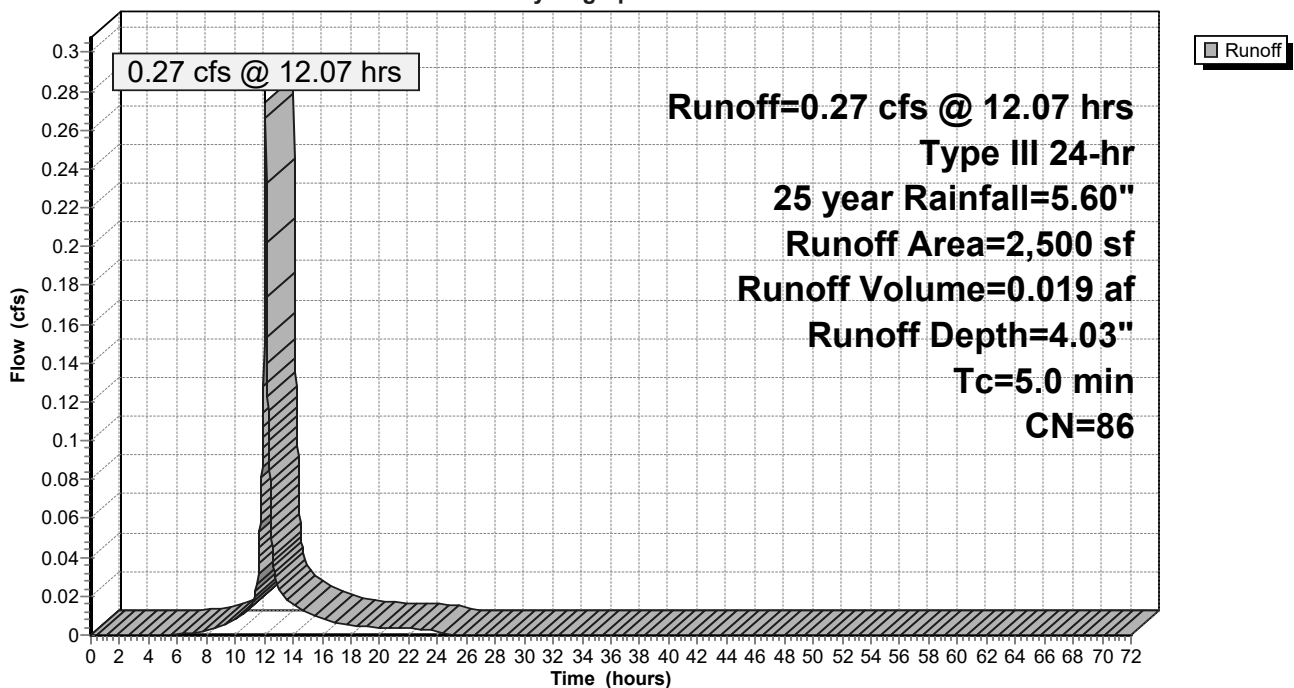
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.60"

	Area (sf)	CN	Description
*	1,246	98	
	1,254	74	>75% Grass cover, Good, HSG C
	2,500	86	Weighted Average
	1,254		50.16% Pervious Area
	1,246		49.84% Impervious Area

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

Subcatchment 6S: Existing

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 25 year Rainfall=5.60"*

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Hydrograph for Subcatchment 6S: Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.60	4.03	0.00
1.00	0.06	0.00	0.00	53.00	5.60	4.03	0.00
2.00	0.11	0.00	0.00	54.00	5.60	4.03	0.00
3.00	0.17	0.00	0.00	55.00	5.60	4.03	0.00
4.00	0.24	0.00	0.00	56.00	5.60	4.03	0.00
5.00	0.32	0.00	0.00	57.00	5.60	4.03	0.00
6.00	0.40	0.00	0.00	58.00	5.60	4.03	0.00
7.00	0.51	0.02	0.00	59.00	5.60	4.03	0.00
8.00	0.64	0.05	0.00	60.00	5.60	4.03	0.00
9.00	0.82	0.11	0.00	61.00	5.60	4.03	0.00
10.00	1.06	0.23	0.01	62.00	5.60	4.03	0.00
11.00	1.40	0.43	0.01	63.00	5.60	4.03	0.00
12.00	2.80	1.49	0.18	64.00	5.60	4.03	0.00
13.00	4.20	2.73	0.02	65.00	5.60	4.03	0.00
14.00	4.54	3.04	0.02	66.00	5.60	4.03	0.00
15.00	4.78	3.27	0.01	67.00	5.60	4.03	0.00
16.00	4.96	3.43	0.01	68.00	5.60	4.03	0.00
17.00	5.09	3.55	0.01	69.00	5.60	4.03	0.00
18.00	5.20	3.65	0.00	70.00	5.60	4.03	0.00
19.00	5.28	3.73	0.00	71.00	5.60	4.03	0.00
20.00	5.36	3.80	0.00	72.00	5.60	4.03	0.00
21.00	5.43	3.87	0.00				
22.00	5.49	3.93	0.00				
23.00	5.55	3.98	0.00				
24.00	5.60	4.03	0.00				
25.00	5.60	4.03	0.00				
26.00	5.60	4.03	0.00				
27.00	5.60	4.03	0.00				
28.00	5.60	4.03	0.00				
29.00	5.60	4.03	0.00				
30.00	5.60	4.03	0.00				
31.00	5.60	4.03	0.00				
32.00	5.60	4.03	0.00				
33.00	5.60	4.03	0.00				
34.00	5.60	4.03	0.00				
35.00	5.60	4.03	0.00				
36.00	5.60	4.03	0.00				
37.00	5.60	4.03	0.00				
38.00	5.60	4.03	0.00				
39.00	5.60	4.03	0.00				
40.00	5.60	4.03	0.00				
41.00	5.60	4.03	0.00				
42.00	5.60	4.03	0.00				
43.00	5.60	4.03	0.00				
44.00	5.60	4.03	0.00				
45.00	5.60	4.03	0.00				
46.00	5.60	4.03	0.00				
47.00	5.60	4.03	0.00				
48.00	5.60	4.03	0.00				
49.00	5.60	4.03	0.00				
50.00	5.60	4.03	0.00				
51.00	5.60	4.03	0.00				

