



Nitsch Engineering

August 07, 2019

**NOTICE OF INTENT**

Under the *Massachusetts Wetland Protection Act*  
(MGL c. 131, s. 40) and implementing  
Regulations (310 CMR 10.00) and the  
City of Boston Wetlands Protection Bylaw  
(Rev. 2014)

For

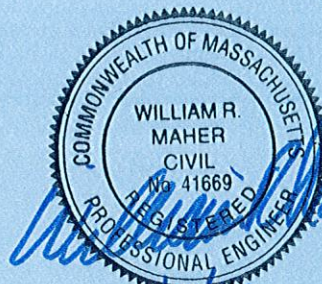
**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared for:

**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared by:

**NITSCH ENGINEERING, INC.**  
2 Center Plaza, Suite 430  
Boston, MA 02108



8/7/19

Nitsch Project #13302



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Yeshiva Ohr Israel – 325 Reservoir Road  
Boston, Massachusetts

Notice of Intent

## **SECTION 1**

### **NOTICE OF INTENT FORMS**

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WPA Form 3 - Notice of Intent  
NOI Wetland Fee Transmittal Form  
Copy of Checks (Local and State Filing Fees)





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

# WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boston

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):

<u>325 Reservoir Road</u>	<u>Boston</u>	<u>02467</u>
a. Street Address	b. City/Town	c. Zip Code
Latitude and Longitude:	<u>42.3312</u>	<u>-71.1570</u>
	d. Latitude	e. Longitude
<u>21053</u>	<u>2102437000</u>	
f. Assessors Map/Plat Number	g. Parcel /Lot Number	

2. Applicant:

<u>Rabbi Uri</u>	<u>Feldman</u>	
a. First Name	b. Last Name	
<u>Yeshiva Ohr Yisrael</u>		
c. Organization		
<u>325 Reservoir Road</u>		
d. Street Address		
<u>Boston</u>	<u>MA</u>	<u>02467</u>
e. City/Town	f. State	g. Zip Code
<u>617-396-8078</u>	<u>RabbiFeldman@OHRYisrael.com</u>	
h. Phone Number	i. Fax Number	j. Email Address

3. Property owner (required if different from applicant):  Check if more than one owner

<u></u>	<u></u>	
a. First Name	b. Last Name	
<u></u>		
c. Organization		
<u></u>		
d. Street Address		
<u></u>	<u></u>	<u></u>
e. City/Town	f. State	g. Zip Code
<u></u>	<u></u>	<u></u>
h. Phone Number	i. Fax Number	j. Email address

4. Representative (if any):

<u>William R.</u>	<u>Maher, PE</u>	
a. First Name	b. Last Name	
<u>Nitsch Engineering</u>		
c. Company		
<u>2 Center Plaza, Suite 430</u>		
d. Street Address		
<u>Boston</u>	<u>MA</u>	<u>02108</u>
e. City/Town	f. State	g. Zip Code
<u>617-338-0063</u>	<u>617-338-6472</u>	<u>wmaher@nitscheng.com</u>
h. Phone Number	i. Fax Number	j. Email address

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

<u>\$1,362.50</u>	<u>\$237.50</u>	<u>\$1,125.00</u>
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid





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### A. General Information (continued)

6. General Project Description:

The project proposes to construct a 3-story addition to the existing private school along with building utility services installations and minor site improvements.

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

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Single Family Home                        | 2. <input type="checkbox"/> Residential Subdivision       |
| 3. <input type="checkbox"/> Commercial/Industrial                     | 4. <input type="checkbox"/> Dock/Pier                     |
| 5. <input type="checkbox"/> Utilities                                 | 6. <input type="checkbox"/> Coastal engineering Structure |
| 7. <input type="checkbox"/> Agriculture (e.g., cranberries, forestry) | 8. <input type="checkbox"/> Transportation                |
| 9. <input checked="" type="checkbox"/> 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

52848

c. Book

b. Certificate # (if registered land)

331

d. Page Number

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

- 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.
- 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.





**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
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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.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input checked="" type="checkbox"/> Bank	0	
	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	

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
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. <input type="checkbox"/> Riverfront Area	1. Name of Waterway (if available) - <b>specify coastal or inland</b>	

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 _____	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet _____	
4. <input type="checkbox"/> 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 BWV _____	b. square feet of Salt Marsh _____
5. <input type="checkbox"/> 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](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**

- 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/nhesp/regulatory\\_review/ mesa/ mesa\\_fee\\_schedule.htm](http://www.mass.gov/dfwele/dfw/nhesp/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/nhesp/regulatory\\_review/ mesa/ mesa\\_exemptions.htm](http://www.mass.gov/dfwele/dfw/nhesp/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](mailto: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](mailto: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)

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.

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



**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

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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.

Yeshiva Ohr Israel Site Utility Plan & Details

a. Plan Title

Nitsch Engineering

William R. Maher, PE

b. Prepared By

c. Signed and Stamped by

1"=10'

d. Final Revision Date

e. Scale

08/07/2019

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:

053229

08/05/2019

2. Municipal Check Number

3. Check date

053230

08/05/2019

4. State Check Number

5. Check date

Nitsch Engineering

6. Payor name on check: First Name

7. Payor name on check: Last Name





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### 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

  
2. Date

3. Signature of Property Owner (if different)

  
5. Signature of Representative (if any)

4. Date

  
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.



**Massachusetts Department of Environmental Protection**  
 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:

325 Reservoir Road  
 a. Street Address  
 053229 & 053230  
 c. Check number  
 Boston  
 b. City/Town  
 \$1,125.00 and \$237.50  
 d. Fee amount

2. Applicant Mailing Address:

Rabbi Uri  
 a. First Name  
 YESHIVA OHR YISRAEL  
 c. Organization  
 325 Reservoir Road  
 d. Mailing Address  
 Boston  
 e. City/Town  
 617-396-8078  
 h. Phone Number  
 MA  
 f. State  
 02467  
 g. Zip Code  
 RabbiFeldman@Ohrlsrael.com  
 j. Email Address  
 i. Fax Number

3. Property Owner (if different):

a. First Name  
 b. Last Name  
 c. Organization  
 d. Mailing Address  
 e. City/Town  
 f. State  
 g. Zip Code  
 h. Phone Number  
 i. Fax Number  
 j. Email Address

**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.

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





Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
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 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Fees** (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 2. J.	1	\$237.50	\$237.50
City of Boston Title 14 Section 450	1	\$1,125.00	\$1,125.00

**Step 5/Total Project Fee:** \$1,362.50

**Step 6/Fee Payments:**

Total Project Fee:	\$1,362.50
State share of filing Fee:	\$237.50
City/Town share of filling Fee:	\$1,125.00

a. Total Fee from Step 5  
 b. 1/2 Total Fee less \$12.50  
 c. 1/2 Total Fee plus \$12.50

**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.)

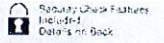
**NITSCH ENGINEERING, INC.**

2 Center Plaza • Suite 430 • 617.338.0063  
Boston, MA 02108

EASTERN BANK  
53-179/113

**053229**  
CHECK DATE

August 5, 2019



PAY One Thousand One Hundred Twenty Five and 00/100 Dollars

**AMOUNT**

TO City of Boston  
Conservation Commission  
Boston City Hall  
1 City Hall Square, Room 709  
Boston, MA 02201

1,125.00

MP  
AUTHORIZED SIGNATURE

⑈053229⑈ ⑆011301798⑆ 601597594⑈

**NITSCH ENGINEERING, INC.**

2 Center Plaza • Suite 430 • 617.338.0063  
Boston, MA 02108

E-MAIL: BUSINESS FORMS 800.392.6019 DDT/TEK/VISION

**053229**

Check Date: 8/5/2019

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
080519-13302.	8/5/2019	0063084	1,125.00			1,125.00
City of Boston		TOTAL	1,125.00			1,125.00
Checking Account	1	10440				



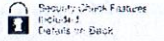
**NITSCH ENGINEERING, INC.**

2 Center Plaza • Suite 430 • 617.338.0063  
Boston, MA 02108

EASTERN BANK  
53-179/113

**053230**  
CHECK DATE

August 5, 2019



PAY Two Hundred Thirty Seven and 50/100 Dollars

AMOUNT

TO Commonwealth of Massachusetts  
Department of Environmental Protection  
P.O. Box 4062  
Boston, MA 02211

237.50

<sup>M</sup>  
AUTHORIZED SIGNATURE

⑈053230⑈ ⑆011301798⑆ 601597594⑈

**NITSCH ENGINEERING, INC.**

2 Center Plaza • Suite 430 • 617.338.0063  
Boston, MA 02108

EAMILY BUSINESS FORMS 800.392.6018 DELTEK VISION

**053230**

Check Date: 8/5/2019

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
080519-13302.	8/5/2019	0063085	237.50			237.50
Commonwealth of Massachusetts			TOTAL			237.50
Checking Account	2	10500				

**SECTION 2**  
**PROJECT NARRATIVE**

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**PROJECT NARRATIVE CONTENTS**

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## **1.0 EXECUTIVE SUMMARY**

---

On behalf of the Applicant, Yeshiva Ohr Yisrael, Nitsch Engineering, Inc. is filing the enclosed Notice of Intent (NOI) with the City of Boston Conservation Commission for the proposed construction of a 3-story building addition to the existing on-site High School building, driveway improvements and installation of new utilities and drainage structures within the limits of the project, which are partially located within the buffer zone to bank associated with an Intermittent Stream (subsequently referred to as the “Project”) as further discussed in the narrative below. The purpose of this NOI Application is to receive an Order of Conditions from the City of Boston Conservation Commission approving the proposed project under the *Wetlands Protection Act* (M.G.L. c. 131, s. 40, the Act) and its implementing Regulations (310 CMR 10.00, Regulations).

The proposed site improvements within the Buffer Zone/Resource Areas include:

- Construct a 3-story building addition;
- Water, sewer, gas, drainage and electric utility services;
- Stabilization of proposed storm drain outfall;
- Landscaping; and
- Associated earthwork and revegetation.

The Project includes several mitigation measures to offset the impacts including, stormwater management system, erosion and sedimentation controls, etc. These mitigation measures are further discussed in the narrative below.

## **2.0 EXISTING CONDITIONS**

---

### **2.1 Existing Site Description**

The 0.40± acre project site is located at 325 Reservoir Road in Boston, MA, which is currently a single-family home used as a high school, with an associated driveway and lawn/patio areas.

Existing utilities within the project limits include a gas line, sewer line, water line, electric lines, telecom lines and overhead wires. Refer to Appendix E for USGS and Aerial maps of the project site.

Under existing conditions, a portion of the site drainage flows to the easterly side of the site to an existing intermittent stream while the other portion flows West and North to the abutting properties. There are no drainage structures on site or stormwater management systems to provide minimal peak flow mitigation, no groundwater recharge and no water quality treatment and does not meet the current MassDEP Stormwater Management Standards.

### **2.2 Other Environmental Considerations**

#### FEMA Flood Zone

Based on the FEMA Flood Insurance Rate Map for the Suffolk County (Map Numbers 25025C0058G and 25025C0059G both dated September 25, 2009), the Project limit of work is located within a Zone X (unshaded). Zone X is defined as “Areas determined to be outside the 0.2% annual chance floodplain” which is outside of the 100- and 500-year Flood Boundaries (Refer to Figure 3).

#### NHESP Priority and Estimated Habitat

The Project is not located within areas mapped as Priority Habitat of Rare Species and/or Estimated Habitat of Rare Wildlife by the Natural Heritage and Endangered Species Program under the



Massachusetts Endangered Species Act and the Massachusetts Wetlands Protection Act, respectively (Natural Heritage Atlas, 2017).

### 3.0 PROPOSED CONDITIONS

#### 3.1 Overview of Proposed Work

The Project includes the construction of an approximate 1,911± sf footprint building addition and installation of building service utilities and site drainage features within the limits of the project. Portions of the existing driveway will be converted to vegetated areas. Portions of the site that exist as vegetated areas will be converted to either roof areas or other impervious areas such as walkways and a new access driveway along the southwestern portion of the site. Overall, there is an increase in impervious area (Refer to Table 1) of approximately 2,936-sf.

**Table 1. Proposed land use for 325 Reservoir Road (in sf)**

Land Use	Existing Site (sf)	Proposed Site (sf)	Change
<b>Building Roof</b>	1,898	3,809	+1,911
<b>Pavement</b>	4,828	5,853	+1,025
<b>Total Impervious Area</b>	6,726	9,662	+2,936
<b>Water Surface (Brook)</b>	755	755	0
<b>Total Pervious Area (Grass)</b>	10,014	7,078	-2,936
Total Area (Total Impervious Area + Total Pervious Area)	17,495	17,495	---

The proposed project also includes the installation of a new stormwater management system that was designed in accordance with the MassDEP Stormwater Management Standards and the City of Boston. The proposed system will provide peak flow mitigation, improve water quality, and provide groundwater recharge.

The proposed storm drainage system includes an overflow flared-end (FES) pipe with stone riprap that will overflow to the intermittent stream. Additionally, the area adjacent to the proposed outfall pipe will be stabilized. Though some work will occur near the bank of the intermittent stream, no work is expected to occur to the bank itself; however, the areas will be fully stabilized to improve the overall function of the resource area.

The Project will also implement long-term pollution prevention and source control measures, including inspections and maintenance of stormwater BMPs. Refer to the enclosed Stormwater Report for additional information on the proposed stormwater management system.

#### 3.2 Snow Removal

Generally, snow will be moved to the edge of the driveway, basketball court and walkways into grass and landscaped areas. Additionally, the Owner will comply following specific requirements:

- During typical snow plowing operations, snow shall be pushed to designated snow removal areas.
- Snow shall not be stockpiled in wetland resource areas or drainage system components.
- In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.
- There will be no usage of salt-based deicing chemicals within buffer areas of the wetland resources areas.
- Deicing chemicals shall be stored inside the building and shall be used at exterior stairs and walkways.
- Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris.

**4.0 WETLAND RESOURCE AREA IMPACTS**

The Project has been designed to limit disturbance to wetland resource areas to the maximum extent possible. However, due to the proximity of the Project site to the nearby wetland system, some of the proposed work will occur within the 100-foot buffer. Table 2 provides a summary of the wetland resource areas impacted by the proposed project.

**Table 2. Summary of alteration within jurisdiction wetland resource areas**

Wetland Resource Area	Proposed Alteration Area (sf) (Temporary/Permanent)	New Impervious Area (sf)
100' Buffer Zone to the Bank Associated with an Intermittent Stream	6,732± SF	4,774± SF

**4.1 Proposed Work Within the 100-foot Buffer Zone**

The proposed site improvements within the 100-foot Buffer Zone to the Bank Associated with an Intermittent Stream:

- Construction of a proposed 3-story addition to the existing residential building used as a high school;
- Water, sewer, gas, drainage and electric utility services;
- Stabilization of proposed storm drain outfall;
- Landscaping; and
- Associated earthwork and revegetation.

**5.0 PROPOSED MITIGATION MEASURES**

The proposed project includes numerous mitigation measures to reduce the impact of the project on adjacent environmentally-sensitive areas.

**5.1 Construction Period Erosion and Sedimentation Controls**

Erosion and sedimentation controls are proposed to minimize the construction-related impacts of the proposed project to the Bank associated with an Intermittent Stream. Straw wattles and siltation fences will be installed along the perimeter of the site to capture sediment on site. All catch basins, existing and proposed, will be equipped with inlet protection devices to prevent sediment and debris from construction from entering the drainage network.



The total disturbed area for the project is not greater than one (1) acre and therefore the project does not need to obtain a National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) through the United States Environmental Protection Agency (EPA).

## **5.2 Post-Construction Stormwater Management**

The proposed stormwater management system is designed in accordance with the MassDEP Stormwater Management Standards and the City of Boston Stormwater Management Standards. Best Management Practices (BMPs) will be used to mitigate potential changes in runoff, promote infiltration, and provide water quality treatment.

Water quality treatment will be achieved to the maximum extent practicable using deep sump catch basins, a rain garden, a water quality swale and a subsurface infiltration system. These BMPs were selected because they efficiently remove stormwater pollutants including Total Suspended Solids (TSS). The proposed infiltration system, water quality swale and the rain garden will promote groundwater recharge. The enclosed Stormwater Report details the proposed stormwater management system and its compliance with local and state regulations

The Stormwater Report includes an Operation and Maintenance Plan (O&M) that was prepared in compliance with Standard 9 of the 2008 MassDEP Stormwater Handbook to provide best management practices for implementing maintenance activities for the stormwater management system in a manner that minimizes impacts to wetland resource areas. The project Owner has reviewed and agreed to implement the operation and maintenance practices outlined in the Plan.

## **5.3 Long-Term Pollution Prevention**

A Long-Term Pollution Prevention Plan has been prepared in compliance with the Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which require provisions for the following:

- Good Housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Storage and used of fertilizers, herbicides, and pesticides
- Pet waste management
- Proper management of deicing chemicals and snow

The project Owner has reviewed and agreed to implement the management practices outlined in the Plan and proactively conduct operations at the Project site in an environmentally-responsible manner.

## **6.0 INTERESTS OF THE WETLANDS PROTECTION ACT**

---

The Wetlands Protection Act regulates wetland resource areas in order to contribute to the following interests:

- Protection of Public and Private Water Supply
- Protection of Groundwater Supply
- Flood Control
- Storm Damage Prevention

- Prevention of Pollution
- Protection of Land Containing Shellfish
- Protection of Fisheries
- Protection of Wildlife Habitat

By implementing Low Impact Development techniques and installing stormwater best management practices on the Project site, the proposed project will protect the interests of the Wetlands Protection Act, including protection of groundwater supply, prevention of storm damage, and prevention of pollution. The other interests, which pertain to the protection of public and private water supply, flood control, land containing shellfish, fisheries and wildlife habitat are not relevant to the proposed Project.

## **7.0 CONCLUSION**

---

On behalf of the Applicant, Nitsch Engineering is filing the enclosed Notice of Intent (NOI) Application with the City of Boston Conservation Commission for the construction of a building addition with utility and site modifications. The Project provides numerous mitigation measures including: limiting clearing and disturbance in wetland resource areas, minimizing the disturbance within resource area boundaries, minimization of earthwork and improving the stormwater management system to meet the MassDEP Stormwater Management Standards. This NOI report and supporting documentation provide a thorough description of the design details and regulatory compliance in accordance with the pertinent Wetland Statutes and Regulations. The Applicant seeks an Order of Conditions approving the Project as proposed.



**SECTION 3**  
**STORMWATER REPORT**

---





**Nitsch Engineering**

August 07, 2019

**STORMWATER  
REPORT**

For

**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared for:

**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared by:

**NITSCH ENGINEERING, INC.**  
2 Center Plaza, Suite 430  
Boston, MA 02108

Nitsch Project #13302



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- Appendix B Proposed Conditions – HydroCAD Calculations**
- Appendix C Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan**
- Appendix D STORMWATER MANAGEMENT STANDARDS DOCUMENTATION**
  - MassDEP Checklist for Stormwater Report
  - Standard 10: Illicit Discharge Compliance Statement

## 1.0 INTRODUCTION

---

On behalf of the Applicant, Yeshiva Ohr Yisrael, Nitsch Engineering, Inc. is filing the enclosed Notice of Intent (NOI) with the City of Boston Conservation Commission for the proposed construction of a 3-story building addition to the existing on-site High School building, driveway improvements and installation of new utilities and drainage structures within the limits of the project, which are partially located within the buffer zone to bank associated with an Intermittent Stream (subsequently referred to as the "Project") as further discussed in the narrative below. The purpose of this NOI Application is to receive an Order of Conditions from the City of Boston Conservation Commission approving the proposed project under the *Wetlands Protection Act* (M.G.L. c. 131, s. 40, the Act) and its implementing Regulations (310 CMR 10.00, Regulations).