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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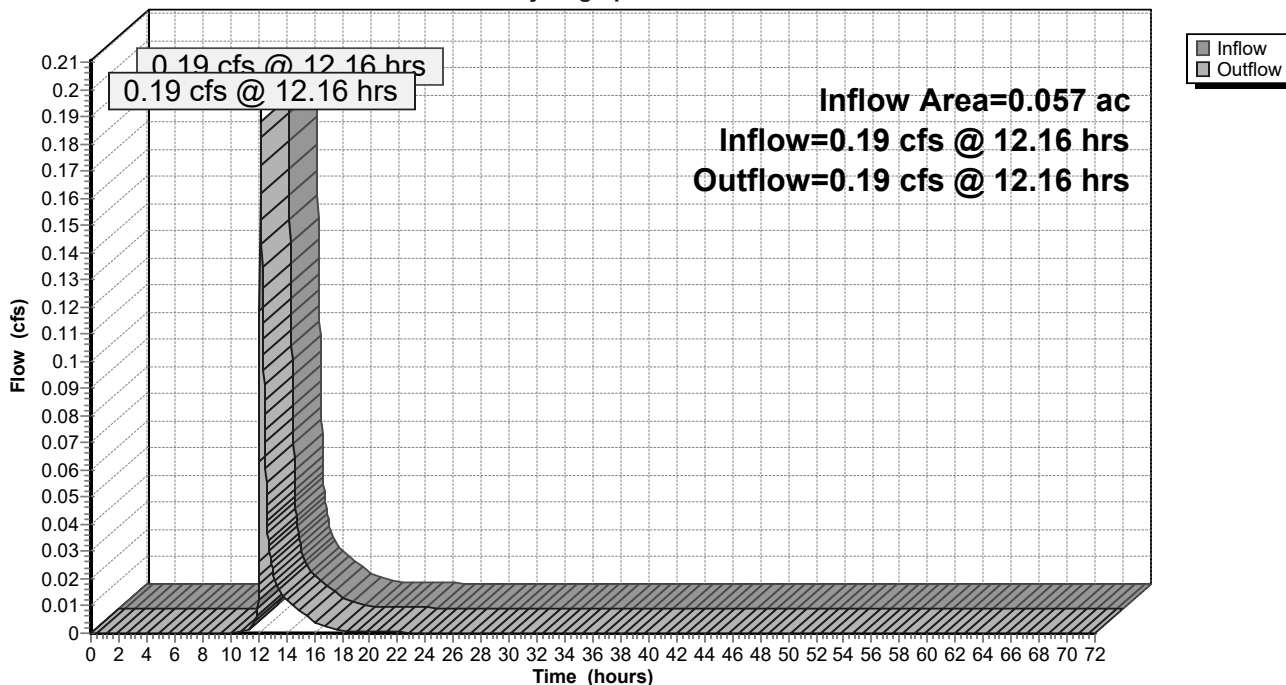
Summary for Reach 6R: Proposed

Inflow Area = 0.057 ac, 88.00% Impervious, Inflow Depth = 2.04" for 25 year event
Inflow = 0.19 cfs @ 12.16 hrs, Volume= 0.010 af
Outflow = 0.19 cfs @ 12.16 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Reach 6R: Proposed

Hydrograph



Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Hydrograph for Reach 6R: Proposed

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.00		0.00
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.01		0.01	64.00	0.00		0.00
13.00	0.02		0.02	65.00	0.00		0.00
14.00	0.01		0.01	66.00	0.00		0.00
15.00	0.01		0.01	67.00	0.00		0.00
16.00	0.00		0.00	68.00	0.00		0.00
17.00	0.00		0.00	69.00	0.00		0.00
18.00	0.00		0.00	70.00	0.00		0.00
19.00	0.00		0.00	71.00	0.00		0.00
20.00	0.00		0.00	72.00	0.00		0.00
21.00	0.00		0.00				
22.00	0.00		0.00				
23.00	0.00		0.00				
24.00	0.00		0.00				
25.00	0.00		0.00				
26.00	0.00		0.00				
27.00	0.00		0.00				
28.00	0.00		0.00				
29.00	0.00		0.00				
30.00	0.00		0.00				
31.00	0.00		0.00				
32.00	0.00		0.00				
33.00	0.00		0.00				
34.00	0.00		0.00				
35.00	0.00		0.00				
36.00	0.00		0.00				
37.00	0.00		0.00				
38.00	0.00		0.00				
39.00	0.00		0.00				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Summary for Pond 5P: (new Pond)

Inflow Area = 0.051 ac, 100.00% Impervious, Inflow Depth = 5.36" for 25 year event
 Inflow = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af
 Outflow = 0.18 cfs @ 12.16 hrs, Volume= 0.023 af, Atten= 38%, Lag= 5.5 min
 Discarded = 0.01 cfs @ 12.16 hrs, Volume= 0.014 af
 Primary = 0.17 cfs @ 12.16 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
 Peak Elev= 5.55' @ 12.16 hrs Surf.Area= 0.007 ac Storage= 0.010 af

Plug-Flow detention time= 556.1 min calculated for 0.023 af (100% of inflow)
 Center-of-Mass det. time= 555.9 min (1,301.2 - 745.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.50'	0.010 af	17.00'W x 18.50'L x 4.54'H Field A 0.033 af Overall - 0.008 af Embedded = 0.025 af x 40.0% Voids
#2A	4.00'	0.008 af	Cultec R-330XLHD x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.018 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	5.30'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	3.50'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1.50'

Discarded OutFlow Max=0.01 cfs @ 12.16 hrs HW=5.55' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.17 cfs @ 12.16 hrs HW=5.55' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.71 fps)

Havre Street 199 East Boston

Type III 24-hr 25 year Rainfall=5.60"

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Pond 5P: (new Pond) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length

3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 18.0" Side Stone x 2 = 17.00' Base Width

6.0" Base + 30.5" Chamber Height + 18.0" Cover = 4.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Voids = 432.8 cf Stone Storage

Chamber Storage + Stone Storage = 779.2 cf = 0.018 af

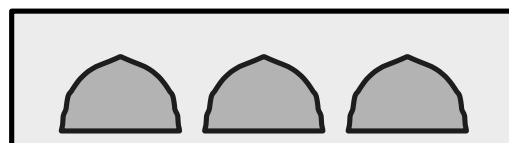
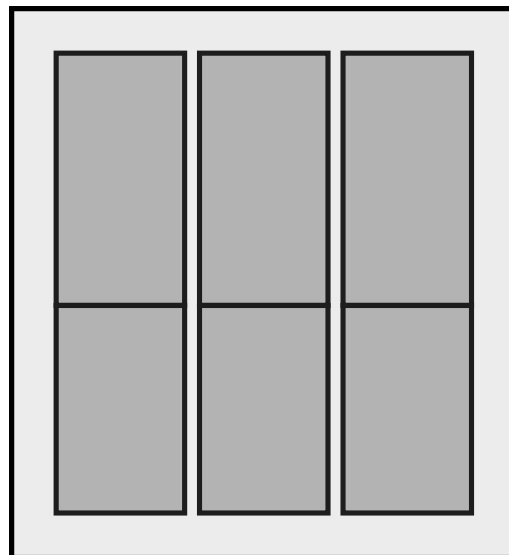
Overall Storage Efficiency = 54.6%

Overall System Size = 18.50' x 17.00' x 4.54'

6 Chambers

52.9 cy Field

40.1 cy Stone



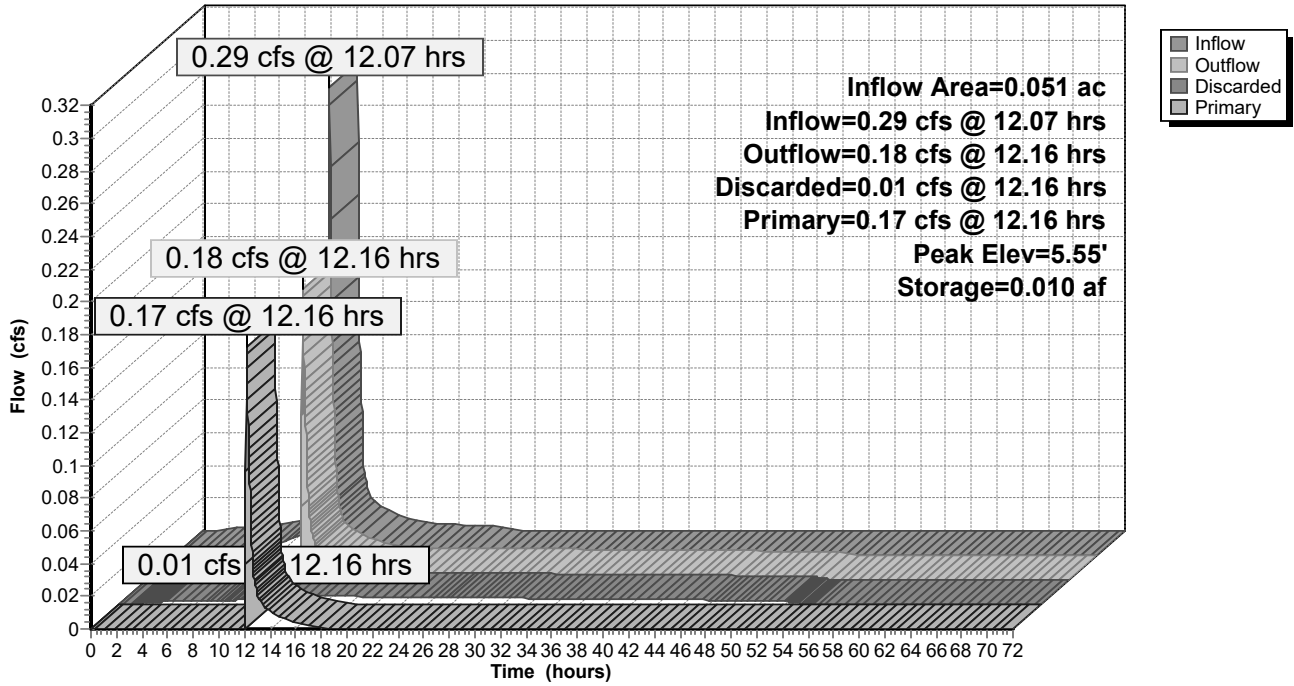
Havre Street 199 East Boston

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Printed 2/27/2019

Pond 5P: (new Pond)

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 25 year Rainfall=5.60"*

Prepared by {enter your company name here}

Printed 2/27/2019

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Hydrograph for Pond 5P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	3.50	0.00	0.00	0.00
2.00	0.00	0.000	3.51	0.00	0.00	0.00
4.00	0.00	0.000	3.55	0.00	0.00	0.00
6.00	0.00	0.000	3.62	0.00	0.00	0.00
8.00	0.01	0.001	3.80	0.00	0.00	0.00
10.00	0.01	0.002	4.12	0.00	0.00	0.00
12.00	0.19	0.007	5.10	0.00	0.00	0.00
14.00	0.01	0.009	5.36	0.02	0.00	0.01
16.00	0.01	0.008	5.33	0.01	0.00	0.00
18.00	0.00	0.008	5.31	0.01	0.00	0.00
20.00	0.00	0.008	5.29	0.00	0.00	0.00
22.00	0.00	0.008	5.24	0.00	0.00	0.00
24.00	0.00	0.008	5.18	0.00	0.00	0.00
26.00	0.00	0.007	5.04	0.00	0.00	0.00
28.00	0.00	0.006	4.91	0.00	0.00	0.00
30.00	0.00	0.006	4.78	0.00	0.00	0.00
32.00	0.00	0.005	4.66	0.00	0.00	0.00
34.00	0.00	0.004	4.54	0.00	0.00	0.00
36.00	0.00	0.004	4.44	0.00	0.00	0.00
38.00	0.00	0.003	4.34	0.00	0.00	0.00
40.00	0.00	0.003	4.24	0.00	0.00	0.00
42.00	0.00	0.002	4.15	0.00	0.00	0.00
44.00	0.00	0.002	4.06	0.00	0.00	0.00
46.00	0.00	0.001	3.96	0.00	0.00	0.00
48.00	0.00	0.001	3.81	0.00	0.00	0.00
50.00	0.00	0.001	3.68	0.00	0.00	0.00
52.00	0.00	0.000	3.56	0.00	0.00	0.00
54.00	0.00	0.000	3.50	0.00	0.00	0.00
56.00	0.00	0.000	3.50	0.00	0.00	0.00
58.00	0.00	0.000	3.50	0.00	0.00	0.00
60.00	0.00	0.000	3.50	0.00	0.00	0.00
62.00	0.00	0.000	3.50	0.00	0.00	0.00
64.00	0.00	0.000	3.50	0.00	0.00	0.00
66.00	0.00	0.000	3.50	0.00	0.00	0.00
68.00	0.00	0.000	3.50	0.00	0.00	0.00
70.00	0.00	0.000	3.50	0.00	0.00	0.00
72.00	0.00	0.000	3.50	0.00	0.00	0.00

Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

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Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 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 2S: Roof and Road Runoff Area=2,200 sf 100.00% Impervious Runoff Depth=6.56"
Tc=5.0 min CN=98 Runoff=0.35 cfs 0.028 af