The proposed site improvements within the Buffer Zone/Resource Areas include:

- Construct a 3-story building addition;
- Water, sewer, gas, drainage and electric utility services;
- Landscaping; and
- Associated earthwork and revegetation.

The Project includes several mitigation measures to offset the impacts including, stormwater management system, erosion and sedimentation controls, etc. These mitigation measures are further discussed in the narrative below.

## 2.0 EXISTING CONDITIONS

---

The 0.40±-acre project site is located at 325 Reservoir Road in Boston, MA, which is currently a single-family home used as a high school, with an associated driveway and lawn/patio areas.

Existing utilities within the project limits include a gas line, water line, electric lines, telecom lines and overhead wires. Refer to Appendix A for USGS and Aerial maps of the project site.

Under existing conditions, a portion of the site drainage flows to the easterly side of the site to an existing intermittent stream while the other portion flows West and North to the abutting properties. There are no drainage structures on site or stormwater management systems to provide minimal peak flow mitigation, no groundwater recharge and no water quality treatment and does not meet the current MassDEP Stormwater Management Standards.

### 2.1 NRSC Soil Designations

The Natural Resources Conservation Service Classified the soils within the site as Urban Land and the soils in surrounding areas as Newport-Urban Land complex (Hydrologic Soil Group "B") and Udorthents, Loamy (Hydrologic Soil Group "A") as noted in Table 1 below.

Table 1. NRCS Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
627C	Newport-Urban land complex 3-15% slopes	B
654	Udorthents, loamy	A



**2.2 Wetland Resource Areas**

LEC Environmental Consultants, Inc. delineated the Wetland Resource Areas on the project site which includes an intermittent stream. The Bank associated with an intermittent stream is located on the west side of the site near the MBTA Green Line railroad tracks.

**3.0 PROPOSED CONDITIONS**

**3.1 Project Description**

The Project includes the construction of an approximate 1,911± square foot (sf) footprint building addition and installation of building service utilities and site drainage features within the limits of the project. Portions of the existing driveway will be converted to vegetated areas. Portions of the site that exist as vegetated areas will be converted to either roof areas or other impervious areas such as walkways and a new access driveway along the southwestern portion of the site. Overall, there is an increase in impervious area (Refer to Table 2) of approximately 2,936-sf.

Table 2. Proposed land use for 325 Reservoir Road (in sf)

Land Use	Existing Site (sf)	Proposed Site (sf)	Change
Building Roof	1,898	3,809	+1,911
Pavement	4,828	5,853	+1,025
<b>Total Impervious Area</b>	<b>6,726</b>	<b>9,662</b>	<b>+2,936</b>
Water Surface (Brook)	755	755	0
<b>Total Pervious Area</b>	<b>10,014</b>	<b>7,078</b>	<b>-2,936</b>
Total Area (Total Impervious Area + Total Pervious Area)	17,495	17,495	---

**3.2 Stormwater Management System**

The Stormwater Management system is comprised of a subsurface infiltration system to collect and infiltrate runoff from roof drains and paved surfaces captured via area drains and treated via water quality structure before discharging to the Intermittent Stream on site.

**3.3 Stormwater Management During Construction**

The total disturbed area for the project is not greater than one (1) acre and therefore the project does not need to obtain a National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) through the United States Environmental Protection Agency (EPA).



## **4.0 STORMWATER MANAGEMENT ANALYSIS**

---

### **4.1 Methodology**

Nitsch Engineering completed a hydrologic analysis of the existing project site utilizing Soil Conservation Service (SCS) Runoff Curve Number (CN) methodology. The SCS method calculates the rate at which the runoff reaches the design point considering several factors: the slope and flow lengths of the subcatchment area, the soil type of the subcatchment area, and the type of surface cover in the subcatchment area. HydroCAD Version 10.00 computer modeling software was used in conjunction with the SCS method to determine the peak runoff rates and runoff volumes for the 2-, 10-, 25-, and 100-year, 24-hour storm events. The proposed project site is being analyzed with the same methodology.

The Site was divided into multiple drainage areas, or subcatchments, which drain to the design points along the property boundary and within the site. For each subcatchment area, SCS Runoff Curve Numbers (CNs) were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates and runoff volumes for the 2-, 10-, 25- and 100-year 24-hour storm events were then determined by inputting the drainage areas, CNs, and time of concentration ( $T_c$ ) paths into the HydroCAD model.

### **4.2 HydroCAD Version 10.00**

The HydroCAD computer program uses SCS and TR-20 methods to model drainage systems. TR-20 (Technical Release 20) was developed by the Soil Conservation Service to estimate runoff and peak discharges in small watersheds. TR-20 is generally accepted by engineers and reviewing authorities as the standard method for estimating runoff and peak discharges.

HydroCAD Version 10.00 uses up to four types of components to analyze the hydrology of a given site: subcatchments, reaches, basins, and links. Subcatchments are areas of land that produce surface runoff. The area, weighted CN, and  $T_c$  characterize each individual subcatchment area. Reaches are generally uniform streams, channels, or pipes that convey water from one point to another. A basin is any impoundment that fills with water from one or more sources and empties via an outlet structure. Links are used to introduce hydrographs into a project from another source or to provide a junction for more than one hydrograph within a project. The time span for the model was set for 0-48 hours in order to prevent truncation of the hydrograph.

### **4.3 Precipitation Data**

Nitsch Engineering, Inc. used NOAA Atlas 14 Point Precipitation Frequency Estimates as prepared by the Hydrometeorological Design Studies Center to estimate the rainfall for the 2-year, 10-year, 25-year and 100-year 24-hour storms. The rainfall values that will be used are as follows:

Storm Event	24-hour Rainfall
2-year	3.26 in.
10-year	5.14 in.
25-year	6.32 in.
100-year	8.14 in.

### **4.4 Existing Hydrologic Conditions**

As summarized in Table 2, Nitsch Engineering delineated the project site into one (1) on-site subcatchment (watershed) area discharging to one (1) design point utilizing an existing conditions survey and on-site observations (Refer to Figures DA-EX and DA-PR). The design point (DP) is defined as Off-Site north of the project site. The HydroCAD model for existing conditions is provided in Appendix A.

#### 4.5 Proposed Hydrologic Conditions

The proposed project has been designed to mimic existing hydrologic conditions. The existing watershed area was modified to reflect the proposed topography and roof areas. The HydroCAD model for proposed conditions is provided in Appendix B.

#### 4.6 Peak Flow Rates

The proposed stormwater management system is expected to decrease the proposed peak runoff rates to below the existing rates for Design Point DP-1 for all analyzed storm events. Tables 3 and 4 below summarize the existing and proposed hydrologic analyses for the site at the design point.

Table 3 – Peak Rates of Runoff for Design Point DP-1 (in Cubic Feet per Second [cfs])

Storm Event	2-year	10-year	25-year	100-year
Existing	0.71	1.46	1.95	2.71
Proposed	0.54	1.36	1.82	2.48

Table 4 – Peak Volumes of Runoff for Design Point DP-1 (in Cubic-Feet [cf])

Storm Event	2-year	10-year	25-year	100-year
Existing	2,211	4,533	6,089	8,565
Proposed	1,283	3,274	4,667	6,972

### 5.0 MassDEP Stormwater Management Standards

The Project is considered a **redevelopment** under the DEP Stormwater Management System. The Site will be designed to meet the MassDEP Stormwater Management Standards to the maximum extent practicable as summarized below:

#### Standard 1: No New Untreated Discharges

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

*The Project is not proposing any new untreated discharges. This standard is met.*

#### Standard 2: Peak Rate Attenuation

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

*Peak rates in the proposed conditions are less than peak rates in existing conditions for discharges to the existing Off-Site (DP-1R). This standard is met to the maximum extent practicable.*



### **Standard 3: Groundwater Recharge**

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

*This standard is met to the maximum extent practicable through the use of an underground infiltration system and a water quality structure.*

### **Standard 4: Water Quality Treatment**

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

- a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
- b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
- c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

*On-site water quality measures are provided to the maximum extent practicable through the use of an underground infiltration system and water quality unit (proprietary separator).*

### **Standard 5: Land Uses with Higher Potential Pollutant Loads**

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

*The project is not associated with any Land Uses with Higher Potential Pollutant Loads. Therefore, this standard is not applicable.*

### **Standard 6: Critical Areas**

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest



and best practical method of treatment. A “storm water discharge” as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

*The Project is not located within any critical area. Therefore, this standard is not applicable.*

#### **Standard 7: Redevelopments**

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

*The project is a redevelopment and will meet all applicable standards to the maximum extent practicable.*

#### **Standard 8: Construction Period Pollution Prevention and Sedimentation Control**

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

*A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) will be developed and implemented during the Notice of Intent permitting process.*

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

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

*A post-construction operation and maintenance plan has been prepared and will be implemented to ensure that stormwater management systems function as designed. Source control and stormwater BMP operation requirements for the academic campus are summarized in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan provided in Appendix E.*

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

All illicit discharges to the stormwater management system are prohibited.

*There will be no illicit discharges to the stormwater management system associated with the Project. An Illicit Discharge Compliance Statement is provided in Appendix F.*

## **6.0 CONCLUSION**

---

In conclusion, the Project's stormwater management system will reduce peak runoff rates and volumes of stormwater through the use of infiltration BMPs and improve the water quality of stormwater being discharged from the Site. The Project is being designed to meet and exceed the MassDEP Stormwater Management Standards to the maximum extent possible.



**FIGURES**

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- DR-EX      Pre-development Subcatchment Plan
- DR-PR      Post-development Subcatchment Plan





REV.	COMMENTS	DATE

**DA-PR**



**APPENDIX A**

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**Pre-Development Conditions – HydroCAD Calculations**

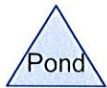




Site



Off-Site



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## Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
10,014	69	50-75% Grass cover, Fair, HSG B (1S)
4,828	98	Unconnected pavement, HSG B (1S)
1,898	98	Unconnected roofs, HSG B (1S)
755	98	Water Surface, HSG B (1S)
<b>17,495</b>	<b>81</b>	<b>TOTAL AREA</b>



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## Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
17,495	HSG B	1S
0	HSG C	
0	HSG D	
0	Other	
<b>17,495</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	10,014	0	0	0	10,014	50-75% Grass cover, Fair
0	4,828	0	0	0	4,828	Unconnected pavement
0	1,898	0	0	0	1,898	Unconnected roofs
0	755	0	0	0	755	Water Surface
<b>0</b>	<b>17,495</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17,495</b>	<b>TOTAL AREA</b>

**13302 - HydroCAD - Pre**

Type III 24-hr 1-Inch Rainfall=1.00"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=0.10"  
Tc=6.0 min CN=81 Runoff=0.02 cfs 143 cf

**Reach DP-1: Off-Site**

Inflow=0.02 cfs 143 cf  
Outflow=0.02 cfs 143 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 143 cf Average Runoff Depth = 0.10"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



**13302 - HydroCAD - Pre**

Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.02 cfs @ 12.27 hrs, Volume= 143 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

### Summary for Reach DP-1: Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 0.10" for 1-Inch event  
Inflow = 0.02 cfs @ 12.27 hrs, Volume= 143 cf  
Outflow = 0.02 cfs @ 12.27 hrs, Volume= 143 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 2-Year Rainfall=3.26"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=1.52"  
Tc=6.0 min CN=81 Runoff=0.71 cfs 2,211 cf

**Reach DP-1: Off-Site**

Inflow=0.71 cfs 2,211 cf  
Outflow=0.71 cfs 2,211 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 2,211 cf Average Runoff Depth = 1.52"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



**13302 - HydroCAD - Pre**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

**Summary for Reach DP-1: Off-Site**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 1.52" for 2-Year event  
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf  
Outflow = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 10-Year Rainfall=5.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=3.11"  
Tc=6.0 min CN=81 Runoff=1.46 cfs 4,533 cf

**Reach DP-1: Off-Site**

Inflow=1.46 cfs 4,533 cf  
Outflow=1.46 cfs 4,533 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 4,533 cf Average Runoff Depth = 3.11"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



**13302 - HydroCAD - Pre**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

**Summary for Reach DP-1: Off-Site**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 3.11" for 10-Year event  
Inflow = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf  
Outflow = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 25-Year Rainfall=6.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=4.18"  
Tc=6.0 min CN=81 Runoff=1.95 cfs 6,089 cf

**Reach DP-1: Off-Site**

Inflow=1.95 cfs 6,089 cf  
Outflow=1.95 cfs 6,089 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 6,089 cf Average Runoff Depth = 4.18"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



**13302 - HydroCAD - Pre**

Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

### Summary for Reach DP-1: Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 4.18" for 25-Year event  
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf  
Outflow = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 100-Year Rainfall=8.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=5.87"  
Tc=6.0 min CN=81 Runoff=2.71 cfs 8,565 cf

**Reach DP-1: Off-Site**

Inflow=2.71 cfs 8,565 cf  
Outflow=2.71 cfs 8,565 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 8,565 cf Average Runoff Depth = 5.87"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



**13302 - HydroCAD - Pre**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

### Summary for Reach DP-1: Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 5.87" for 100-Year event  
Inflow = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf  
Outflow = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**APPENDIX B**

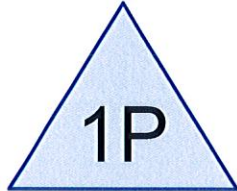
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**Post-Development Conditions – HydroCAD Calculations**





Site



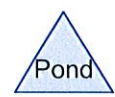
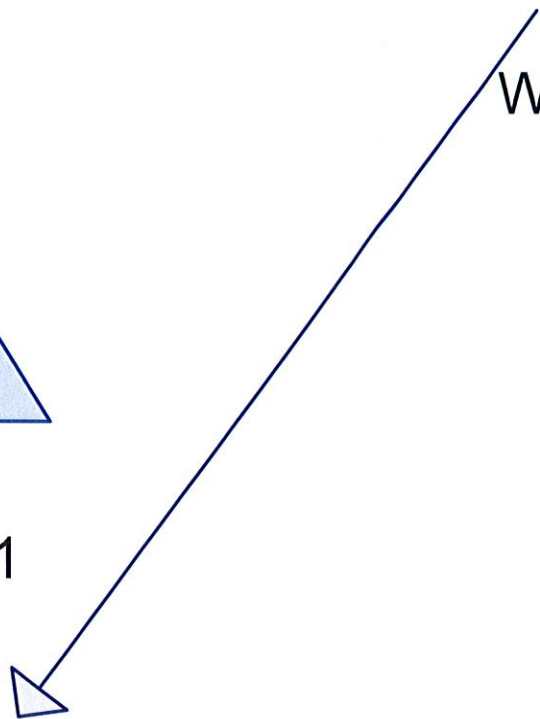
SIS #1



Off-Site



West Site



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Page 2

**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,078	61	>75% Grass cover, Good, HSG B (2S)
3,809	98	Roofs, HSG B (1S)
5,853	98	Unconnected pavement, HSG B (1S)
755	98	Water Surface, HSG B (2S)
<b>17,495</b>	<b>83</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
17,495	HSG B	1S, 2S
0	HSG C	
0	HSG D	
0	Other	
<b>17,495</b>		<b>TOTAL AREA</b>



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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	7,078	0	0	0	7,078	>75% Grass cover, Good
0	3,809	0	0	0	3,809	Roofs
0	5,853	0	0	0	5,853	Unconnected pavement
0	755	0	0	0	755	Water Surface
<b>0</b>	<b>17,495</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17,495</b>	<b>TOTAL AREA</b>

**13302 - HydroCAD - Post**

Type III 24-hr 1-Inch Rainfall=1.00"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=0.79"  
Tc=6.0 min CN=98 Runoff=0.20 cfs 637 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=0.00"  
Tc=6.0 min CN=65 Runoff=0.00 cfs 0 cf

**Reach DP-1: Off-Site**

Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 1P: SIS #1**

Peak Elev=140.28' Storage=235 cf Inflow=0.20 cfs 637 cf  
Discarded=0.02 cfs 637 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 637 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 637 cf Average Runoff Depth = 0.44"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 637 cf, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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



**13302 - HydroCAD - Post**

Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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

**13302 - HydroCAD - Post**

Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 0.00" for 1-Inch event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event  
 Inflow = 0.20 cfs @ 12.08 hrs, Volume= 637 cf  
 Outflow = 0.02 cfs @ 11.72 hrs, Volume= 637 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.02 cfs @ 11.72 hrs, Volume= 637 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 140.28' @ 12.99 hrs Surf.Area= 745 sf Storage= 235 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 100.5 min ( 888.4 - 787.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	597 cf	<b>14.75'W x 50.50'L x 2.75'H Field A</b> 2,049 cf Overall - 558 cf Embedded = 1,492 cf x 40.0% Voids
#2A	140.00'	451 cf	<b>ADS N-12 18" x 10 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 5 rows 12.75' Header x 1.80 sf x 2 = 45.9 cf Inside
		1,048 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>

**Discarded OutFlow** Max=0.02 cfs @ 11.72 hrs HW=139.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=139.50' TW=0.00' (Dynamic Tailwater)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 5 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

5 Rows x 21.0" Wide + 12.0" Spacing x 4 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

10 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 5 Rows + 12.75' Header x 1.80 sf x 2 = 450.9 cf Chamber Storage

10 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 5 Rows + 12.75' Header x 2.23 sf x 2 = 557.7 cf Displacement

2,049.2 cf Field - 557.7 cf Chambers = 1,491.5 cf Stone x 40.0% Voids = 596.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,047.5 cf = 0.024 af

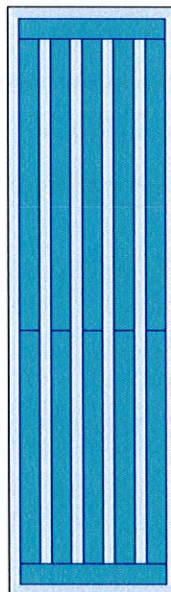
Overall Storage Efficiency = 51.1%

Overall System Size = 50.50' x 14.75' x 2.75'

10 Chambers

75.9 cy Field

55.2 cy Stone





**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=3.03"  
Tc=6.0 min CN=98 Runoff=0.70 cfs 2,437 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=0.63"  
Tc=6.0 min CN=65 Runoff=0.11 cfs 411 cf

**Reach DP-1: Off-Site**

Inflow=0.54 cfs 1,283 cf  
Outflow=0.54 cfs 1,283 cf

**Pond 1P: SIS #1**

Peak Elev=141.36' Storage=762 cf Inflow=0.70 cfs 2,437 cf  
Discarded=0.02 cfs 1,565 cf Primary=0.45 cfs 872 cf Outflow=0.47 cfs 2,438 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 2,849 cf Average Runoff Depth = 1.95"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.70 cfs @ 12.08 hrs, Volume= 2,437 cf, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.11 cfs @ 12.11 hrs, Volume= 411 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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

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*Type III 24-hr 2-Year Rainfall=3.26"*