Subcatchment 4S: no detention Runoff Area=300 sf 0.00% Impervious Runoff Depth=3.87"
Tc=5.0 min CN=74 Runoff=0.03 cfs 0.002 af

Subcatchment 6S: Existing Runoff Area=2,500 sf 49.84% Impervious Runoff Depth=5.17"
Tc=5.0 min CN=86 Runoff=0.35 cfs 0.025 af

Reach 6R: Proposed Inflow=0.33 cfs 0.015 af
Outflow=0.33 cfs 0.015 af

Pond 5P: (new Pond) Peak Elev=5.65' Storage=0.010 af Inflow=0.35 cfs 0.028 af
Discarded=0.01 cfs 0.015 af Primary=0.30 cfs 0.013 af Outflow=0.30 cfs 0.028 af

Total Runoff Area = 0.115 ac Runoff Volume = 0.055 af Average Runoff Depth = 5.71"
31.08% Pervious = 0.036 ac 68.92% Impervious = 0.079 ac

Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

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Summary for Subcatchment 2S: Roof and Road

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.028 af, Depth= 6.56"

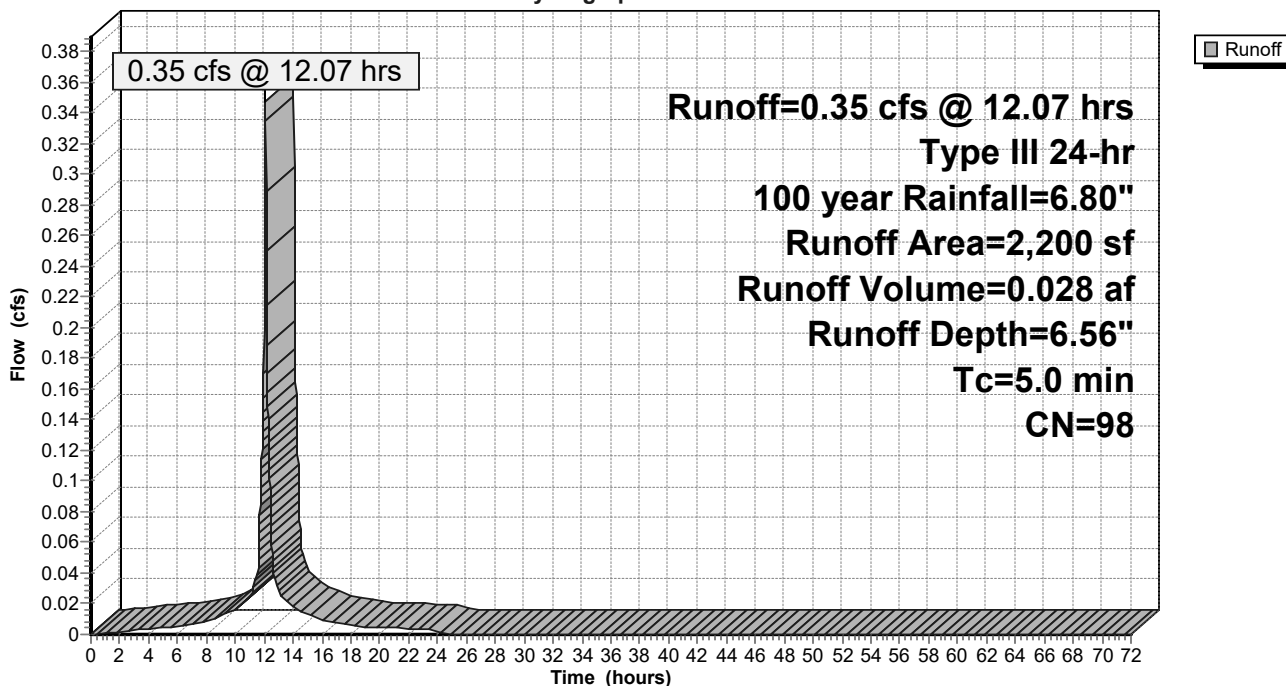
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.80"

Area (sf)	CN	Description
2,200	98	Roofs, HSG C
2,200		100.00% Impervious Area

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

Subcatchment 2S: Roof and Road

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 100 year Rainfall=6.80"*

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Hydrograph for Subcatchment 2S: Roof and Road

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	6.80	6.56	0.00
1.00	0.07	0.00	0.00	53.00	6.80	6.56	0.00
2.00	0.14	0.03	0.00	54.00	6.80	6.56	0.00
3.00	0.21	0.08	0.00	55.00	6.80	6.56	0.00
4.00	0.29	0.14	0.00	56.00	6.80	6.56	0.00
5.00	0.39	0.22	0.00	57.00	6.80	6.56	0.00
6.00	0.49	0.31	0.00	58.00	6.80	6.56	0.00
7.00	0.62	0.42	0.01	59.00	6.80	6.56	0.00
8.00	0.78	0.57	0.01	60.00	6.80	6.56	0.00
9.00	0.99	0.78	0.01	61.00	6.80	6.56	0.00
10.00	1.29	1.07	0.02	62.00	6.80	6.56	0.00
11.00	1.70	1.48	0.02	63.00	6.80	6.56	0.00
12.00	3.40	3.17	0.24	64.00	6.80	6.56	0.00
13.00	5.10	4.86	0.03	65.00	6.80	6.56	0.00
14.00	5.51	5.28	0.02	66.00	6.80	6.56	0.00
15.00	5.81	5.57	0.01	67.00	6.80	6.56	0.00
16.00	6.02	5.79	0.01	68.00	6.80	6.56	0.00
17.00	6.18	5.95	0.01	69.00	6.80	6.56	0.00
18.00	6.31	6.07	0.01	70.00	6.80	6.56	0.00
19.00	6.41	6.18	0.01	71.00	6.80	6.56	0.00
20.00	6.51	6.27	0.00	72.00	6.80	6.56	0.00
21.00	6.59	6.35	0.00				
22.00	6.67	6.43	0.00				
23.00	6.74	6.50	0.00				
24.00	6.80	6.56	0.00				
25.00	6.80	6.56	0.00				
26.00	6.80	6.56	0.00				
27.00	6.80	6.56	0.00				
28.00	6.80	6.56	0.00				
29.00	6.80	6.56	0.00				
30.00	6.80	6.56	0.00				
31.00	6.80	6.56	0.00				
32.00	6.80	6.56	0.00				
33.00	6.80	6.56	0.00				
34.00	6.80	6.56	0.00				
35.00	6.80	6.56	0.00				
36.00	6.80	6.56	0.00				
37.00	6.80	6.56	0.00				
38.00	6.80	6.56	0.00				
39.00	6.80	6.56	0.00				
40.00	6.80	6.56	0.00				
41.00	6.80	6.56	0.00				
42.00	6.80	6.56	0.00				
43.00	6.80	6.56	0.00				
44.00	6.80	6.56	0.00				
45.00	6.80	6.56	0.00				
46.00	6.80	6.56	0.00				
47.00	6.80	6.56	0.00				
48.00	6.80	6.56	0.00				
49.00	6.80	6.56	0.00				
50.00	6.80	6.56	0.00				
51.00	6.80	6.56	0.00				

Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

Prepared by {enter your company name here}

Printed 2/27/2019

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Summary for Subcatchment 4S: no detention

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 3.87"

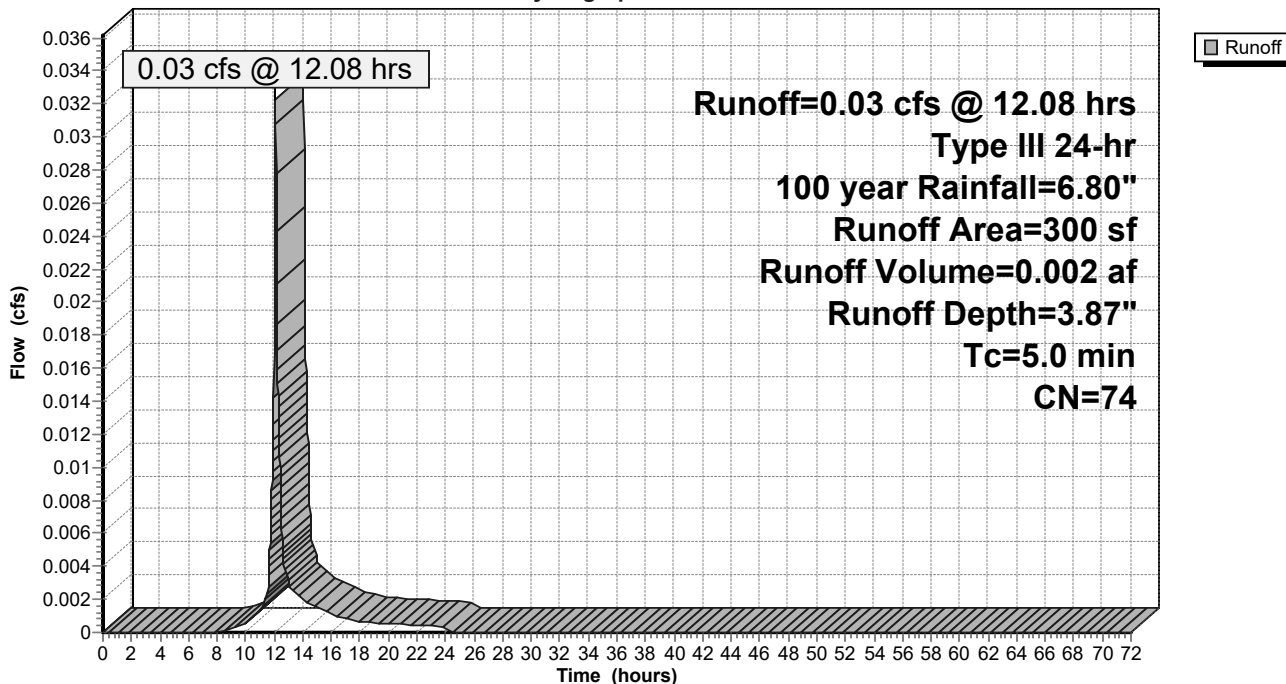
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.80"

Area (sf)	CN	Description
300	74	>75% Grass cover, Good, HSG C
300		100.00% Pervious Area

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

Subcatchment 4S: no detention

Hydrograph



Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

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Hydrograph for Subcatchment 4S: no detention

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	6.80	3.87	0.00
1.00	0.07	0.00	0.00	53.00	6.80	3.87	0.00
2.00	0.14	0.00	0.00	54.00	6.80	3.87	0.00
3.00	0.21	0.00	0.00	55.00	6.80	3.87	0.00
4.00	0.29	0.00	0.00	56.00	6.80	3.87	0.00
5.00	0.39	0.00	0.00	57.00	6.80	3.87	0.00
6.00	0.49	0.00	0.00	58.00	6.80	3.87	0.00
7.00	0.62	0.00	0.00	59.00	6.80	3.87	0.00
8.00	0.78	0.00	0.00	60.00	6.80	3.87	0.00
9.00	0.99	0.02	0.00	61.00	6.80	3.87	0.00
10.00	1.29	0.08	0.00	62.00	6.80	3.87	0.00
11.00	1.70	0.22	0.00	63.00	6.80	3.87	0.00
12.00	3.40	1.17	0.02	64.00	6.80	3.87	0.00
13.00	5.10	2.44	0.00	65.00	6.80	3.87	0.00
14.00	5.51	2.78	0.00	66.00	6.80	3.87	0.00
15.00	5.81	3.02	0.00	67.00	6.80	3.87	0.00
16.00	6.02	3.21	0.00	68.00	6.80	3.87	0.00
17.00	6.18	3.34	0.00	69.00	6.80	3.87	0.00
18.00	6.31	3.45	0.00	70.00	6.80	3.87	0.00
19.00	6.41	3.54	0.00	71.00	6.80	3.87	0.00
20.00	6.51	3.62	0.00	72.00	6.80	3.87	0.00
21.00	6.59	3.69	0.00				
22.00	6.67	3.76	0.00				
23.00	6.74	3.81	0.00				
24.00	6.80	3.87	0.00				
25.00	6.80	3.87	0.00				
26.00	6.80	3.87	0.00				
27.00	6.80	3.87	0.00				
28.00	6.80	3.87	0.00				
29.00	6.80	3.87	0.00				
30.00	6.80	3.87	0.00				
31.00	6.80	3.87	0.00				
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34.00	6.80	3.87	0.00				
35.00	6.80	3.87	0.00				
36.00	6.80	3.87	0.00				
37.00	6.80	3.87	0.00				
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39.00	6.80	3.87	0.00				
40.00	6.80	3.87	0.00				
41.00	6.80	3.87	0.00				
42.00	6.80	3.87	0.00				
43.00	6.80	3.87	0.00				
44.00	6.80	3.87	0.00				
45.00	6.80	3.87	0.00				
46.00	6.80	3.87	0.00				
47.00	6.80	3.87	0.00				
48.00	6.80	3.87	0.00				
49.00	6.80	3.87	0.00				
50.00	6.80	3.87	0.00				
51.00	6.80	3.87	0.00				

Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

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Summary for Subcatchment 6S: Existing

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 5.17"

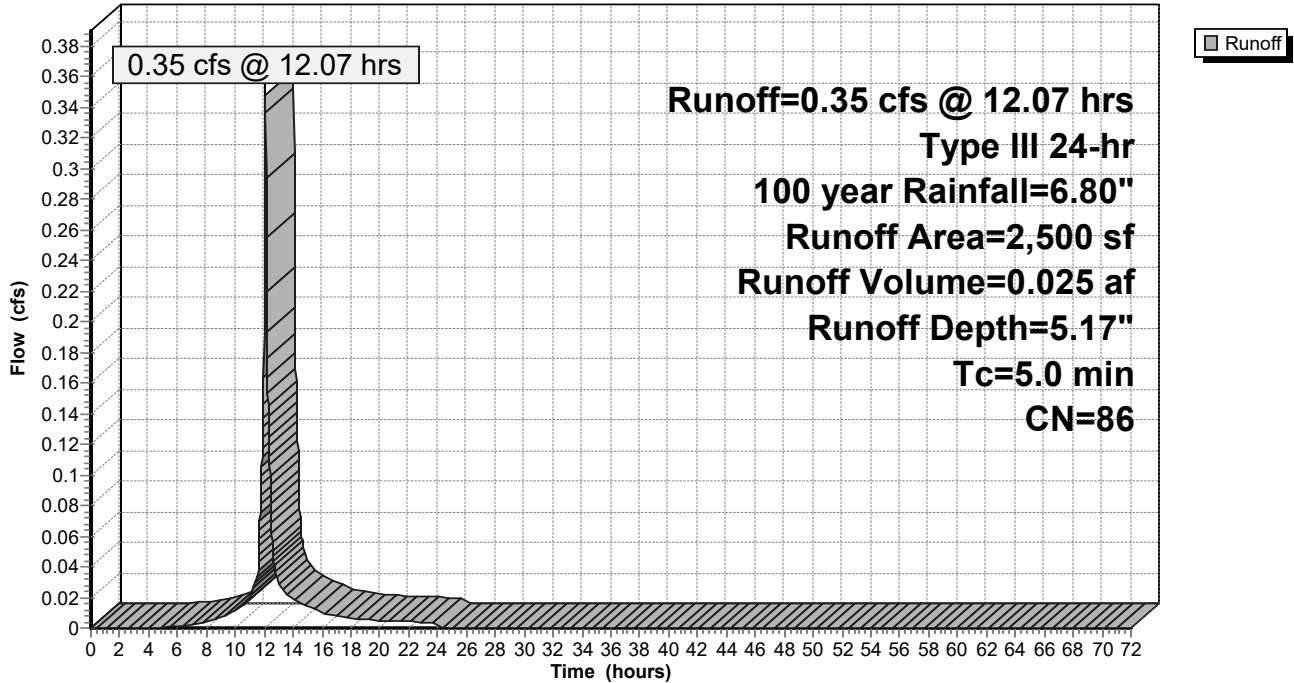
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.80"

	Area (sf)	CN	Description
*	1,246	98	
	1,254	74	>75% Grass cover, Good, HSG C
	2,500	86	Weighted Average
	1,254		50.16% Pervious Area
	1,246		49.84% Impervious Area

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

Subcatchment 6S: Existing

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 100 year Rainfall=6.80"*

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Hydrograph for Subcatchment 6S: Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	6.80	5.17	0.00
1.00	0.07	0.00	0.00	53.00	6.80	5.17	0.00
2.00	0.14	0.00	0.00	54.00	6.80	5.17	0.00
3.00	0.21	0.00	0.00	55.00	6.80	5.17	0.00
4.00	0.29	0.00	0.00	56.00	6.80	5.17	0.00
5.00	0.39	0.00	0.00	57.00	6.80	5.17	0.00
6.00	0.49	0.02	0.00	58.00	6.80	5.17	0.00
7.00	0.62	0.04	0.00	59.00	6.80	5.17	0.00
8.00	0.78	0.10	0.00	60.00	6.80	5.17	0.00
9.00	0.99	0.19	0.01	61.00	6.80	5.17	0.00
10.00	1.29	0.36	0.01	62.00	6.80	5.17	0.00
11.00	1.70	0.63	0.02	63.00	6.80	5.17	0.00
12.00	3.40	2.01	0.23	64.00	6.80	5.17	0.00
13.00	5.10	3.56	0.03	65.00	6.80	5.17	0.00
14.00	5.51	3.95	0.02	66.00	6.80	5.17	0.00
15.00	5.81	4.23	0.01	67.00	6.80	5.17	0.00
16.00	6.02	4.43	0.01	68.00	6.80	5.17	0.00
17.00	6.18	4.59	0.01	69.00	6.80	5.17	0.00
18.00	6.31	4.71	0.01	70.00	6.80	5.17	0.00
19.00	6.41	4.80	0.01	71.00	6.80	5.17	0.00
20.00	6.51	4.89	0.00	72.00	6.80	5.17	0.00
21.00	6.59	4.97	0.00				
22.00	6.67	5.05	0.00				
23.00	6.74	5.11	0.00				
24.00	6.80	5.17	0.00				
25.00	6.80	5.17	0.00				
26.00	6.80	5.17	0.00				
27.00	6.80	5.17	0.00				
28.00	6.80	5.17	0.00				
29.00	6.80	5.17	0.00				
30.00	6.80	5.17	0.00				
31.00	6.80	5.17	0.00				
32.00	6.80	5.17	0.00				
33.00	6.80	5.17	0.00				
34.00	6.80	5.17	0.00				
35.00	6.80	5.17	0.00				
36.00	6.80	5.17	0.00				
37.00	6.80	5.17	0.00				
38.00	6.80	5.17	0.00				
39.00	6.80	5.17	0.00				
40.00	6.80	5.17	0.00				
41.00	6.80	5.17	0.00				
42.00	6.80	5.17	0.00				
43.00	6.80	5.17	0.00				
44.00	6.80	5.17	0.00				
45.00	6.80	5.17	0.00				
46.00	6.80	5.17	0.00				
47.00	6.80	5.17	0.00				
48.00	6.80	5.17	0.00				
49.00	6.80	5.17	0.00				
50.00	6.80	5.17	0.00				
51.00	6.80	5.17	0.00				

Havre Street 199 East Boston

Type III 24-hr 100 year Rainfall=6.80"