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 0.88" for 2-Year event  
Inflow = 0.54 cfs @ 12.16 hrs, Volume= 1,283 cf  
Outflow = 0.54 cfs @ 12.16 hrs, Volume= 1,283 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



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Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 3.03" for 2-Year event  
 Inflow = 0.70 cfs @ 12.08 hrs, Volume= 2,437 cf  
 Outflow = 0.47 cfs @ 12.17 hrs, Volume= 2,438 cf, Atten= 33%, Lag= 5.2 min  
 Discarded = 0.02 cfs @ 9.01 hrs, Volume= 1,565 cf  
 Primary = 0.45 cfs @ 12.17 hrs, Volume= 872 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.36' @ 12.17 hrs Surf.Area= 745 sf Storage= 762 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 204.2 min ( 960.2 - 756.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	597 cf	<b>14.75'W x 50.50'L x 2.75'H Field A</b> 2,049 cf Overall - 558 cf Embedded = 1,492 cf x 40.0% Voids
#2A	140.00'	451 cf	<b>ADS N-12 18" x 10 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 5 rows 12.75' Header x 1.80 sf x 2 = 45.9 cf Inside
		1,048 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>

**Discarded OutFlow** Max=0.02 cfs @ 9.01 hrs HW=139.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.45 cfs @ 12.17 hrs HW=141.36' TW=0.00' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 0.45 cfs @ 2.03 fps)

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Type III 24-hr 2-Year Rainfall=3.26"

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### Pond 1P: SIS #1 - Chamber Wizard Field A

#### Chamber Model = ADS N-12 18" (ADS N-12® Pipe)

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 5 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

5 Rows x 21.0" Wide + 12.0" Spacing x 4 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

10 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 5 Rows + 12.75' Header x 1.80 sf x 2 = 450.9 cf Chamber Storage

10 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 5 Rows + 12.75' Header x 2.23 sf x 2 = 557.7 cf Displacement

2,049.2 cf Field - 557.7 cf Chambers = 1,491.5 cf Stone x 40.0% Voids = 596.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,047.5 cf = 0.024 af

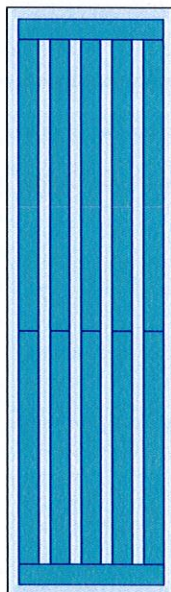
Overall Storage Efficiency = 51.1%

Overall System Size = 50.50' x 14.75' x 2.75'

10 Chambers

75.9 cy Field

55.2 cy Stone



**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=4.90"  
Tc=6.0 min CN=98 Runoff=1.12 cfs 3,948 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=1.75"  
Tc=6.0 min CN=65 Runoff=0.35 cfs 1,141 cf

**Reach DP-1: Off-Site**

Inflow=1.36 cfs 3,274 cf  
Outflow=1.36 cfs 3,274 cf

**Pond 1P: SIS #1**

Peak Elev=141.57' Storage=850 cf Inflow=1.12 cfs 3,948 cf  
Discarded=0.02 cfs 1,815 cf Primary=1.01 cfs 2,133 cf Outflow=1.03 cfs 3,948 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 5,088 cf Average Runoff Depth = 3.49"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 3,948 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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



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Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.35 cfs @ 12.10 hrs, Volume= 1,141 cf, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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

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*Type III 24-hr 10-Year Rainfall=5.14"*

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 2.25" for 10-Year event  
Inflow = 1.36 cfs @ 12.11 hrs, Volume= 3,274 cf  
Outflow = 1.36 cfs @ 12.11 hrs, Volume= 3,274 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 4.90" for 10-Year event  
 Inflow = 1.12 cfs @ 12.08 hrs, Volume= 3,948 cf  
 Outflow = 1.03 cfs @ 12.12 hrs, Volume= 3,948 cf, Atten= 8%, Lag= 2.0 min  
 Discarded = 0.02 cfs @ 7.30 hrs, Volume= 1,815 cf  
 Primary = 1.01 cfs @ 12.12 hrs, Volume= 2,133 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.57' @ 12.12 hrs Surf.Area= 745 sf Storage= 850 cf

Plug-Flow detention time= 158.2 min calculated for 3,947 cf (100% of inflow)  
 Center-of-Mass det. time= 158.3 min ( 905.9 - 747.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	597 cf	<b>14.75'W x 50.50'L x 2.75'H Field A</b> 2,049 cf Overall - 558 cf Embedded = 1,492 cf x 40.0% Voids
#2A	140.00'	451 cf	<b>ADS N-12 18" x 10 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 5 rows 12.75' Header x 1.80 sf x 2 = 45.9 cf Inside
		1,048 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.02 cfs @ 7.30 hrs HW=139.53' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.01 cfs @ 12.12 hrs HW=141.57' TW=0.00' (Dynamic Tailwater)

↑ **2=Orifice/Grate** (Orifice Controls 1.01 cfs @ 2.56 fps)

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Type III 24-hr 10-Year Rainfall=5.14"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 5 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

5 Rows x 21.0" Wide + 12.0" Spacing x 4 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

10 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 5 Rows + 12.75' Header x 1.80 sf x 2 = 450.9 cf Chamber Storage

10 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 5 Rows + 12.75' Header x 2.23 sf x 2 = 557.7 cf Displacement

2,049.2 cf Field - 557.7 cf Chambers = 1,491.5 cf Stone x 40.0% Voids = 596.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,047.5 cf = 0.024 af

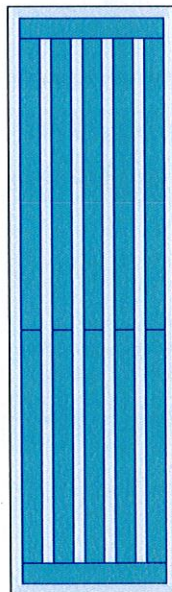
Overall Storage Efficiency = 51.1%

Overall System Size = 50.50' x 14.75' x 2.75'

10 Chambers

75.9 cy Field

55.2 cy Stone





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Type III 24-hr 25-Year Rainfall=6.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=6.08"  
Tc=6.0 min CN=98 Runoff=1.37 cfs 4,897 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=2.59"  
Tc=6.0 min CN=65 Runoff=0.54 cfs 1,688 cf

**Reach DP-1: Off-Site**

Inflow=1.82 cfs 4,667 cf  
Outflow=1.82 cfs 4,667 cf

**Pond 1P: SIS #1**

Peak Elev=141.66' Storage=877 cf Inflow=1.37 cfs 4,897 cf  
Discarded=0.02 cfs 1,918 cf Primary=1.29 cfs 2,979 cf Outflow=1.31 cfs 4,897 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 6,585 cf Average Runoff Depth = 4.52"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

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Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.37 cfs @ 12.08 hrs, Volume= 4,897 cf, Depth= 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 1,688 cf, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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

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*Type III 24-hr 25-Year Rainfall=6.32"*

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 3.20" for 25-Year event  
Inflow = 1.82 cfs @ 12.10 hrs, Volume= 4,667 cf  
Outflow = 1.82 cfs @ 12.10 hrs, Volume= 4,667 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



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Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 6.08" for 25-Year event  
 Inflow = 1.37 cfs @ 12.08 hrs, Volume= 4,897 cf  
 Outflow = 1.31 cfs @ 12.11 hrs, Volume= 4,897 cf, Atten= 5%, Lag= 1.5 min  
 Discarded = 0.02 cfs @ 6.39 hrs, Volume= 1,918 cf  
 Primary = 1.29 cfs @ 12.11 hrs, Volume= 2,979 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.66' @ 12.11 hrs Surf.Area= 745 sf Storage= 877 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 140.4 min ( 884.8 - 744.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	597 cf	<b>14.75'W x 50.50'L x 2.75'H Field A</b> 2,049 cf Overall - 558 cf Embedded = 1,492 cf x 40.0% Voids
#2A	140.00'	451 cf	<b>ADS N-12 18" x 10 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 5 rows 12.75' Header x 1.80 sf x 2 = 45.9 cf Inside
		1,048 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>

**Discarded OutFlow** Max=0.02 cfs @ 6.39 hrs HW=139.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.29 cfs @ 12.11 hrs HW=141.66' TW=0.00' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 1.29 cfs @ 2.77 fps)

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Type III 24-hr 25-Year Rainfall=6.32"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 5 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

5 Rows x 21.0" Wide + 12.0" Spacing x 4 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

10 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 5 Rows + 12.75' Header x 1.80 sf x 2 = 450.9 cf Chamber Storage

10 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 5 Rows + 12.75' Header x 2.23 sf x 2 = 557.7 cf Displacement

2,049.2 cf Field - 557.7 cf Chambers = 1,491.5 cf Stone x 40.0% Voids = 596.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,047.5 cf = 0.024 af

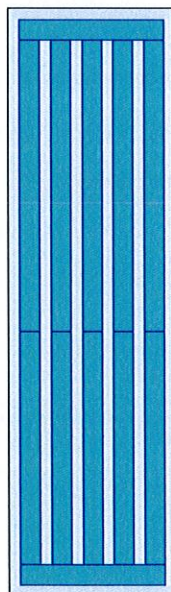
Overall Storage Efficiency = 51.1%

Overall System Size = 50.50' x 14.75' x 2.75'

10 Chambers

75.9 cy Field

55.2 cy Stone



**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=7.90"  
Tc=6.0 min CN=98 Runoff=1.77 cfs 6,361 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=4.01"  
Tc=6.0 min CN=65 Runoff=0.84 cfs 2,616 cf

**Reach DP-1: Off-Site**

Inflow=2.48 cfs 6,972 cf  
Outflow=2.48 cfs 6,972 cf

**Pond 1P: SIS #1**

Peak Elev=141.81' Storage=916 cf Inflow=1.77 cfs 6,361 cf  
Discarded=0.02 cfs 2,005 cf Primary=1.66 cfs 4,356 cf Outflow=1.67 cfs 6,361 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 8,977 cf Average Runoff Depth = 6.16"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.77 cfs @ 12.08 hrs, Volume= 6,361 cf, Depth= 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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



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Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 2,616 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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

**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 4.78" for 100-Year event  
Inflow = 2.48 cfs @ 12.10 hrs, Volume= 6,972 cf  
Outflow = 2.48 cfs @ 12.10 hrs, Volume= 6,972 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 7.90" for 100-Year event  
 Inflow = 1.77 cfs @ 12.08 hrs, Volume= 6,361 cf  
 Outflow = 1.67 cfs @ 12.11 hrs, Volume= 6,361 cf, Atten= 6%, Lag= 1.7 min  
 Discarded = 0.02 cfs @ 4.58 hrs, Volume= 2,005 cf  
 Primary = 1.66 cfs @ 12.11 hrs, Volume= 4,356 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.81' @ 12.11 hrs Surf.Area= 745 sf Storage= 916 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 119.1 min ( 860.1 - 741.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	597 cf	<b>14.75'W x 50.50'L x 2.75'H Field A</b> 2,049 cf Overall - 558 cf Embedded = 1,492 cf x 40.0% Voids
#2A	140.00'	451 cf	<b>ADS N-12 18" x 10 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 5 rows 12.75' Header x 1.80 sf x 2 = 45.9 cf Inside
		1,048 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>

**Discarded OutFlow** Max=0.02 cfs @ 4.58 hrs HW=139.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.65 cfs @ 12.11 hrs HW=141.81' TW=0.00' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 1.65 cfs @ 3.06 fps)

**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 5 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

5 Rows x 21.0" Wide + 12.0" Spacing x 4 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

10 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 5 Rows + 12.75' Header x 1.80 sf x 2 = 450.9 cf Chamber Storage

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Chamber Storage + Stone Storage = 1,047.5 cf = 0.024 af

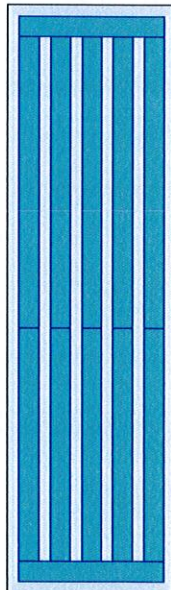
Overall Storage Efficiency = 51.1%

Overall System Size = 50.50' x 14.75' x 2.75'

10 Chambers

75.9 cy Field

55.2 cy Stone





Yeshiva Ohr Israel – 325 Reservoir Road  
Boston, Massachusetts

Stormwater Report  
August 07, 2019

## **APPENDIX C**

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### **Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan**

## **LONG-TERM POLLUTION PREVENTION PLAN AND STORMWATER OPERATION AND MAINTENANCE PLAN**

Yeshiva Ohr Yisrael, 325 Reservoir Road, Chestnut Hill, MA

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## 1.0 INTRODUCTION

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The purpose of this document is to specify the pollution prevention measures and stormwater management system operation and maintenance for the Yeshiva Ohr Yisrael School located at 325 Reservoir Road in Chestnut Hill, MA. The Responsible Party indicated below shall implement the management practices outlined in this document and proactively conduct operations at the project site in an environmentally responsible manner. Compliance with this Manual does not in any way dismiss the responsible party, owner, property manager, or occupants from compliance with other applicable federal, state or local laws.

Responsible Party: Rabbi Uri Feldman  
Yeshiva Ohr Yisrael  
325 Reservoir Road, Chestnut Hill, MA  
617-396-8078

This Document has been prepared in compliance with Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which state:

### Standard 4:

The Long Term Pollution Prevention Plan shall include the proper procedures for the following:

- Good housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Storage and use of fertilizers, herbicides, and pesticides
- Pet waste management
- Proper management of deicing chemicals and snow

### Standard 9:

The Long-Term Operation and Maintenance Plan shall at a minimum include:

- Stormwater management system(s) owner(s)
- The party or parties responsible for operation and maintenance, including how future property owners shall be notified of the presence of the stormwater management system and the requirement for operation and maintenance
- The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks
- A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point
- A description and delineation of public safety features
- An estimated operations and maintenance budget



## **2.0 LONG-TERM POLLUTION PREVENTION PLAN**

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The Responsible Party shall implement the following good housekeeping procedures at the project site to reduce the possibility of accidental releases and to reduce safety hazards.

### **2.1 Storage of Hazardous Materials**

To prevent leaks and spills, keep hazardous materials and waste products under cover or inside. Use drip pans or spill containment systems to prevent chemicals from entering the drainage system. Inspect storage areas for materials and waste products at least once per year to determine amount and type of the material on site, and if the material requires disposal.

Securely store liquid petroleum products and other liquid chemicals in federally- and state-approved containers. Restrict access to maintenance personnel and administrators.

### **2.2 Storage of Waste Products**

Collect and store all waste materials in securely lidded dumpster(s) or other secure containers as applicable to the material. Keep dumpster lids closed and the areas around them clean. Do not fill the dumpsters with liquid waste or hose them out. Sweep areas around the dumpster regularly and put the debris in the garbage, instead of sweeping or hosing it into the parking lot. Legally dispose of collected waste on a regular basis.

Segregate liquid wastes, including motor oil, antifreeze, solvents, and lubricants, from solid waste and recycle through hazardous waste disposal companies, whenever possible. Separate oil filters, batteries, tires, and metal filings from grinding and polishing metal parts from common trash items and recycle. These items are not trash and are illegal to dump. Contact a hazardous waste hauler for proper disposal to a hazardous waste collection center.

### **2.3 Spill Prevention and Response**

Implement spill response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other area that could reasonably be expected to discharge to surface or groundwater.

- For minor spills, keep fifty (50) gallon spill control kits and Speedy Dry at all shop and work areas.
- Immediately contact applicable Federal, State, and local agencies for reportable quantities as required by law.
- Immediately perform applicable containment and cleanup procedures following a spill release.
- Promptly remove and dispose of all material collected during the response in accordance with Federal, State and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release, and the ability of the Contractor to perform the required response.
- Reportable quantities of chemicals, fuels, or oils are established under the Clean Water Act and enforced through Massachusetts Department of Environmental Protection (DEP).

### **2.4 Minimize Soil Erosion**

Soil erosion facilitates mechanical transport of nutrients, pathogens, and organic matter to surface water bodies. Repair all areas where erosion is occurring throughout the project site. Stabilize bare soil with riprap, seed, mulch, or vegetation.



## **2.5 Vehicle Washing**

Vehicle washing will not occur on the site.

## **2.6 Maintenance of Lawns, Gardens, and other Landscaped Areas**

Pesticides and fertilizers shall not be used in the landscaped areas associated with the project site and shall not be stored on-site. Dumping of lawn wastes, brush or leaves or other materials or debris is not permitted in any Resource Area. Grass clippings, pruned branches and any other landscaped waste should be disposed of or composted in an appropriate location. No irrigation shall be used in the landscaped areas for this project.

## **2.7 Management of Deicing Chemicals and Snow**

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored on-site. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways. The snow plow contractor shall adhere to these magnesium chloride use and storage requirements.

During typical snow plowing operations, snow shall be pushed to the designated snow removal areas. Snow shall not be stockpiled in wetland resource areas or within the 100-foot Buffer Zone. In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.

Use of sand is permitted only for impervious roadways and parking areas. If sand is applied, the snow plowed from impervious areas shall not be stored on porous asphalt.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris. Street and parking lot sweeping should be followed in accordance with the Operation and Maintenance Plan.

## **2.8 Coordination with other Permits and Requirements**

Certain conditions of other approvals affecting the long-term management of the property shall be considered part of this Long Term Pollution Prevention Plan. The Owner shall become familiar with those documents and comply with the guidelines set forth in those documents.

### **3.0 STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN**

#### **3.1 Introduction**

This Operation and Maintenance Plan (O&M Plan) for the Yeshiva Ohr Yisrael site is required under Standard 9 of the 2008 MassDEP Stormwater Handbook to provide best management practices for implementing maintenance activities for the stormwater management system in a manner that minimizes impacts to wetland resource areas.

The Owner shall implement this O&M Plan and proactively conduct operations at the site in an environmentally responsible manner. Compliance with this O&M Plan does not in any way dismiss the Owner from compliance with other applicable Federal, State or local laws.

Routine maintenance during construction and post-development phases of the project, as defined in the Operation and Maintenance Plan, shall be permitted without amendment to the Order of Conditions. A continuing condition in the Certificate of Compliance shall ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

All stormwater best management practices (BMPs) shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority. The Owner shall:

- a. Maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement and disposal (for disposal the log shall indicate the type of material and the disposal location). This is a rolling log in which the responsible party records all operation and maintenance activities for the past three years.
- b. Make this log available to MassDEP and the Conservation Commissions upon request; and
- c. Allow members and agents of the MassDEP and the Conservation Commissions to enter and inspect the premises to evaluate and ensure that the Owner complies with the Operation and Maintenance requirements for each BMP.

#### **3.2 Stormwater Operation and Maintenance Requirements**

Inspect and maintain the stormwater management system as directed below. Refer to the Stormwater Management System Location Map (Figure 1) for the location of each component of the system. Repairs to any component of the system shall be made as soon as possible to prevent any potential pollutants (including silt) from entering the resource areas.

##### Area Drains

Inspect area drains at least once per month and remove debris from the grate. Clean out accumulated sediments at least once per year and more frequently as necessary.

##### Water Quality Units (Proprietary Separators)

Maintain water quality units according the recommendations set forth by the manufacturer. General inspection and maintenance procedures for proprietary devices are provided below:

- Inspect units following completion of construction, prior to being put into service.
- Inspect units at least twice per year following installation and no less than once per year thereafter.