Prepared by {enter your company name here}

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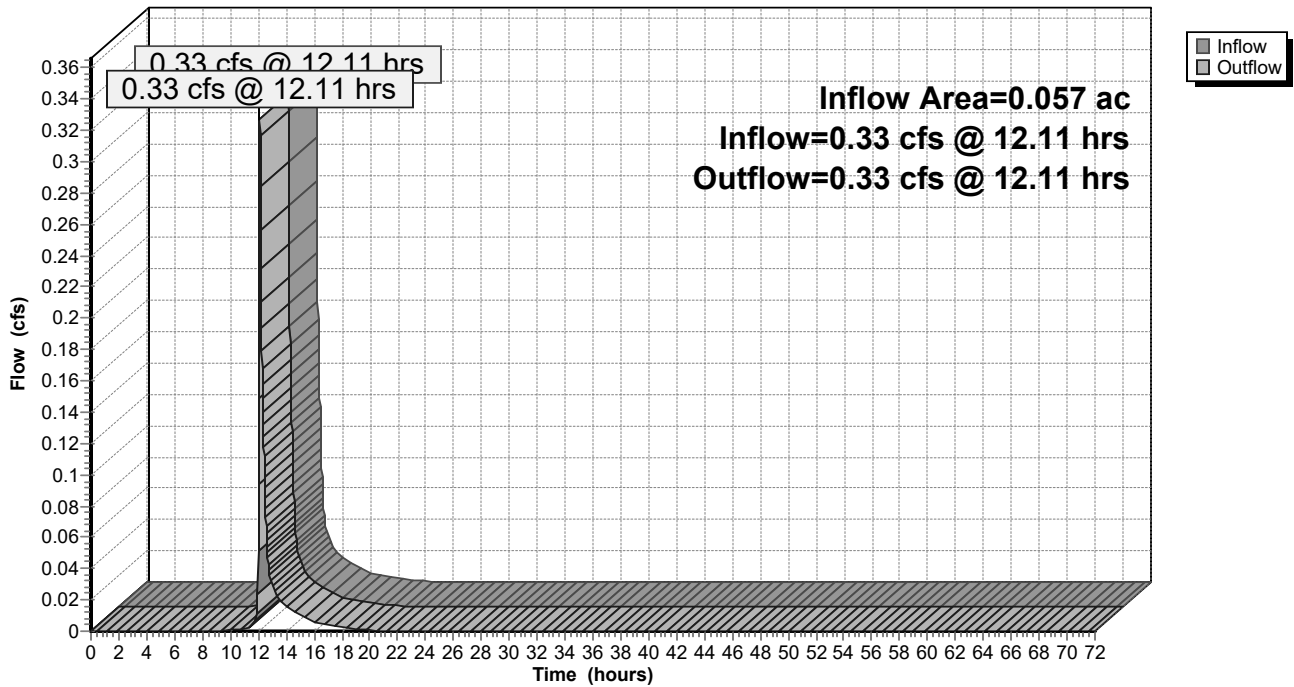
Summary for Reach 6R: Proposed

Inflow Area = 0.057 ac, 88.00% Impervious, Inflow Depth = 3.10" for 100 year event
Inflow = 0.33 cfs @ 12.11 hrs, Volume= 0.015 af
Outflow = 0.33 cfs @ 12.11 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Reach 6R: Proposed

Hydrograph



Havre Street 199 East Boston*Type III 24-hr 100 year Rainfall=6.80"*

Prepared by {enter your company name here}

Printed 2/27/2019

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Hydrograph for Reach 6R: Proposed

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.00		0.00
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.09		0.09	64.00	0.00		0.00
13.00	0.03		0.03	65.00	0.00		0.00
14.00	0.02		0.02	66.00	0.00		0.00
15.00	0.01		0.01	67.00	0.00		0.00
16.00	0.01		0.01	68.00	0.00		0.00
17.00	0.00		0.00	69.00	0.00		0.00
18.00	0.00		0.00	70.00	0.00		0.00
19.00	0.00		0.00	71.00	0.00		0.00
20.00	0.00		0.00	72.00	0.00		0.00
21.00	0.00		0.00				
22.00	0.00		0.00				
23.00	0.00		0.00				
24.00	0.00		0.00				
25.00	0.00		0.00				
26.00	0.00		0.00				
27.00	0.00		0.00				
28.00	0.00		0.00				
29.00	0.00		0.00				
30.00	0.00		0.00				
31.00	0.00		0.00				
32.00	0.00		0.00				
33.00	0.00		0.00				
34.00	0.00		0.00				
35.00	0.00		0.00				
36.00	0.00		0.00				
37.00	0.00		0.00				
38.00	0.00		0.00				
39.00	0.00		0.00				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				

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Summary for Pond 5P: (new Pond)

Inflow Area = 0.051 ac, 100.00% Impervious, Inflow Depth = 6.56" for 100 year event
 Inflow = 0.35 cfs @ 12.07 hrs, Volume= 0.028 af
 Outflow = 0.30 cfs @ 12.11 hrs, Volume= 0.028 af, Atten= 13%, Lag= 2.6 min
 Discarded = 0.01 cfs @ 12.11 hrs, Volume= 0.015 af
 Primary = 0.30 cfs @ 12.11 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
 Peak Elev= 5.65' @ 12.11 hrs Surf.Area= 0.007 ac Storage= 0.010 af

Plug-Flow detention time= 479.2 min calculated for 0.028 af (100% of inflow)
 Center-of-Mass det. time= 479.6 min (1,222.0 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.50'	0.010 af	17.00'W x 18.50'L x 4.54'H Field A 0.033 af Overall - 0.008 af Embedded = 0.025 af x 40.0% Voids
#2A	4.00'	0.008 af	Cultec R-330XLHD x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.018 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	5.30'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	3.50'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1.50'

Discarded OutFlow Max=0.01 cfs @ 12.11 hrs HW=5.65' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.30 cfs @ 12.11 hrs HW=5.65' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.30 cfs @ 2.01 fps)

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Pond 5P: (new Pond) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length

3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 18.0" Side Stone x 2 = 17.00' Base Width

6.0" Base + 30.5" Chamber Height + 18.0" Cover = 4.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,428.4 cf Field - 346.5 cf Chambers = 1,081.9 cf Stone x 40.0% Voids = 432.8 cf Stone Storage