- Inspect units immediately after any oil, fuel or chemical spill.
- All inspections shall include checking the oil level and sediment depth in the unit. Removal of sediments/oils shall occur per manufacturer recommendations.
- A licensed waste management company shall remove captured petroleum waste products from any oil, chemical or fuel spills and dispose.
- OSHA confined space entry protocols shall be followed if entry into the unit is required.

#### Subsurface Detention/Infiltration Structures

Inspect subsurface detention/infiltration structures twice per year. Inspect the inlets and observation ports to determine if there is accumulated sediment within the system. Remove all debris and accumulated sediment that may clog the system. Include mosquito controls.

#### Stormwater Outfalls

Inspect flared end sections and associated riprap spillways at least once per year and after major storm events (rainfall totals greater than 2.5 inches in 24 hours) to ensure that the stability of the outlet area is maintained. Keep the outfall area clear of debris such as trash, branches, and sediment. Make repairs immediately if riprap displacement or downstream channel scour is observed.

### **3.3 Street Sweeping**

Perform street sweeping at least once per month, whenever there is significant debris present on the driveway/basketball court. Sweepings must be handled and disposed of properly according to the Boston Conservation Commission.

### **3.4 Repair of the Stormwater Management System**

The stormwater management system shall be maintained. The repair of any component of the system shall be made as soon as possible to prevent any potential pollutants including silt from entering the resource areas or the existing closed drainage system.

### **3.5 Reporting**

The Owner shall maintain a record of drainage system inspections and maintenance (per this Plan) and submit a yearly report to the Boston Conservation Commission.

**STORMWATER MANAGEMENT SYSTEM INSPECTION FORM**

---

<b>325 Reservoir Road Chestnut Hill, MA</b>		Inspected by: _____ Date: _____
Component	Status/Inspection	Action Taken
Area Drains and Drain Manholes		
Water Quality Units		
Subsurface Infiltration System		
Stormwater Outfalls & Level Spreaders		
General site conditions – evidence of erosion, etc.		

**SUBMIT COPIES OF STORMWATER MANAGEMENT SYSTEM INSPECTION FORM TO THE BOSTON CONSERVATION COMMISSION WITH THE YEARLY REPORT.**



**APPENDIX D**

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**Stormwater Management Standards Documentation**

MassDEP Checklist for Stormwater Report

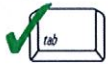
Standard 10: Illicit Discharge Compliance Statement



# Checklist for Stormwater Report

## A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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





# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

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

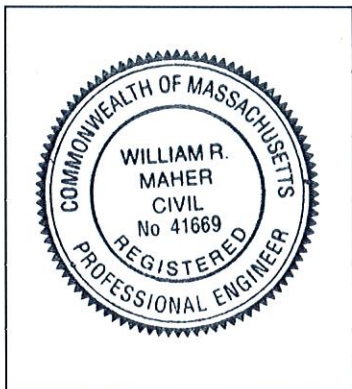
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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

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

### Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



*William R. Maher*

*8/7/2019*

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): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

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





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

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

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

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

### Standard 4: Water Quality

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

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





# Checklist for Stormwater Report

---

## Checklist (continued)

### Standard 4: Water Quality (continued)

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

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

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

### Standard 6: Critical Areas

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



# Checklist for Stormwater Report

## Checklist (continued)

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

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

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

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

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





# Checklist for Stormwater Report

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## Checklist (continued)

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

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

### Standard 9: Operation and Maintenance Plan

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

### Standard 10: Prohibition of Illicit Discharges

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



2 Center Plaza, Suite 430  
Boston, MA 02108-1928  
T: 617-338-0063  
F: 617-338-6472  
www.nitscheng.com

**STANDARD 10: Illicit Discharge Compliance Statement**

Project Name: Yeshiva Ohr Yisrael	Nitsch Project #: 13302
Location: 325 Reservoir Road, Chestnut Hill, MA	Checked by: WRM
Prepared by: WRM	Sheet No. 1 of 1
Date: August 7, 2019	

**Standard 10 states: All illicit discharges to the stormwater management system are prohibited.**

This is to verify:

1. Based on the information available there are no known or suspected illicit discharges to the stormwater management system at Yeshiva Ohr Yisrael site as defined in the MassDEP Stormwater Handbook.
2. The design of the stormwater system includes no proposed illicit discharges.

William R. Maher, PE, LSIT

August 7, 2019

Date

Yeshiva Ohr Israel – 325 Reservoir Road  
Boston, Massachusetts

Notice of Intent

## **SECTION 4**

### **WETLAND RESOURCE AREA INFORMATION**

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Wetland Resource Area Delineation Report





June 17, 2019

**Email** (wmaher@nitscheng.com)

Mr. William Maher, PE  
Nitsch Engineering  
2 Center Plaza, Suite 430  
Boston, MA 02108

**Re: Wetland Resource Area Analysis Report**  
**Yeshiva Ohr Yisrael**  
**325 Reservoir Road**  
**Assessor's Parcel ID: 2102437000**  
**Boston, Massachusetts**

[LEC File #: YOY\19-178.04]

Dear Mr. Maher:

Pursuant to your request, LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation and Wetland Resource Area boundary determination at the Yeshiva Ohr Yisrael, 325 Reservoir Road (Assessor's Parcel ID #: 2102437000) in Boston, Massachusetts. Our site evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (Act, M.G.L. c. 131, s. 40) and its implementing Regulations (*Act Regulations*, 310 CMR 10.00), and the criteria provided in *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995) and *Field Indicators for Identifying Hydric Soils in New England* (Version 4, May 2018). The City of Boston does not administer a Wetlands Protection Ordinance. The following report provides a general site description, wetland delineation methodology, and a description of the Wetland Resource Areas and potential regulatory implications.

### General Site Description

The 17,496± square foot property is located off the north side of Reservoir Road, south of Beacon Street and the Chestnut Hill Reservoir, east of the Newton/Boston municipal boundary, and northwest of the MBTA Green Line and Brookline/Boston municipal boundary, within the Brighton section of Boston, Massachusetts. The property contains a centrally located two-story, brick building. A paved driveway extends north from Reservoir Road to the rear of the building, while a second paved driveway extends from Reservoir Road to the eastern façade of the building. The building is surrounded by lawn and landscape plantings. An unnamed intermittent stream flows northerly within the eastern portion of the property at the bottom of a wooded embankment. A dilapidated chain-link fence separates the yard of the



dwelling from the embankment (Photo 1.). The dwelling is located on a topographic high point within the property. Topography descends moderately from the dwelling to the west and north, and steeply toward the intermittent stream to the east.

Vegetation along the embankment contains a canopy dominated by Norway maple (*Acer platanoides*) and northern red oak (*Quercus rubra*). The sparse understory contains

saplings from the canopy, sapling black cherry (*Prunus serotina*), staghorn sumac (*Rhus typhina*), and entanglements of oriental bittersweet (*Celastrus orbiculatus*). The ground cover contains poison ivy (*Toxicodendron radicans*), white wood aster (*Eurybia divaricata*), garlic mustard (*Alliaria petiolata*), jewelweed (*Impatiens capensis*), and pachysandra (*Pachysandra* sp.).



Photo 1. Southerly view of upland wooded embankment within eastern portion of the site.

## Natural Heritage and Endangered Species Program (NHESP) Designation

According to the 14<sup>th</sup> Edition (August 1, 2017) of the Natural Heritage Endangered Species Program (NHESP) *Massachusetts Natural Heritage Atlas*, the site is not located within *Estimated Habitat of Rare Species* or *Priority Habitat of Rare Species*. In addition, there are no mapped certified or potential vernal pools on or in proximity to the site.

## Floodplain Designation

According to the September 25, 2009 *Federal Emergency Management Agency Flood Insurance Rate Maps* for Suffolk County, Massachusetts (Map Numbers: 25025C0058G and 25025C0059G), the entire property is located within Zone X [unshaded]: *Areas determined to be outside the 0.2% annual chance floodplain.*

## Wetland Resource Areas

On May 17, 2019 LEC conducted a site evaluation to identify and characterize existing protectable Wetland Resource Areas on and immediately adjacent to the site. LEC determined that Wetland Resource Areas associated with the site are limited to Bank associated with the intermittent stream. This resource area places the 100-foot Buffer Zone on the site.



## Bank to Intermittent Stream

According to 310 CMR 10.54(2): *Bank is defined as the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent flood plain, or, in the absence of these, it occurs between a water body and an upland... The upper boundary of a Bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the mean annual low flow level.*

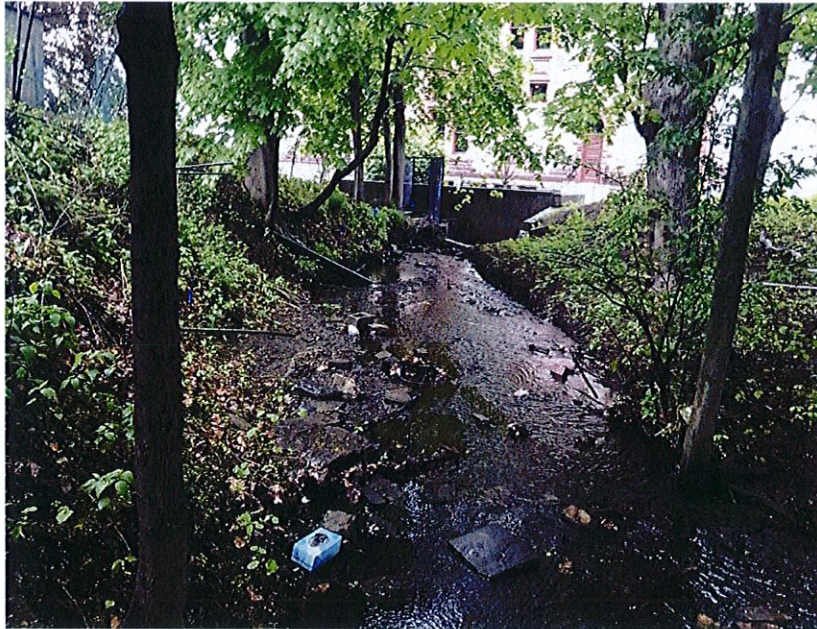


Photo 2. Northerly view of intermittent stream channel.

An unnamed intermittent stream flows northerly within the eastern portion of the property at the bottom of a wooded embankment (Photo 2.). The 6 to 9 foot wide channel is contained within abrupt 12-inch high scoured Banks. The top of the Bank is vegetated, while the toe of the Bank contains scours, exposed soils, stones, and muck. A variety of remnant construction debris is loaded within the channel, including concrete footings, cinder blocks, bricks, and metal posts. The stream

flows northerly within the eastern portion of the property, out of a concrete headwall located underneath the MBTA railroad tracks, and into a concrete headwall located north of the property boundary.

LEC delineated the Bank with blue flagging stations B1 through B8.

In accordance with 310 CMR 10.58(2)(a)(1)(c), in order to confirm the intermittent stream status, LEC utilized the USGS water resources web application, StreamStats, to calculate the contributing watershed area and 99% flow duration. Based on the StreamStats Watershed Maps and Flow Statistics Report, the contributing watershed area of 0.28 square miles is less than the minimum 0.50 square mile threshold required for a perennial stream determination, and therefore, LEC confirms the Intermittent Stream Status of the onsite stream.

## Summary

LEC conducted a site evaluation and wetland delineation on May 17, 2019 to determine the extent of Wetland Resource Areas subject to jurisdiction under the *Act* and *Act Regulations*. Based on our site evaluation and review of pertinent maps, LEC determined that the on-site Wetland Resource Areas are limited to Bank to intermittent stream. Any work proposed within the Bank and/or their corresponding 100-foot Buffer Zone will require compliance with performance standards enumerated in the *Act*





*Regulations*, and filing for the appropriate permits with the City of Boston Conservation Commission and/or the Massachusetts Department of Environmental Protection, and may require additional wetlands permitting depending on the extent and scope of work.

Thank you for the opportunity to provide these services. Should you have any questions or require additional information, do not hesitate to contact me in our Worcester office at 508-753-3077 or at [akendall@lecenvironmental.com](mailto:akendall@lecenvironmental.com).

Sincerely,

**LEC Environmental Consultants, Inc.**

A handwritten signature in black ink that reads "Andrea Kendall".

Andrea Kendall  
Senior Environmental Scientist

A handwritten signature in black ink that reads "Julia Hoogeboom".

Julia Hoogeboom  
Wetland Specialist

---

alk: projects\19-178 YoY WRAA

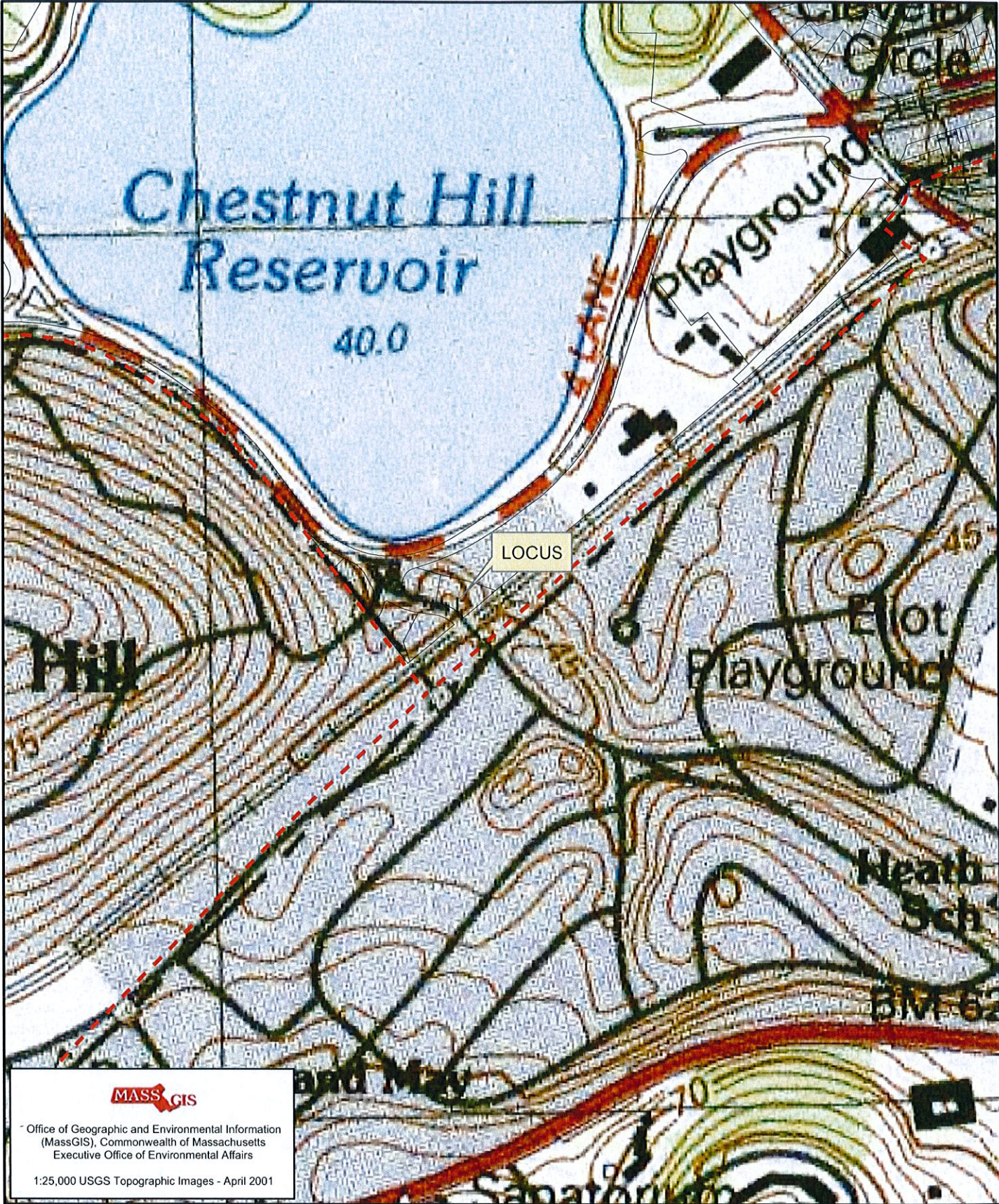
## **Attachments**

USGS Topographic Map  
USGS Color Ortho Imagery with NHESP Estimated & Priority Habitats

FEMA Flood Insurance Rate Map

USGS StreamStats Report



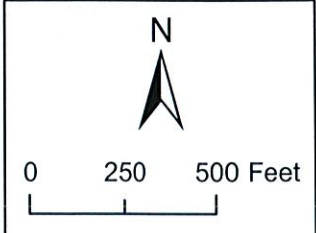


**MASS GIS**  
Office of Geographic and Environmental Information  
(MassGIS), Commonwealth of Massachusetts  
Executive Office of Environmental Affairs  
1:25,000 USGS Topographic Images - April 2001

**LEC**  
Environmental Consultants, Inc.  
Wakefield, MA  
781.245.2500  
www.lecenvironmental.com

325 Reservoir Road  
Boston, MA

May 15, 2019





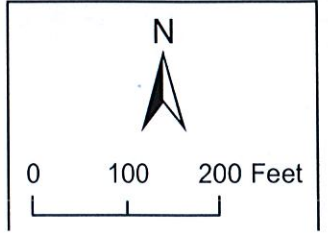


**MASS GIS**  
 Office of Geographic and Environmental Information  
 (MassGIS) Commonwealth of Massachusetts,  
 Executive Office of Environmental Affairs  
 MassGIS USGS Ortho Imagery (2013)

- Legend**
-  NHESP Certified Vernal Pool
  -  NHESP Potential Vernal Pool
  -  NHESP Estimated Habitats of Rare Wildlife (2017)
  -  NHESP Priority Habitats of Rare Species (2017)
  -  DEP Wetlands
  -  DEP Hydrography Layer
  -  DEP Wetlands Linear Features
  -  ACEC

**LEC**  
 Environmental Consultants, Inc.  
 Wakefield, MA  
 781.245.2500  
 www.lecenvironmental.com

325 Reservoir Road  
 Boston, MA  
 May 15, 2019







MAP SCALE 1" = 500'



NFIP

PANEL 0058G

**FIRM**  
FLOOD INSURANCE RATE MAP  
SUFFOLK COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 58 OF 151  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY NUMBER 250296  
CITY OF BOSTON, CITY OF  
PANEL SUFFIX 0058 G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
25025C0058G

EFFECTIVE DATE  
SEPTEMBER 25, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

JOINS PANEL 0059

898048 M







MAP SCALE 1" = 500'



NFIP

PANEL 0059G

**FIRM**  
FLOOD INSURANCE RATE MAP  
SUFFOLK COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 59 OF 151  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY NUMBER 250286  
CITY OF BOSTON

PANEL SUFFIX 0059  
G

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown here should be used on insurance applications for the subject community.



MAP NUMBER  
25025C0059G

EFFECTIVE DATE  
SEPTEMBER 25, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



JOINS PANEL 0058

46,000m N

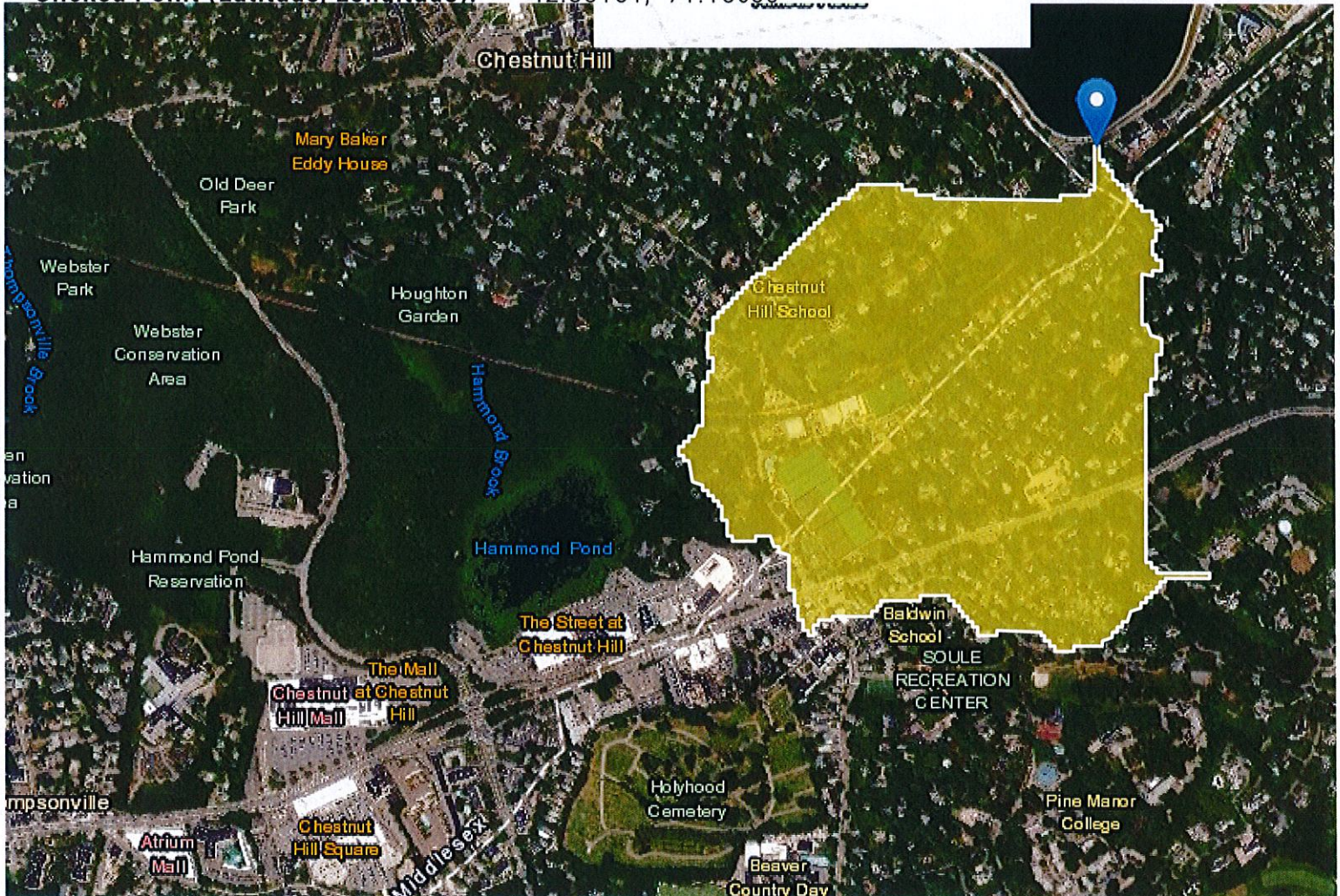


# StreamStats Report

Region ID: MA

Workspace ID: MA20190514143849978000

Clicked Point (Latitude, Longitude): 42.33161, -71.15680



Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.28	square miles
ELEV	Mean Basin Elevation	193	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	0	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.682	percent
BSLDEM10M	Mean basin slope computed from 10 m DEM	6.304	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel	0	percent



Code	Parameter Description	Value	Unit
FOREST	Percentage of area covered by forest	9.69	percent

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	0.16	512
ELEV	Mean Basin Elevation	193	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	0	percent	0	32.3

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

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	SEp
2 Year Peak Flood	16.7	ft <sup>3</sup> /s	8.38	33.3	42.3
5 Year Peak Flood	28.3	ft <sup>3</sup> /s	14	57.4	43.4
10 Year Peak Flood	37.7	ft <sup>3</sup> /s	18.2	78.4	44.7
25 Year Peak Flood	51.6	ft <sup>3</sup> /s	23.9	111	47.1
50 Year Peak Flood	63.2	ft <sup>3</sup> /s	28.3	141	49.4
100 Year Peak Flood	75.6	ft <sup>3</sup> /s	32.8	174	51.8
200 Year Peak Flood	89.3	ft <sup>3</sup> /s	37.5	212	54.1
500 Year Peak Flood	109	ft <sup>3</sup> /s	51.5	231	57.6

Peak-Flow Statistics Citations

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

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29

Code	Parameter Name	Value	Units	Limit	Limit
MAREGION	Massachusetts Region	0	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	2.682	percent	0.32	24.6

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

Statistic	Value	Unit
-----------	-------	------

*Flow-Duration Statistics Citations*

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.682	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

Statistic	Value	Unit
-----------	-------	------

*Low-Flow Statistics Citations*

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.682	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29



Statistic	Value	Unit
<i>August Flow-Duration Statistics Citations</i>		

Bankfull Statistics Parameters [Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	6.304	percent	2.2	23.9

Bankfull Statistics Disclaimers [Bankfull Statewide SIR2013 5155]

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

Bankfull Statistics Flow Report [Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	8.92	ft
Bankfull Depth	0.648	ft
Bankfull Area	5.69	ft <sup>2</sup>
Bankfull Streamflow	12.9	ft <sup>3</sup> /s

*Bankfull Statistics Citations*

**Bent, G.C., and Waite, A.M., 2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (<http://pubs.usgs.gov/sir/2013/5155/>)**

Probability Statistics Parameters [Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.28	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	9.69	percent	0	100
MAREGION	Massachusetts Region	0	dimensionless	0	1

Probability Statistics Flow Report [Perennial Flow Probability]

(other -- see report)

<b>Statistic</b>	<b>Value</b>	<b>Unit</b>	<b>PC</b>
Probability Stream Flowing Perennially	0.79	dim	71

*Probability Statistics Citations*

**Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. ([http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR\\_2006-5031rev.pdf](http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf))**

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.3.0

**SECTION 5**

**DOCUMENTATION OF ABUTTER NOTIFICATION**

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Abutter Notification  
Affidavit of Service  
Abutters List



**NOTIFICATION TO ABUTTERS  
UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT**

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

- A. The name of the Applicant is the Yeshiva Ohr Israel School.
- B. The Applicant has filed a Notice of Intent with the Boston Conservation Commission to remove, fill, dredge or alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40).

The project consists proposes to construct a 3-story addition to the existing private school along with building utility service installations and minor site improvements.

- C. The location of the proposed activity is located at 325 Reservoir Road, Boston, MA 02178.
- D. Copies of the Notice of Intent may be examined at the Boston Conservation Commission (1 City Hall Square, Boston, MA) between the hours of 9:00 am and 5:00 pm, Monday – Friday.
- E. Copies of the Notice of Intent may be obtained from the applicant's representative: Please contact Suny Bhagat at Nitsch Engineering, Inc. at (617) 338-0063 between 8:30 am and 5:30 pm, Monday through Friday.
- F. Information regarding the date, time, and place of the Public Hearing may be obtained from the Boston Conservation Commission by calling 508-821-1095 9:00 am and 5:00 pm, Monday – Friday.

**The Public Hearing for the proposed project will be held during the Boston Conservation Commission meeting on Wednesday, August 21, 2019 at 6:00 PM.**

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in The Boston Herald.

NOTE: Notice of the public hearing, including its date, time, and place, will be posted at Boston City Hall, 1 City Hall Square not less than forty-eight (48) hours in advance.

NOTE: You may contact the nearest Department of Environmental Protection Regional office for more information about this application or the Wetlands Protection Act. To contact DEP, call:

Central Region: 508-792-7650

**Northeast Region: 978-661-7600**

Southeast Region: 508-947-6557

Western Region: 413-784-1100

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, William R. Maher, P.E., hereby certify under the pains and penalties that at least one week prior to the public hearing, I gave notification to abutters in compliance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the DEP guide to Abutter Notification dated April 8, 1994, in connection to the following matter:

Submission of a Notice of Intent to the Boston Conservation Commission for the work associated with the proposed building additions at the Yeshiva Ohr Yisrael School located at 325 Reservoir Road, was filed on Wednesday, August 21, 2019. The project includes site improvements, including two (2) building additions, utility connections (sanitary sewer, water and storm drainage), and landscape improvements.

The form of notification and the list of abutters to whom it was given, is attached to the Affidavit of Service.

  
Name

  
Date

PID	OWNER	MLG_ADDRESS	MLG_CITYSTATE	MLG_ZIPCODE
2102435000	PATEL NIRAV	20 MALIA TERRACE	CHESTNUT HILL MA	2467
2102436000	WENTWORTH AUSTIN N	326 RESERVOIR RD	CHESTNUT HILL MA	2467
2102437000	YESHIVA OHR YISRAEL HIGH	27 COLWELL AVE	BOSTON MA	2135
2102438000	MELCER ANDREW	2496 BEACON ST	CHESTNUT HILL MA	2467
2102439010	WATERWORKS MUSEUM CONDO	536 GRANITE ST	BRAINTREE MA	2184
2102439012	STOECKER JOHN G III	2442 BEACON ST #2442	CHESTNUT HILL MA	2467
2102439014	JOY STEPHEN	2450 BEACON ST #2444	CHESTNUT HILL MA	2467
2102439016	BEACON STREET 2446 NOMINEE	2446 BEACON STREET UNIT 2446	CHESTNUT HILL MA	2467
2102439018	ABBOUD JOSEPH	PO BOX 486	BEDFORD NY	10506
2102439020	METROPOLITAN WATERWORKS	2450 BEACON ST # 2450	CHESTNUT HILL MA	2467

PID	OWNER	LOC_ADDRESS	LOC_CITY	LOC_ZIPCODE
2102435000	PATEL NIRAV	330 RESERVOIR RD	ALLSTON	2134
2102436000	WENTWORTH AUSTIN N	326 RESERVOIR RD	ALLSTON	2134
2102437000	YESHIVA OHR YISRAEL HIGH	325 RESERVOIR RD	CHESTNUT HILL	2467
2102438000	MELCER ANDREW	2496 2496 BEACON ST	BRIGHTON	2135
2102439010	WATERWORKS MUSEUM CONDO	2450 BEACON ST	BRIGHTON	2135
2102439012	STOECKER JOHN G III	2442 2450 BEACON ST #2442	BRIGHTON	2135
2102439014	JOY STEPHEN	2442 2450 BEACON ST #2444	CHESTNUT HILL	2467
2102439016	BEACON STREET 2446 NOMINEE	2442 2450 BEACON ST #2446	CHESTNUT HILL	2467
2102439018	ABBOUD JOSEPH	2442 2450 BEACON ST #2448	BRIGHTON	2135
2102439020	METROPOLITAN WATERWORKS	2442 2450 BEACON ST	BRIGHTON	2135



Yeshiva Ohr Israel – 325 Reservoir Road  
Boston, Massachusetts

Notice of Intent

**SECTION 6**

**SITE PHOTOGRAPHS**

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**PHOTO NO. 1 – EXISTING BUILDING (FRONT)**



**PHOTO NO. 2 – EXISTING BUILDING (REAR)**





**PHOTO NO. 3 – EXISTING BROOK**



**PHOTO NO. 4 – EXISTING BROOK**

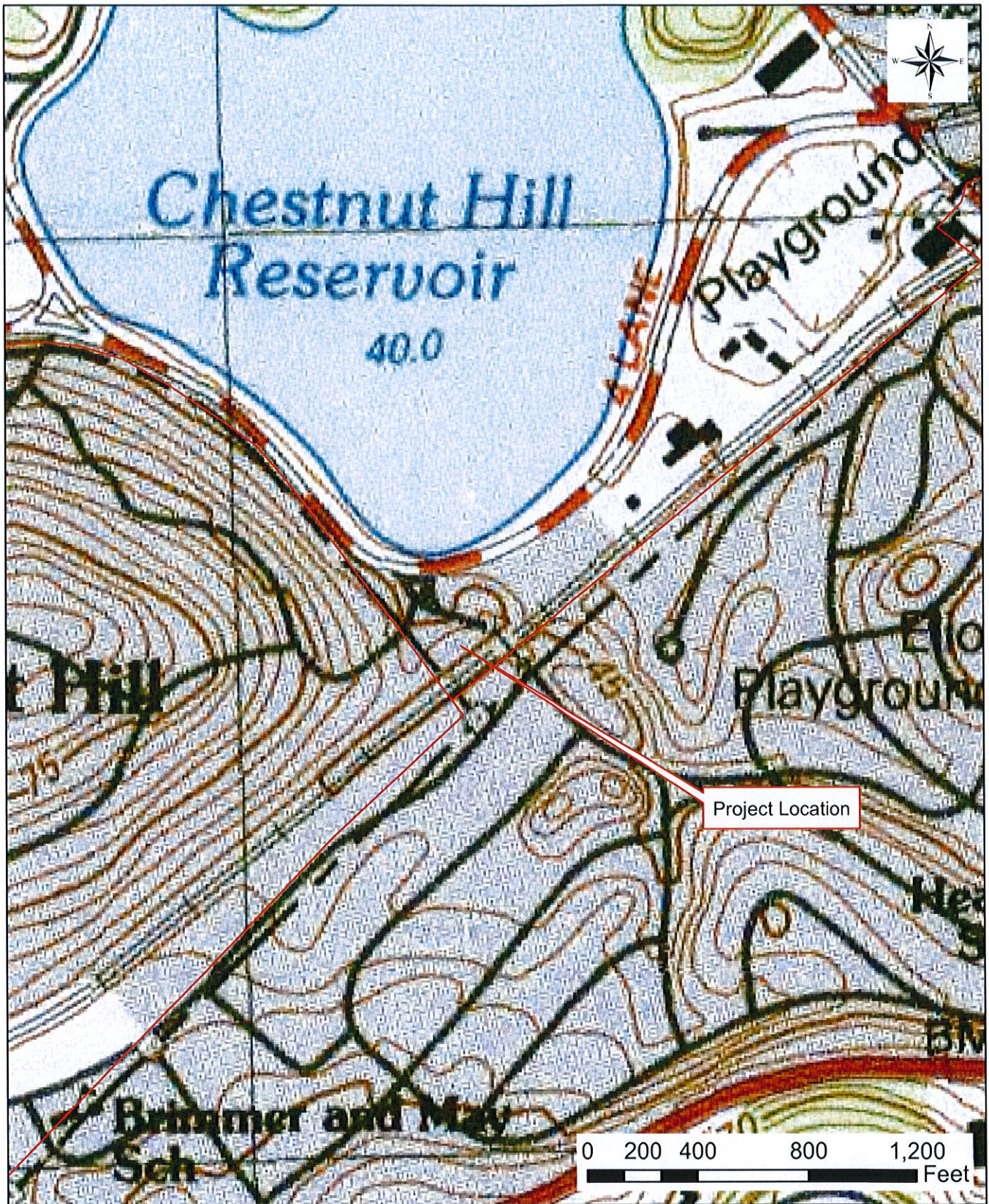


## **APPENDIX E**

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- Figure 1 – USGS Locus Map
- Figure 2 – Aerial Locus Map
- Figure 3 – FEMA Map
- Figure 4 – NRCS Soils Map