Chamber Storage + Stone Storage = 779.2 cf = 0.018 af

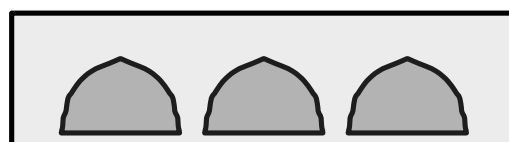
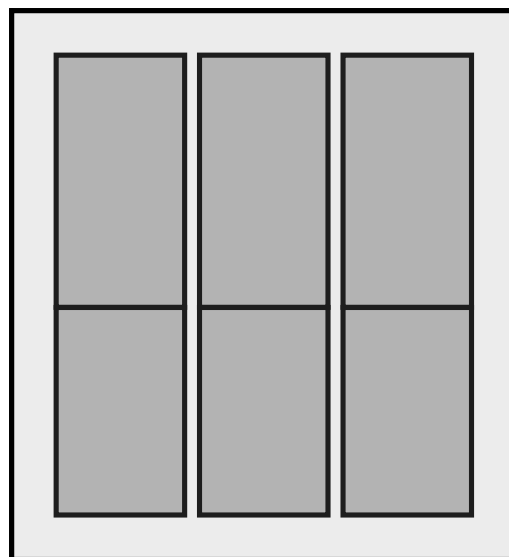
Overall Storage Efficiency = 54.6%

Overall System Size = 18.50' x 17.00' x 4.54'

6 Chambers

52.9 cy Field

40.1 cy Stone



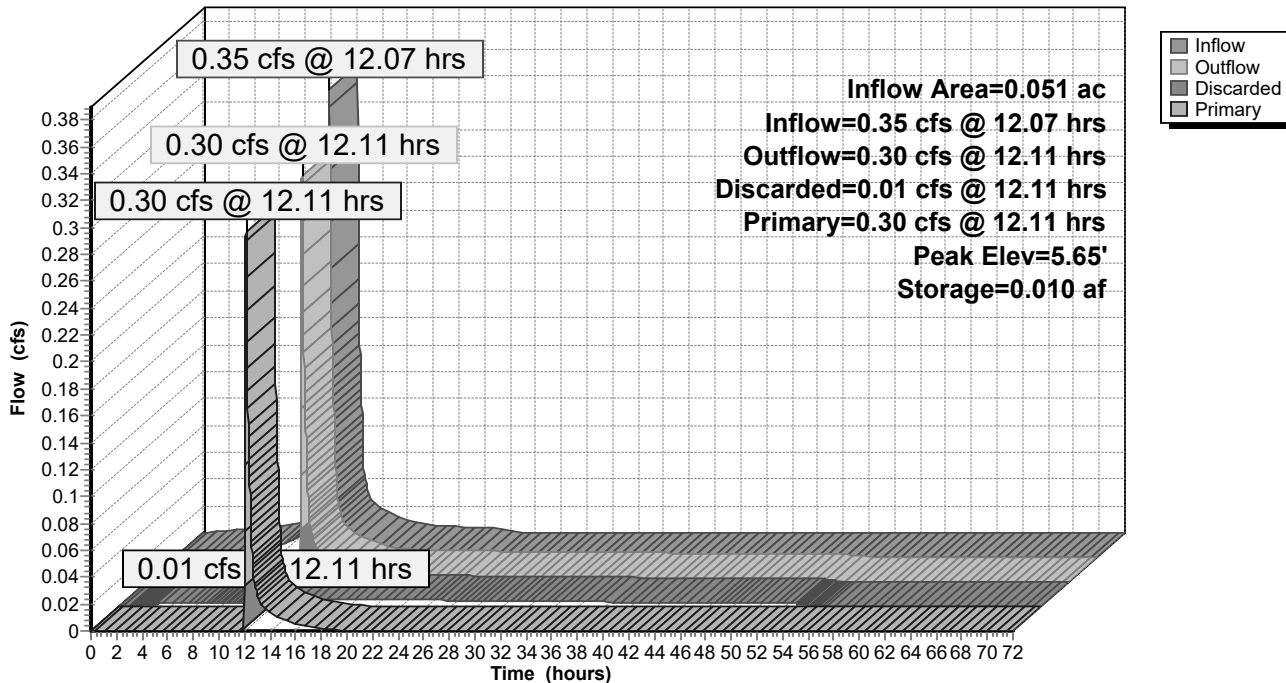
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Pond 5P: (new Pond)

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Hydrograph for Pond 5P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	3.50	0.00	0.00	0.00
2.00	0.00	0.000	3.52	0.00	0.00	0.00
4.00	0.00	0.000	3.58	0.00	0.00	0.00
6.00	0.00	0.001	3.70	0.00	0.00	0.00
8.00	0.01	0.001	3.94	0.00	0.00	0.00
10.00	0.02	0.003	4.26	0.00	0.00	0.00
12.00	0.24	0.009	5.46	0.08	0.01	0.07
14.00	0.02	0.009	5.37	0.02	0.00	0.01
16.00	0.01	0.009	5.34	0.01	0.00	0.01
18.00	0.01	0.008	5.32	0.01	0.00	0.00
20.00	0.00	0.008	5.30	0.01	0.00	0.00
22.00	0.00	0.008	5.28	0.00	0.00	0.00
24.00	0.00	0.008	5.24	0.00	0.00	0.00
26.00	0.00	0.007	5.09	0.00	0.00	0.00
28.00	0.00	0.007	4.96	0.00	0.00	0.00
30.00	0.00	0.006	4.82	0.00	0.00	0.00
32.00	0.00	0.005	4.70	0.00	0.00	0.00
34.00	0.00	0.005	4.59	0.00	0.00	0.00
36.00	0.00	0.004	4.48	0.00	0.00	0.00
38.00	0.00	0.003	4.37	0.00	0.00	0.00
40.00	0.00	0.003	4.27	0.00	0.00	0.00
42.00	0.00	0.002	4.18	0.00	0.00	0.00
44.00	0.00	0.002	4.09	0.00	0.00	0.00
46.00	0.00	0.001	4.01	0.00	0.00	0.00
48.00	0.00	0.001	3.86	0.00	0.00	0.00
50.00	0.00	0.001	3.73	0.00	0.00	0.00
52.00	0.00	0.000	3.60	0.00	0.00	0.00
54.00	0.00	0.000	3.51	0.00	0.00	0.00
56.00	0.00	0.000	3.50	0.00	0.00	0.00
58.00	0.00	0.000	3.50	0.00	0.00	0.00
60.00	0.00	0.000	3.50	0.00	0.00	0.00
62.00	0.00	0.000	3.50	0.00	0.00	0.00
64.00	0.00	0.000	3.50	0.00	0.00	0.00
66.00	0.00	0.000	3.50	0.00	0.00	0.00
68.00	0.00	0.000	3.50	0.00	0.00	0.00
70.00	0.00	0.000	3.50	0.00	0.00	0.00
72.00	0.00	0.000	3.50	0.00	0.00	0.00

**System empty
at 56 hours**