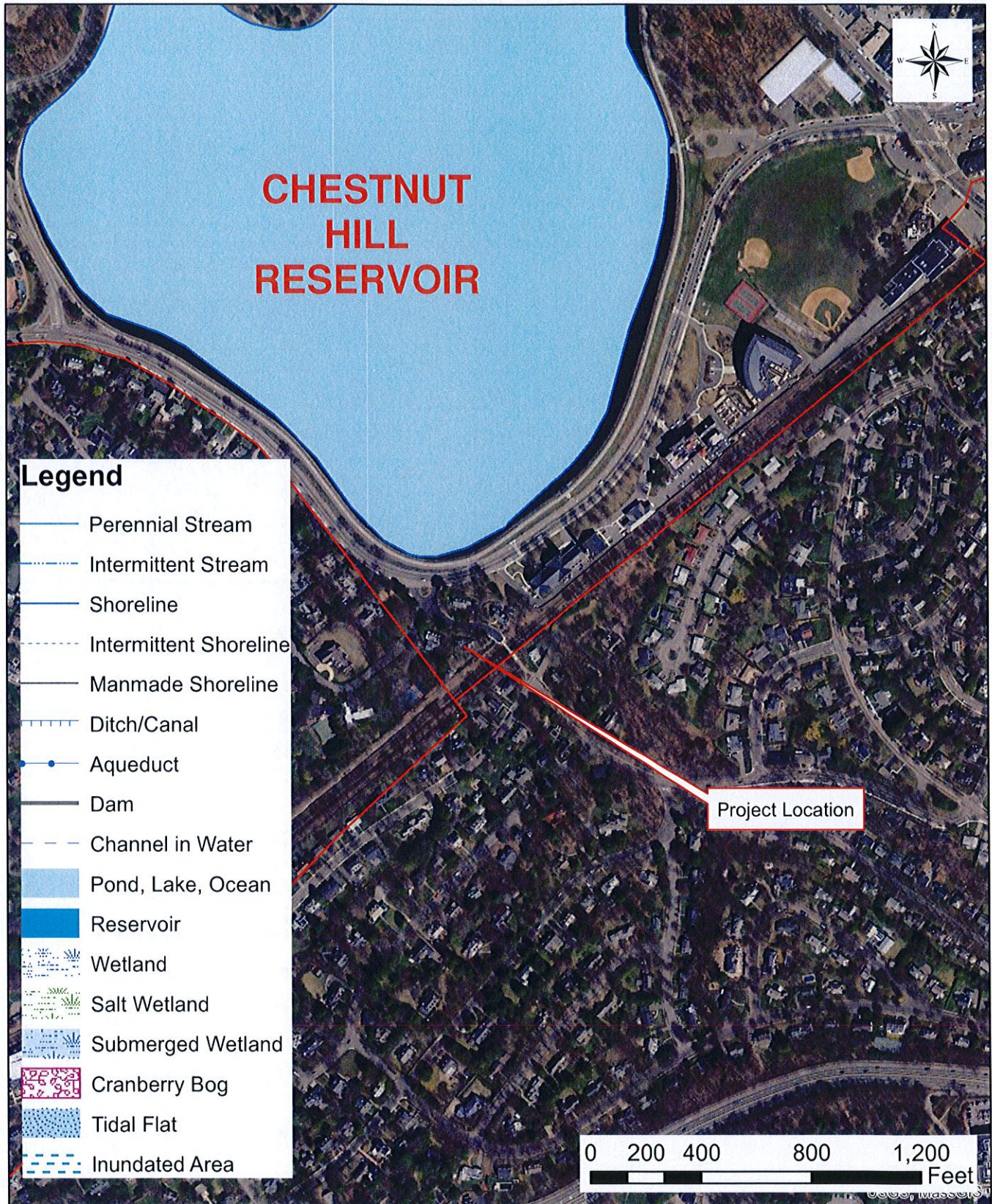




**Figure 1 - USGS Locus**

Yeshiva Ohr Israel  
325 Reservoir Road  
Boston, MA 02467





**Figure 2 - Aerial Locus**

Yeshiva Ohr Israel  
 325 Reservoir Road  
 Boston, MA 02467







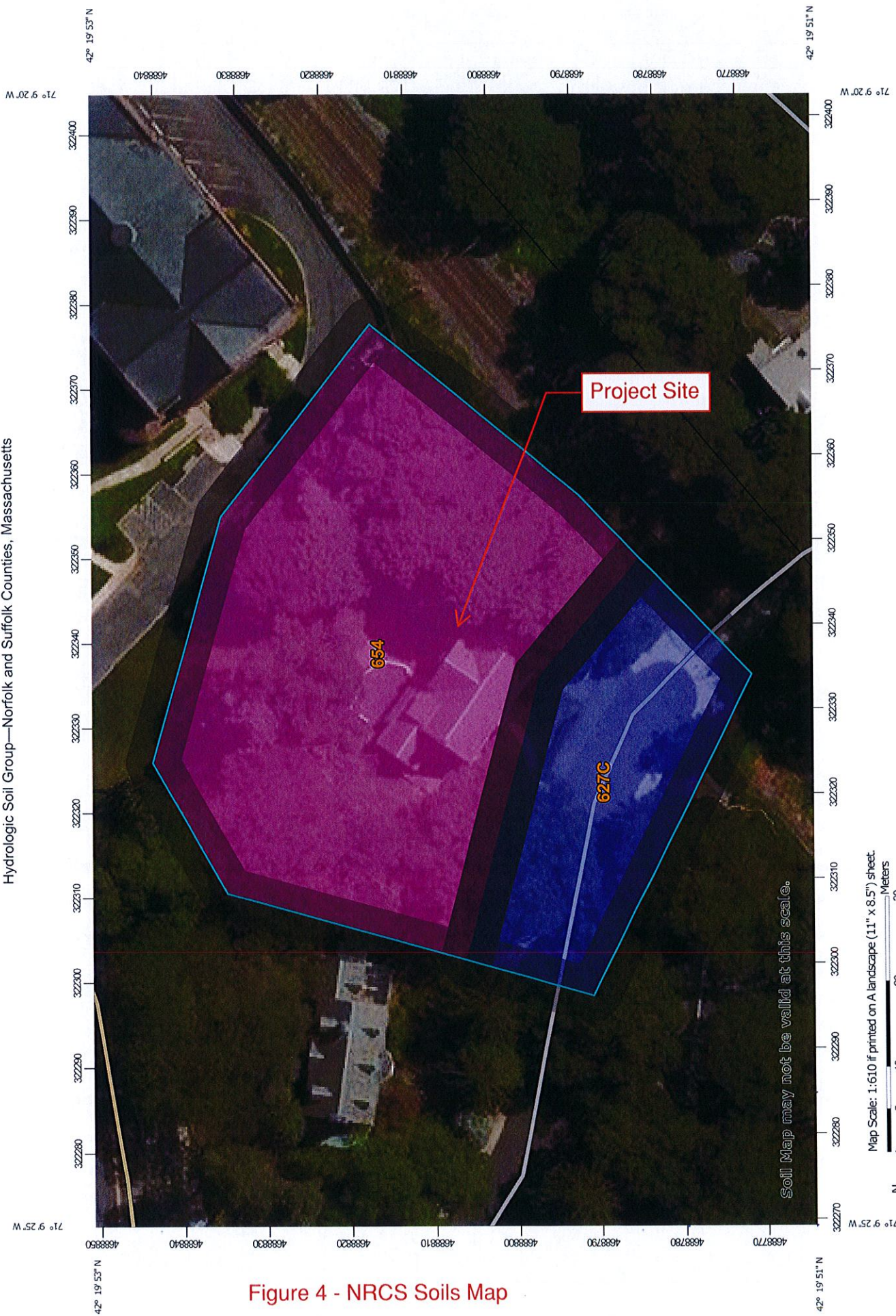













































Figure 4 - NRCS Soils Map



## MAP LEGEND

 Area of Interest (AOI)	 C
 Soils	 C/D
 Soil Rating Polygons	 D
 A	 Not rated or not available
 A/D	 Water Features
 B	 Streams and Canals
 B/D	 Transportation
 C	 Rails
 C/D	 Interstate Highways
 D	 US Routes
 Not rated or not available	 Major Roads
 Soil Rating Lines	 Local Roads
 A	 Background
 A/D	 Aerial Photography
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	
 Soil Rating Points	
 A	
 A/D	
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts  
Survey Area Data: Version 14, Sep 12, 2018

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

Date(s) aerial images were photographed: Aug 10, 2014—Aug 25, 2014

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



## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
627C	Newport-Urban land complex, 3 to 15 percent slopes	B	0.2	26.8%
654	Udorthents, loamy	A	0.6	73.2%
<b>Totals for Area of Interest</b>			<b>0.9</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*



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**DEMOLITION NOTES:**

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE PLUGGED AT THEIR ENDS WITH WATERTIGHT BRICK MASONRY OR CEMENT MORTAR WITH A MINIMUM THICKNESS OF 8 INCHES.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. ALL EXISTING TREES AND SHRUBS TO REMAIN SHALL BE PROTECTED AND MAINTAINED THROUGHOUT THE TIME OF CONSTRUCTION, AS SPECIFIED AND DIRECTED BY THE LANDSCAPE ARCHITECT.
16. BEFORE ANY TREES OR SHRUBS ARE REMOVED, THE CONTRACTOR SHALL ARRANGE A CONFERENCE ON THE SITE WITH THE OWNER OR OWNER'S REPRESENTATIVE TO IDENTIFY TREES AND SHRUBS THAT ARE TO BE REMOVED, AS WELL AS THOSE WHICH ARE TO BE PROTECTED. DO NOT COMMENCE CLEARING OPERATIONS WITHOUT A CLEAR UNDERSTANDING OF EXISTING CONDITIONS TO BE PRESERVED.
17. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.

**EROSION AND SEDIMENT CONTROL NOTES:**

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" PREPARED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF RESOURCE PROTECTION, AND THE CURRENT NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE CONDITIONS AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY CONTROLLING MUNICIPAL AUTHORITIES, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AN EROSION CONTROL BARRIER SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT AS INDICATED IN THE PLAN PRIOR TO COMMENCEMENT OF DEMOLITION OR CONSTRUCTION OPERATIONS.
4. SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
5. AFTER ANY SIGNIFICANT RAINFALL (GREATER THAN 0.25 INCHES OF RAINFALL WITHIN 24 HOURS), SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
6. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. SEDIMENT CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ADJUTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
8. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE SWALES AND GROUND SURFACES WITHIN THE LIMIT OF WORK FROM EROSION. STRAW BALE, CRUSHED STONE OR EQUIVALENT CHECK DAMS ARE TO BE PROVIDED AT A MAXIMUM OF TWO HUNDRED (200) FOOT SPACING, OR LESS AS SITE-SPECIFIC CONDITIONS WARRANT, WITHIN ALL DRAINAGE SWALES AND DITCHES AND AT UPSTREAM SIDES OF ALL DRAINAGE INLETS.
9. ALL STOCK PILES SHALL BE PROTECTED AND LOCATED A MINIMUM OF 100' FROM EXISTING WETLAND RESOURCE AREAS & WITHIN THE LIMIT OF WORK.
10. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEEPED AT THE END OF EACH WORKING DAY.
11. ALL SEDIMENT RETAINED BY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LEGALLY DISPOSED OF OFFSITE.
12. TEMPORARY DIVERSION DITCHES, PERMANENT DITCHES, CHANNELS, EMBANKMENTS, AND ANY DENuded SURFACE THAT WILL BE EXPOSED FOR A PERIOD OF 14 CALENDAR DAYS OR MORE SHALL BE CONSIDERED CRITICAL VEGETATION AREAS. THESE AREAS SHALL BE STABILIZED/PROTECTED WITH APPROPRIATE EROSION CONTROL MATTING OR OTHER EROSION CONTROL METHODS.
13. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS DIRECTED BY THE PERMITTING AUTHORITY OR OWNER.
14. THE CONTRACTOR SHALL USE TEMPORARY SEEDING, MULCHING, OR OTHER APPROVED STABILIZATION MEASURES TO PROTECT EXPOSED AREAS DURING PROLONGED CONSTRUCTION OR OTHER LAND DISTURBANCE. STOCKPILES THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS SHALL BE STABILIZED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENT CONTROLS AT THE COMPLETION OF SITE CONSTRUCTION, BUT ONLY WHEN DIRECTED BY THE CITY OF BOSTON CONSERVATION AGENT. STABILIZE OR SEED BARE AREAS LEFT AFTER EROSION CONTROL REMOVAL.

**UTILITY NOTES:**

1. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF, AND GRANTING OF PERMITS BY, THE LOCAL MUNICIPALITY. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS RELATED TO UTILITY WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR OBTAINING ALL PERMISSIONS FOR, AND FOR CONDUCTING ALL PREPARATIONS RELATED TO, WORK AFFECTING ANY UTILITIES WITHIN THE JURISDICTION OF ANY NON-MUNICIPAL UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO ELECTRIC, TELEPHONE, AND/OR GAS. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES, DEPARTMENTS, AND UTILITY COMPANIES, IN WRITING, AT LEAST 7 DAYS (OR PER UTILITY COMPANY REQUIREMENT) AND NOT MORE THAN 30 DAYS PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN UTILITIES SERVICING BUILDINGS AND FACILITIES WITHIN OR OUTSIDE THE PROJECT LIMIT UNLESS THE INTERRUPTION OF SERVICE IS COORDINATED WITH THE OWNER.
4. ALL WATER, SEWER, AND DRAIN WORK SHALL BE PERFORMED ACCORDING TO THE REQUIREMENTS AND STANDARD SPECIFICATIONS OF THE BOSTON WATER AND SEWER COMMISSION (BWSC).
5. GAS, TELECOMMUNICATIONS AND ELECTRIC SERVICES ARE TO BE DESIGNED BY EACH UTILITY COMPANY IN COORDINATION WITH THE MECHANICAL, ELECTRIC, AND PLUMBING CONSULTANTS.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OF NEW UTILITIES WITH GAS, TELECOMMUNICATION AND ELECTRICAL SERVICES.
7. INSTALL WATER LINES WITH A MINIMUM OF FIVE FEET OF COVER AND A MAXIMUM OF SEVEN FEET COVER FROM THE FINAL DESIGN GRADES.
8. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION (WATER OVER SEWER) BETWEEN SEWER AND WATER LINES. WHEREVER THERE IS LESS THAN 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN A PROPOSED OR EXISTING SEWER LINE TO REMAIN AND A PROPOSED OR EXISTING WATER LINE TO REMAIN BOTH WATER MAIN AND SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT CEMENT LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10- FEET ON EITHER SIDE OF THE CROSSING. ONE (1) FULL LENGTH OF WATER PIPE SHALL BE CENTERED OVER THE SEWER AT THE CROSSING.
9. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED AND/OR REMOVED & DISPOSED.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR TRENCHING, BACKFILLING, AND SURFACE RESTORATION FOR GAS UTILITY SYSTEMS.
11. ALL ONSITE UTILITIES SHALL BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
12. ALL EXISTING AND PROPOSED MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, CASTINGS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL GRADING AND PAVING CONSTRUCTION.
13. ALL GRATES IN WALKWAYS SHALL BE ADA COMPLIANT.

**GENERAL NOTES:**

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM A PLAN ENTITLED "EXISTING CONDITIONS, 325 RESERVOIR ROAD, CHESTNUT HILL, MASSACHUSETTS", PREPARED BY NITSCH ENGINEERING, DATED APRIL 23, 2019.
2. FLOODPLAIN INFORMATION WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM) NOS. 2502500050 DATED SEPTEMBER 25, 2009. THE SITE IS LOCATED IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN).
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
4. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 OMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
6. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NITSCH ENGINEERING. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
9. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
11. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
13. ELEVATIONS REFER TO BOSTON CITY BASE (BCB).
14. THE CONTRACTOR SHALL COMPLY WITH THE ORDER OF CONDITIONS DATED XXXX XX, XXXX AND ISSUED BY THE BOSTON CONSERVATION COMMISSION (DEP #XXX-XXXX).

**PROPOSED LEGEND**

- — — — — LIMIT OF WORK
- // —// — EXISTING UTILITY TO BE ABANDONED, REMOVED AND DISPOSED IF IN CONFLICT WITH NEW SITE IMPROVEMENTS, OR AS INDICATED ON DRAWINGS
- o — o — EROSION CONTROL BARRIER
- x — x — CONSTRUCTION FENCE
- W — DOMESTIC WATER PIPE
- FP — FIRE PROTECTION PIPE
- S — SANITARY SEWER PIPE
- D — STORM DRAIN PIPE
- G — GAS PIPE
- E — ELECTRIC DUCT/BANK
- - - - - ELEVATION CONTOURS
- CO ● CLEANOUT
- AREA DRAIN
- ACCESS BASIN
- DRAIN MANHOLE
- WATER QUALITY STRUCTURE
- ⊕ CATCH BASIN
- ⊕ DOUBLE CATCH BASIN
- ⊕ WATER QUALITY INLET
- SEWER MANHOLE
- WV ► WATER VALVE
- HYD ► FIRE HYDRANT

**ABBREVIATIONS**

- AB ACCESS BASIN
- AD AREA DRAIN
- BB BOTTOM OF BANK
- BC BOTTOM OF CURB ELEVATION
- BW BOTTOM OF WALL ELEVATION
- CB CATCH BASIN
- CO CLEANOUT
- GPP CORRUGATED POLYETHYLENE PIPE
- DCB DOUBLE CATCH BASIN
- DICL DUCTILE IRON CEMENT LINE PIPE
- DMH DRAIN MANHOLE
- EMH ELECTRIC MANHOLE
- FES FLARED END SECTION
- FFE FINISHED FLOOR ELEVATION
- HYD FIRE HYDRANT
- INV INVERT ELEVATION
- LF LINEAR FEET
- LOW LIMIT OF WORK
- M&P MAINTAIN AND PROTECT
- OCS OUTLET CONTROL STRUCTURE
- PERF PERFORATED
- PVC POLYVINYL CHLORIDE PIPE
- R&D REMOVE AND DISPOSE OF
- R&S REMOVE AND STOCKPILE
- RD ROOF DRAIN
- RIM RIM ELEVATION
- SMH SEWER MANHOLE
- TB TOP OF BANK
- TW TOP OF WALL ELEVATION
- TYP TYPICAL
- VGC VERTICAL GRANITE CURB
- WQI WATER QUALITY INLET
- WQS WATER QUALITY STRUCTURE
- WV WATER VALVE

**EROSION CONTROL LEGEND**

- ⊕ INLET PROTECTION
- - - - - PAVEMENT SAWCUT



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**CIVIL NOTES, LEGEND AND ABBREVIATIONS**

YESHIVA OHR ISRAEL  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

PREPARED FOR  
**YESHIVA OHR ISRAEL**  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

REV.	COMMENTS	DATE

NITSCH PROJECT #	13302
FILE:	13302cno
SCALE:	1"=10'
DATE:	08/09/2019
PROJECT MANAGER:	WRM
SURVEYOR:	NITSCH
DRAFTED BY:	SB
CHECKED BY:	WRM



FOR NOI PERMITTING ONLY  
NOT FOR CONSTRUCTION

**C-000**



9/9/2019 9:41 AM

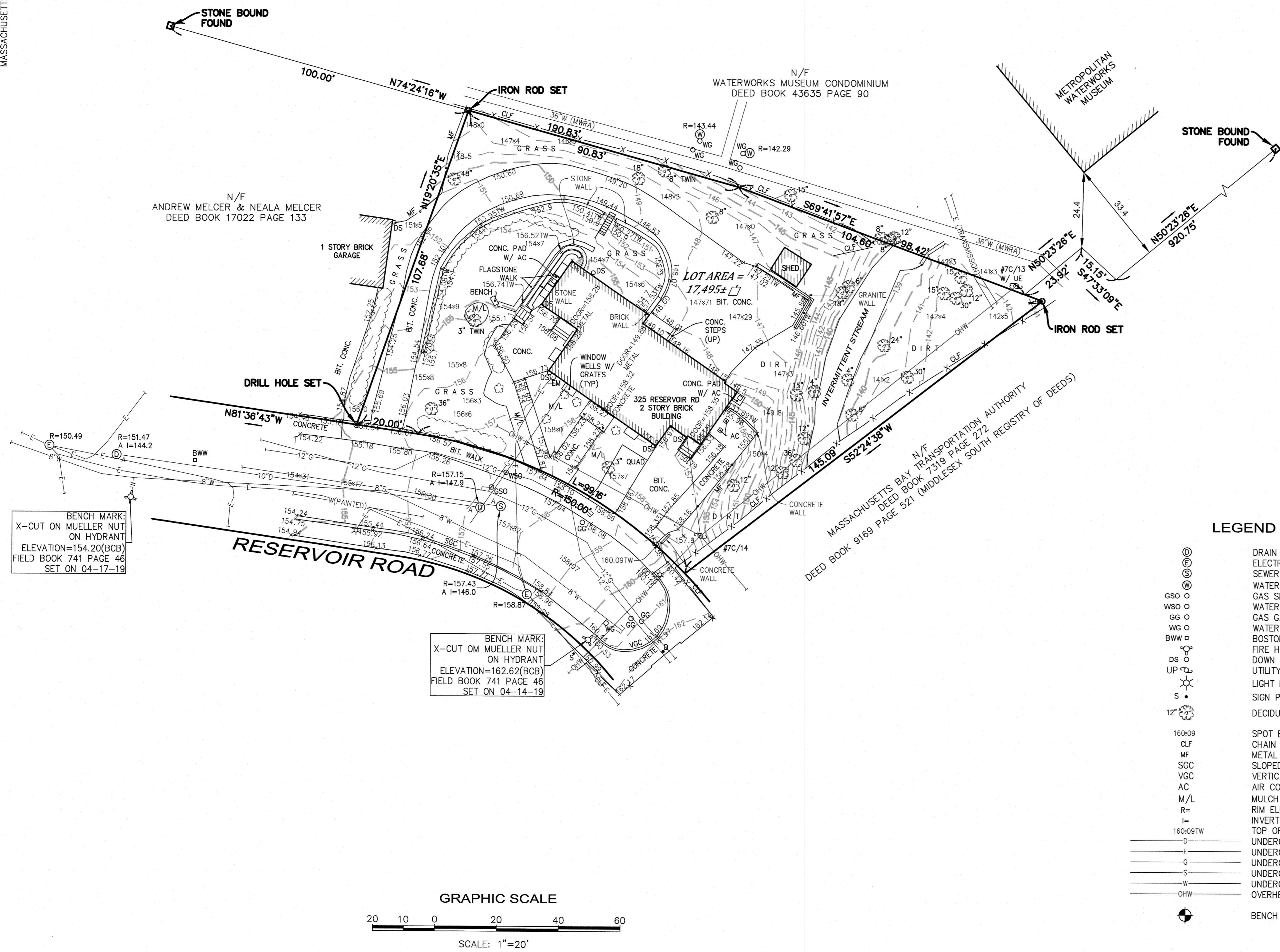
MASSACHUSETTS STATE PLANE COORDINATE SYSTEM  
NAD 83

### UTILITY INFORMATION STATEMENT

1. THE SUB-SURFACE UTILITY INFORMATION SHOWN HEREON IS COMPILED BASED ON FIELD SURVEY INFORMATION, RECORD INFORMATION AS SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES, AND PLAN INFORMATION SUPPLIED BY THE CLIENT, IF ANY; THEREFORE WE CANNOT GUARANTEE THE ACCURACY OF SAID COMPILED SUB-SURFACE INFORMATION TO ANY CERTAIN DEGREE OF STATED TOLERANCE. ONLY PHYSICALLY LOCATED SUB-SURFACE UTILITY FEATURES FALL WITHIN NORMAL STANDARD OF CARE ACCURACIES.
2. THE LOCATIONS OF UNDERGROUND PIPES, CONDUITS, AND STRUCTURES HAVE BEEN DETERMINED FROM SAID INFORMATION, AND ARE APPROXIMATE ONLY. COMPILED LOCATIONS OF ANY UNDERGROUND STRUCTURES, NOT VISIBLY OBSERVED AND LOCATED, CAN VARY FROM THEIR ACTUAL LOCATIONS.
3. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED.
4. THE STATUS OF UTILITIES, WHETHER ACTIVE, ABANDONED, OR REMOVED, IS AN UNKNOWN CONDITION AS FAR AS OUR COMPILATION OF THIS INFORMATION.
5. IT IS INCUMBENT UPON INDIVIDUALS USING THIS INFORMATION TO UNDERSTAND THAT COMPILING UTILITY INFORMATION IS NOT EXACT, AND IS SUBJECT TO CHANGE BASED UPON VARYING PLAN INFORMATION RECEIVED AND ACTUAL LOCATIONS.
6. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES IS SUBJECT TO FIELD CONDITIONS, THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS AND OTHER MATTERS.
7. THE PROPER UTILITY ENGINEERING/COMPANY SHOULD BE CONSULTED AND THE ACTUAL LOCATIONS OF SUBSURFACE STRUCTURES SHOULD BE VERIFIED IN THE FIELD (V.I.F.) BEFORE PLANNING FUTURE CONNECTIONS. CONTACT THE DIG SAFE CALL CENTER AT 1-888-344-7233, SEVENTY-TWO HOURS PRIOR TO EXCAVATION, BLASTING, GRADING, AND/OR PAVING.
8. AS OF THE DATE OF THIS PLAN RECORD INFORMATION HAS NOT BEEN RECEIVED BY NITSCH ENGINEERING FOR THE FOLLOWING UTILITIES: TELEPHONE (VERIZON), WATER (MWRA), RAILROAD (PANAM, CSX, AMTRAK), CABLE (COMCAST, AT&T, CROWN CASTLE< EVERSOURCE FIBER), TOWN (BOSTON FIRE ALARM), OTHER (VERIZON BUSINESS, ZAYO GROUP, CENTURYLINK)

### NOTES

1. THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF NITSCH ENGINEERING. IT IS ISSUED TO RABBI URI FELDMAN & YESHIVA OHR YISRAEL FOR PURPOSES RELATED DIRECTLY AND SOLELY TO NITSCH ENGINEERING'S SCOPE OF SERVICES UNDER CONTRACT WITH RABBI URI FELDMAN & YESHIVA OHR YISRAEL FOR EXISTING CONDITIONS SURVEY FOR 325 RESERVOIR ROAD. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT AND PROJECT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN AUTHORIZATION IS GIVEN THEREFOR BY NITSCH ENGINEERING.
2. THE PURPOSE OF THIS PLAN IS TO SHOW EXISTING CONDITIONS AS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY WHICH OCCURRED APRIL 16-17, 2019 & APRIL 22, 2019.
3. HORIZONTAL BEARINGS REFER TO MASSACHUSETTS STATE PLANE COORDINATE SYSTEM (NAD83) BASED ON GPS OBSERVATIONS.
4. ELEVATION REFERS TO BOSTON CITY BASE (BCB) VERTICAL BASED ON GPS OBSERVATIONS.
5. THE INFORMATION CONTAINED ON THE DISK OR ELECTRONIC DRAWING FILE ACCOMPANYING THIS PLAN MUST BE COMPARED TO THE SEALED AND SIGNED HARD COPY OF THE PLAN TO ENSURE THE ACCURACY OF ALL INFORMATION AND TO ENSURE NO CHANGES, ALTERATIONS, OR MODIFICATIONS HAVE BEEN MADE. RELIANCE SHALL NOT BE MADE ON A DOCUMENT TRANSMITTED BY COMPUTER OR OTHER ELECTRONIC MEANS UNLESS FIRST COMPARED TO THE ORIGINAL SEALED DOCUMENT ISSUED AT THE TIME OF THE SURVEY. DUE TO THE CRITICAL NATURE OF SURVEYING, DATA ACQUISITION, AND AUTOCAD PLAN DEVELOPMENT, IF CRITICAL DIMENSIONAL INFORMATION IS NEEDED AND IS NOT SPECIFICALLY SHOWN ON THE ELECTRONIC DRAWING FILE, PLEASE CONTACT NITSCH ENGINEERING.



### LEGEND

- ⊙ DRAIN MANHOLE
- ⊙ ELECTRIC MANHOLE
- ⊙ SEWER MANHOLE
- ⊙ WATER MANHOLE
- ⊙ GAS SHUT-OFF
- ⊙ WATER SHUT-OFF
- ⊙ GAS GATE
- ⊙ WATER GATE
- ⊙ BOSTON WATER WORKS
- ⊙ FIRE HYDRANT
- ⊙ DOWN SPOUT
- ⊙ UTILITY POLE
- ⊙ LIGHT POLE
- ⊙ SIGN POST
- ⊙ DECIDUOUS TREE WITH TRUNK DIAMETER
- 160009 SPOT ELEVATION
- CLF CHAIN LINK FENCE
- MF METAL FENCE
- SCC SLOPED GRANITE CURB
- VGC VERTICAL GRANITE CURB
- AC AIR CONDITIONER
- M/L MULCH AND/OR LANDSCAPE
- R= RIM ELEVATION EQUALS
- I= INVERT ELEVATION EQUALS
- 160097W TOP OF WALL ELEVATION
- D- UNDERGROUND DRAIN LINE
- E- UNDERGROUND ELECTRIC LINE
- G- UNDERGROUND GAS LINE
- S- UNDERGROUND SEWER LINE
- W- UNDERGROUND WATER LINE
- OHV- OVERHEAD WIRES
- ⊙ BENCH MARK

COMMONWEALTH OF MASSACHUSETTS  
**JEFFREY CAMPBELL**  
 No. 53407  
 REGISTERED PROFESSIONAL LAND SURVEYOR  
*Jeffrey Campbell*  
 8-9-2019

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PROJECT # 13302.1  
 FILE: 13302.1\_TOPO1.dwg  
 SCALE: 1"=20'  
 DATE: APRIL 23, 2019  
 PROJECT MANAGER: JCC  
 FIELD BOOK: 741  
 DRAFTED BY: CPH  
 CHECKED BY:

REV.	COMMENTS	DATE
A	CHANGED BROOK TO INTERMITTENT STREAM	8/9/2019

**EXISTING CONDITIONS**  
 325 RESERVOIR ROAD  
 CHESTNUT HILL, MASSACHUSETTS

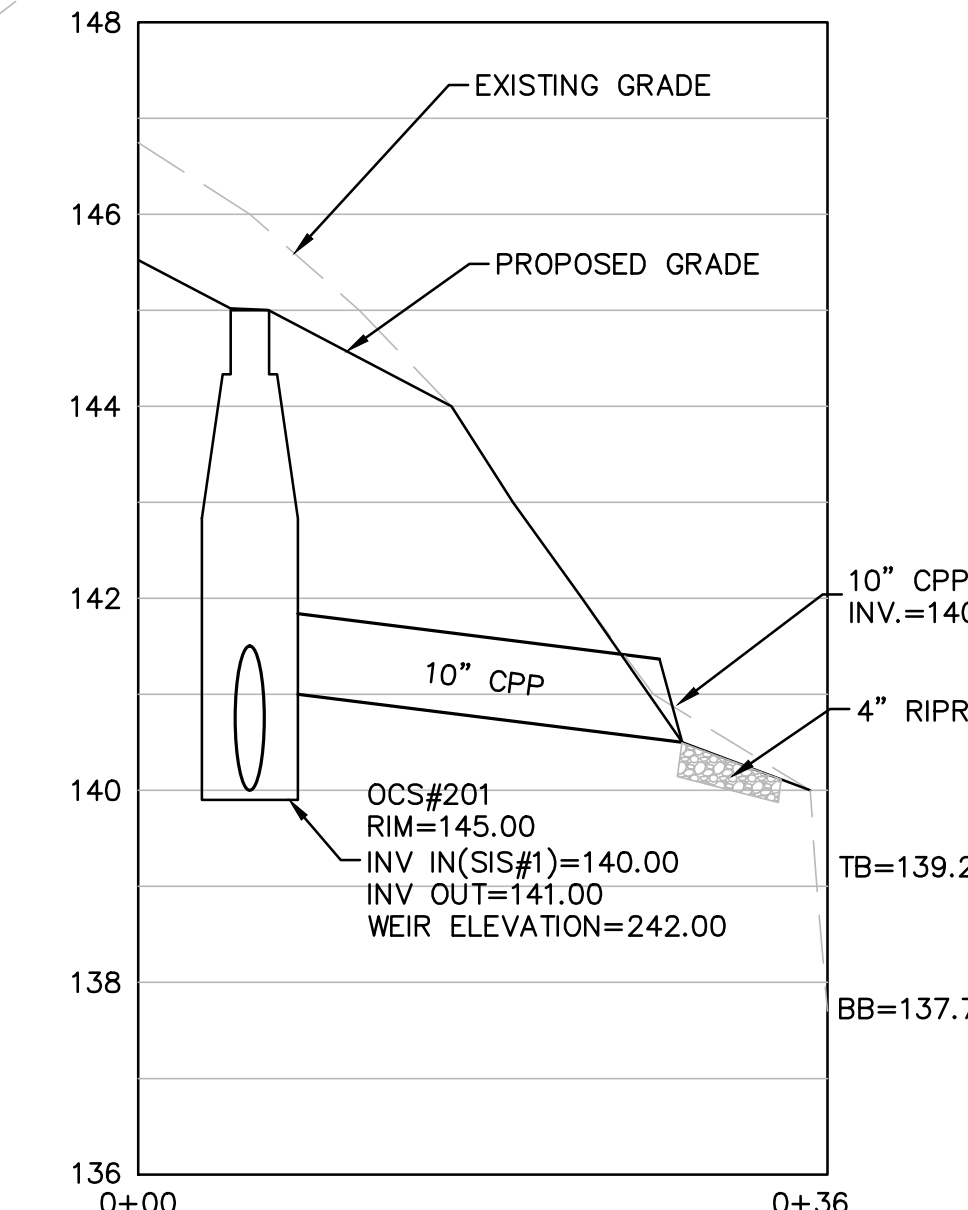
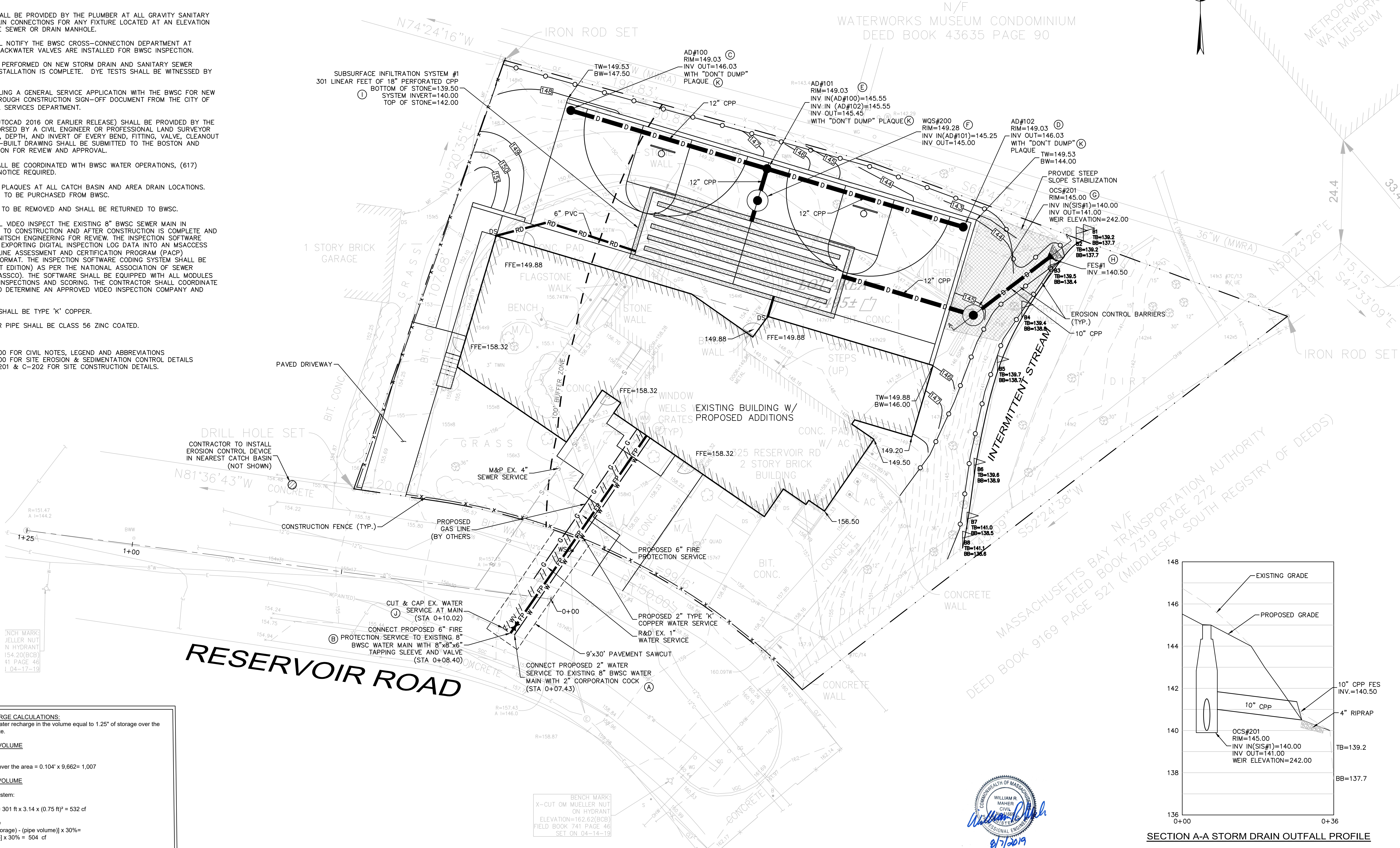
PREPARED FOR:  
**RABBI URI FELDMAN & YESHIVA OHR YISRAEL**  
 325 RESERVOIR ROAD, CHESTNUT HILL, MA 02467



**BWSC & CONTRACTOR NOTES:**

- THE ESTIMATED SANITARY SEWAGE DISCHARGE IS 1,350 GALLONS PER DAY (GPD). THIS ESTIMATE IS BASED ON 310 C.M.R. 15.000 THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION, INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE.
- THE ESTIMATED DAILY WATER USE IS 1,485 GPD BASED ON THE ESTIMATED SANITARY SEWAGE DISCHARGE WITH A 10% PEAKING FACTOR. THE PEAK DOMESTIC FLOW BASED ON FIXTURE COUNTS IS APPROXIMATELY 82 GPM.
- THE BWSC SHALL PROVIDE A 1.5" DISC TYPE WATER METER AND METER TRANSMITTER UNIT (MTU).
- BACKWATER VALVES SHALL BE PROVIDED BY THE PLUMBER AT ALL GRAVITY SANITARY SEWER AND STORM DRAIN CONNECTIONS FOR ANY FIXTURE LOCATED AT AN ELEVATION BELOW THE TOP OF THE SEWER OR DRAIN MANHOLE.
- THE CONTRACTOR SHALL NOTIFY THE BWSC CROSS-CONNECTION DEPARTMENT AT 617-989-7283 ONCE BACKWATER VALVES ARE INSTALLED FOR BWSC INSPECTION.
- DYE TESTING SHALL BE PERFORMED ON NEW STORM DRAIN AND SANITARY SEWER CONNECTIONS AFTER INSTALLATION IS COMPLETE. DYE TESTS SHALL BE WITNESSED BY THE BWSC.
- A PREREQUISITE FOR FILING A GENERAL SERVICE APPLICATION WITH THE BWSC FOR NEW CONSTRUCTION IS THE ROUGH CONSTRUCTION SIGN-OFF DOCUMENT FROM THE CITY OF BOSTON'S INSPECTIONAL SERVICES DEPARTMENT.
- AN AS-BUILT PLAN (AUTOCAD 2016 OR EARLIER RELEASE) SHALL BE PROVIDED BY THE CONTRACTOR AND ENDORSED BY A CIVIL ENGINEER OR PROFESSIONAL LAND SURVEYOR SHOWING THE LOCATION, DEPTH, AND INVERT OF EVERY BEND, FITTING, VALVE, CLEANOUT AND ANCHOR. THE AS-BUILT DRAWING SHALL BE SUBMITTED TO THE BOSTON AND WATER SEWER COMMISSION FOR REVIEW AND APPROVAL.
- WATER SHUT DOWN SHALL BE COORDINATED WITH BWSC WATER OPERATIONS. (617) 989-7276, 24 HOURS NOTICE REQUIRED.
- PROVIDE "DON'T DUMP" PLAQUES AT ALL CATCH BASIN AND AREA DRAIN LOCATIONS. "DON'T DUMP" PLAQUES TO BE PURCHASED FROM BWSC.
- EXISTING WATER METER TO BE REMOVED AND SHALL BE RETURNED TO BWSC.
- THE CONTRACTOR SHALL VIDEO INSPECT THE EXISTING 8" BWSC SEWER MAIN IN RESERVOIR ROAD PRIOR TO CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE AND SUBMIT TO BWSC AND NITSCH ENGINEERING FOR REVIEW. THE INSPECTION SOFTWARE SHALL BE CAPABLE OF EXPORTING DIGITAL INSPECTION LOG DATA INTO AN MISACCESS DATABASE IN THE PIPELINE ASSESSMENT AND CERTIFICATION PROGRAM (PACP) STANDARD EXCHANGE FORMAT. THE INSPECTION SOFTWARE CODING SYSTEM SHALL BE PACP CERTIFIED (LATEST EDITION) AS PER THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO). THE SOFTWARE SHALL BE EQUIPPED WITH ALL MODULES NECESSARY FOR PACP INSPECTIONS AND SCORING. THE CONTRACTOR SHALL COORDINATE DIRECTLY WITH BWSC TO DETERMINE AN APPROVED VIDEO INSPECTION COMPANY AND DELIVERABLE.
- DOMESTIC WATER PIPE SHALL BE TYPE 'K' COPPER.
- FIRE PROTECTION WATER PIPE SHALL BE CLASS 56 ZINC COATED.

- NOTES:**
- REFER TO SHEET C-000 FOR CIVIL NOTES, LEGEND AND ABBREVIATIONS
  - REFER TO SHEET C-200 FOR SITE EROSION & SEDIMENTATION CONTROL DETAILS
  - REFER TO SHEETS C-201 & C-202 FOR SITE CONSTRUCTION DETAILS.



**PHOSPHORUS RECHARGE CALCULATIONS:**  
 BWSC requires groundwater recharge in the volume equal to 1.25' of storage over the impervious area of the site.

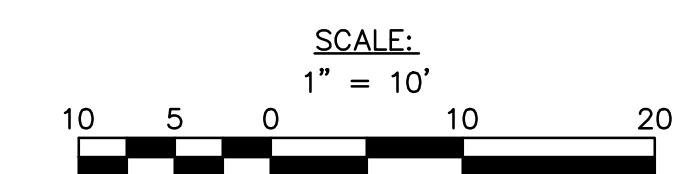
**REQUIRED STORAGE VOLUME**  
 Impervious Area = 9,662  
 1.25" of runoff (0.104 ft) over the area = 0.104 x 9,662 = 1,007

**PROVIDED STORAGE VOLUME**  
 Subsurface Infiltration System:  
 301 of 18" pipe storage = 301 ft x 3.14 x (0.75 ft)<sup>3</sup> = 532 cf  
 884 sf of crushed stone =  
 [(area stone x depth of storage) - (pipe volume)] x 30% =  
 [(884 sf x 2.5 ft) - 532 cf] x 30% = 504 cf  
 Total Storage (12" Pipe + Crushed Stone) = 532 cf + 504 cf = 1,036 cf  
 Required Storage = 1,007 cf < 1,036 cf = Storage Provided

**BWSC INSPECTION SIGNOFF SITE UTILITY PLAN**

	INSPECTOR	DATE	DYE TEST	SAWCUT	COMMENT
(A) CONNECT PROPOSED 2" TYPE 'K' COPPER DOMESTIC WATER SERVICE TO EXISTING 8" BWSC WATER MAIN			N/A	9'x30'	
(B) CONNECT PROPOSED 6" CLDI CLASS 56 FIRE PROTECTION SERVICE TO EXISTING 8" BWSC WATER MAIN			N/A	9'x30'	
(C) AREA DRAIN #100					
(D) AREA DRAIN #101					
(E) AREA DRAIN #102					
(F) WQS #200					
(G) OCS #201			N/A		
(H) FES #1 WITH RIPRAP			N/A		
(I) SUBSURFACE INFILTRATION SYSTEM #1					
(J) CUT & CAP EX. 1" WATER SERVICE AT MAIN			N/A	9'x30'	
(K) "DON'T DUMP" PLAQUES (3)			N/A		

- |                               |   |
|-------------------------------|---|
| 1. ACCOUNT/METER NUMBER       | 307894000/14004574 (EXISTING)<br>TO BE ASSIGNED FOR NEW METER |
| 2. PARCEL NUMBER              | 2102437000  |
| 3. WARD                       | 21  |
| 4. PROPERTY LOCATION          | 325 RESERVOIR ROAD<br>CHESTNUT HILL, MA 02467                 |
| 5. OWNER                      | YESHIVA OHR ISRAEL  |
| 6. OWNER'S ADDRESS            | 325 RESERVOIR ROAD<br>CHESTNUT HILL, MA 02467                 |
| 7. OWNER CONTACT              | RABBI URI FELDMAN   |
| 8. OWNER CONTACT TEL NO.      | 617-396-8078  |
| 9. CIVIL ENGINEER CONTACT     | WILLIAM R. MAHER, PE (NITSCH)                                 |
| 10. ENGINEER CONTACT TEL. NO. | 617-338-0063, EXT. 8707                                       |
| 11. LAND USE CODE             | SCHOOL (EXEMPT)   |



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**SITE UTILITY PLAN**  
 YESHIVA OHR ISRAEL  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

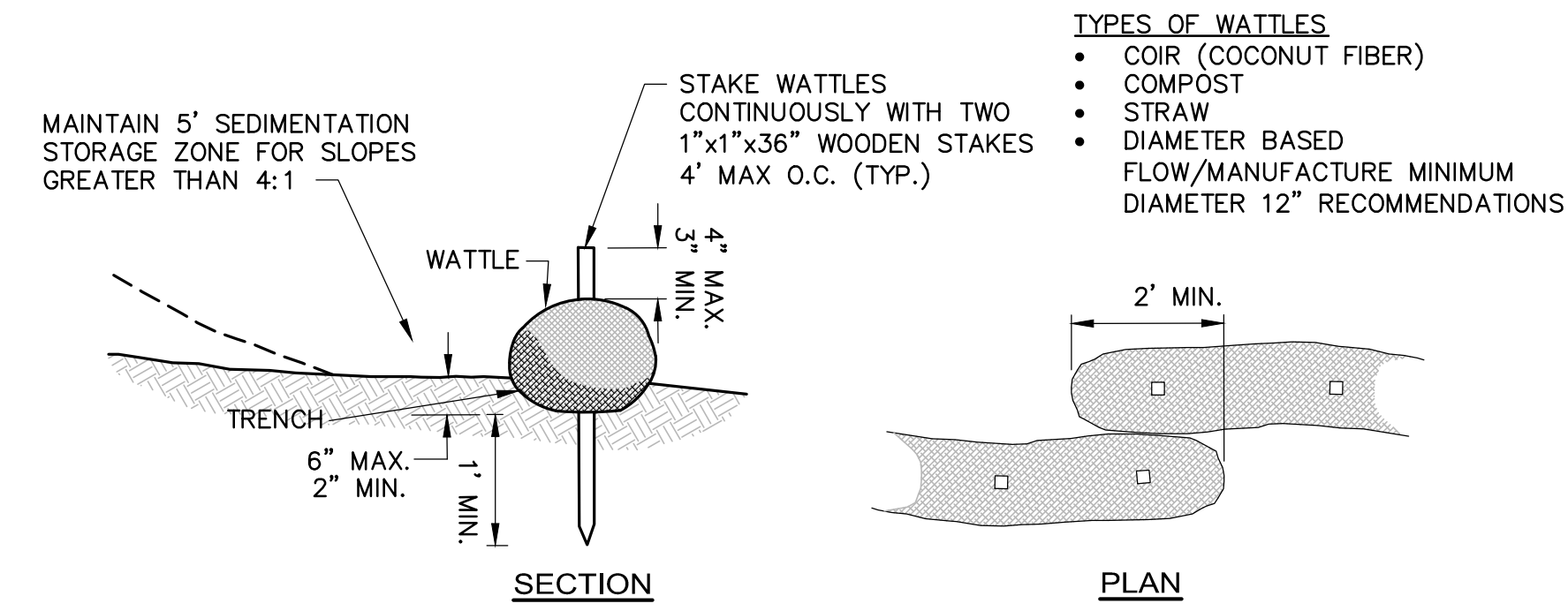
PREPARED FOR  
**YESHIVA OHR ISRAEL**  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

**BWSC SITE PLAN #19XXX  
 BWSC USE ONLY**

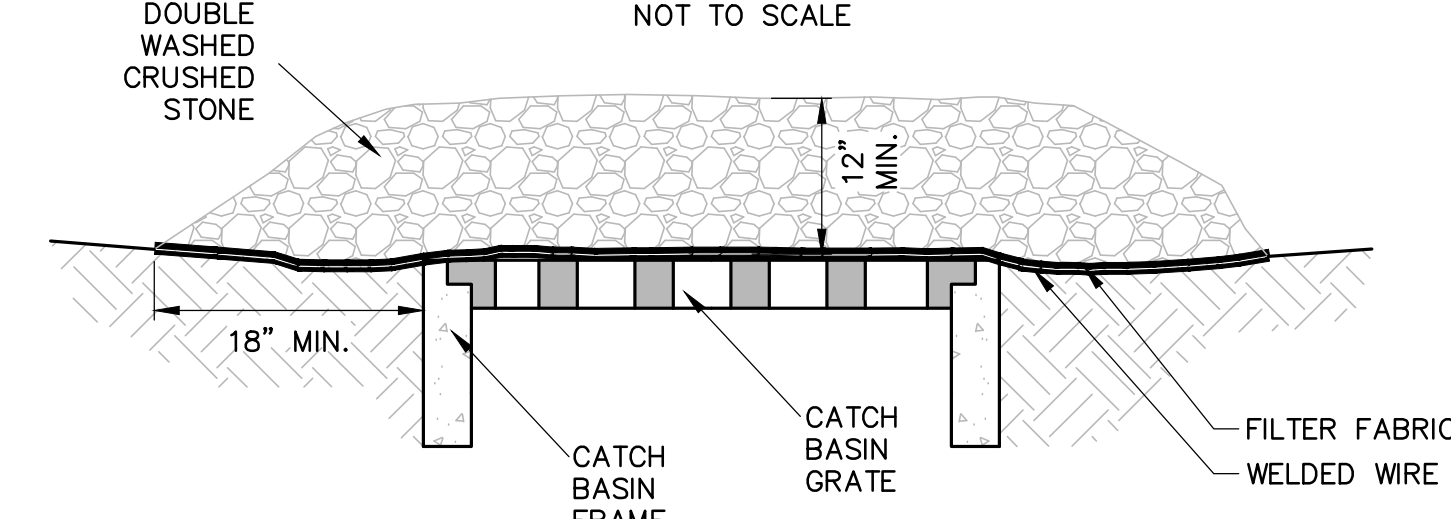
REV.	COMMENTS	DATE
	NITSCH PROJECT # 13302	
	FILE: 13302CUT	
	SCALE: 1"=10'	
	DATE: 08/13/2019	
	PROJECT MANAGER: WRM	
	SURVEYOR: NITSCH	
	DRAFTED BY: SB	
	CHECKED BY: WRM	

**C-100**



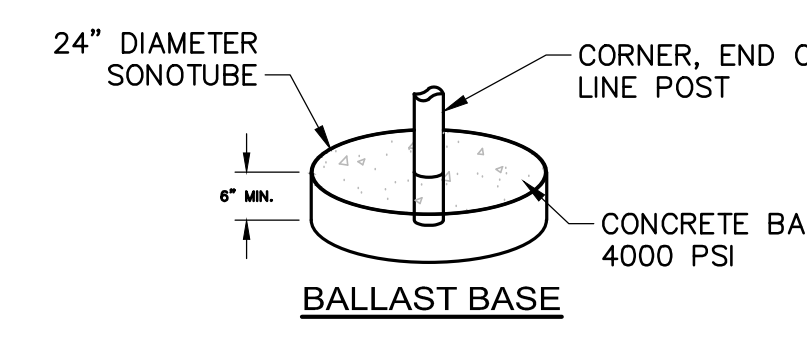
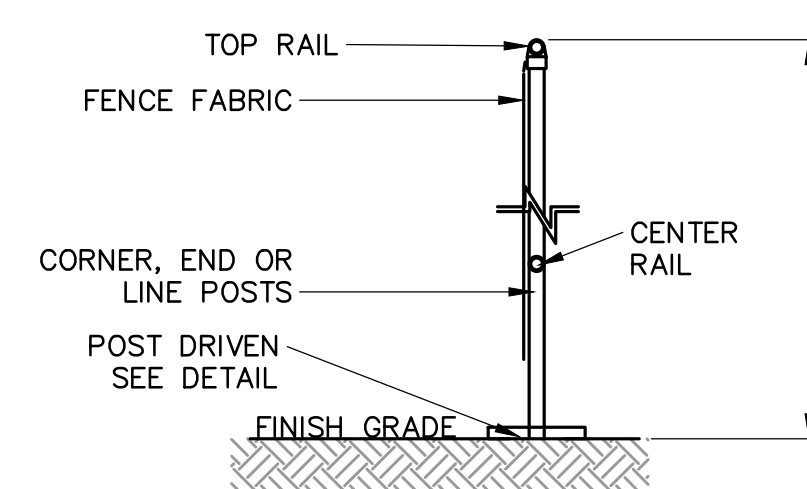
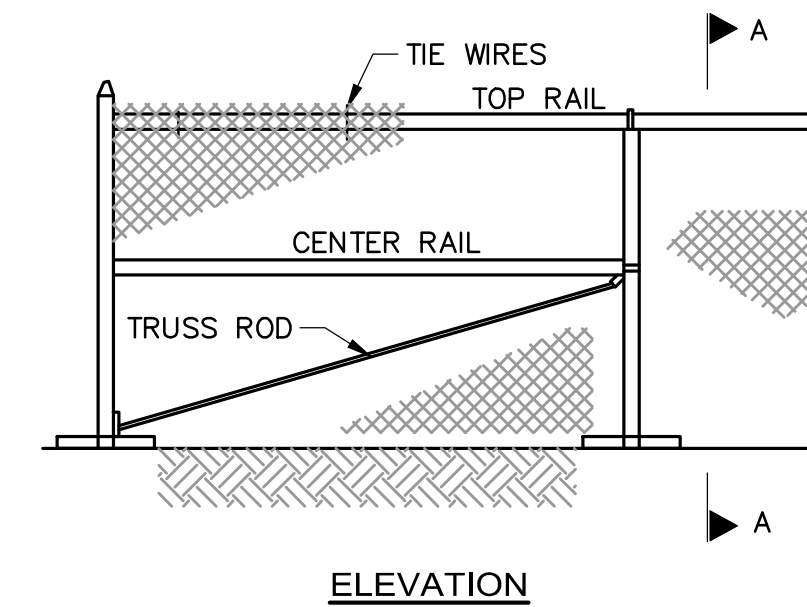


**WATTLES - SLOPE PROTECTION FOR SLOPES LESS THAN 10:1**  
 NOT TO SCALE



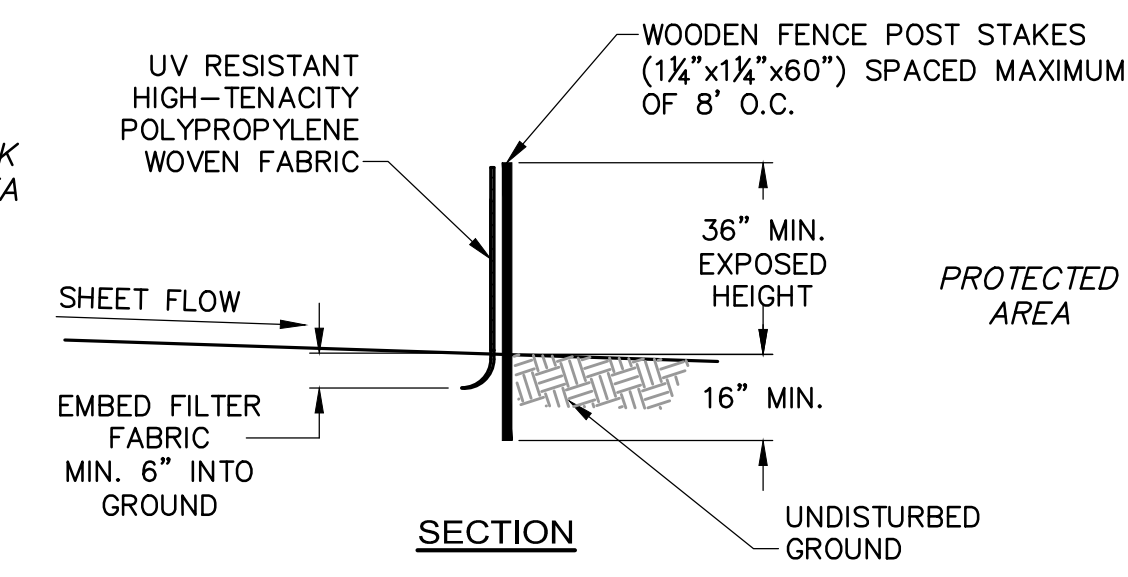
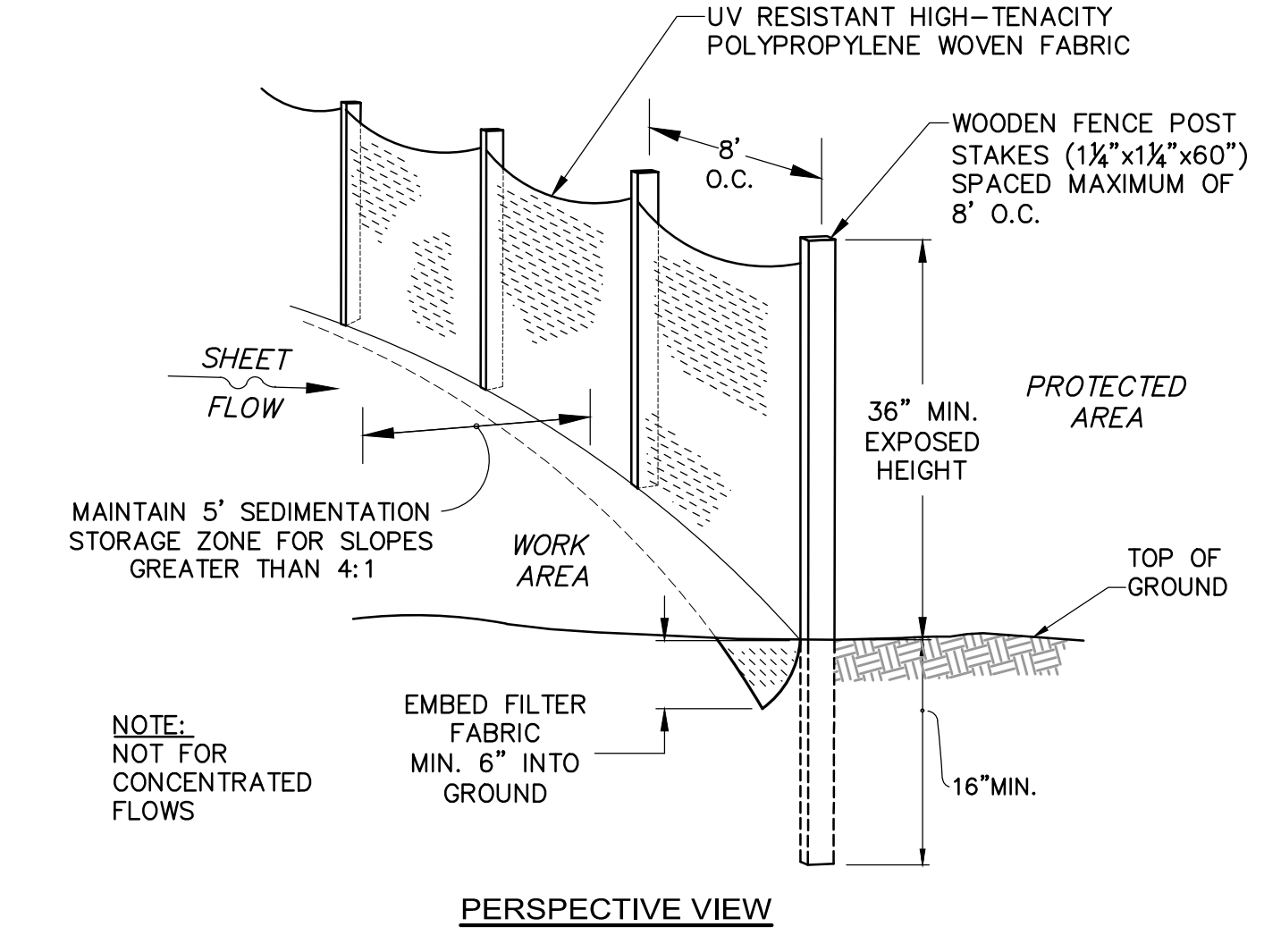
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED, BUT NOT WHERE PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS. THIS METHOD NOT ACCEPTABLE IN ACTIVE TRAFFIC AREAS.

**INLET PROTECTION CATCH BASIN W/ GRAVEL**  
 NOT TO SCALE

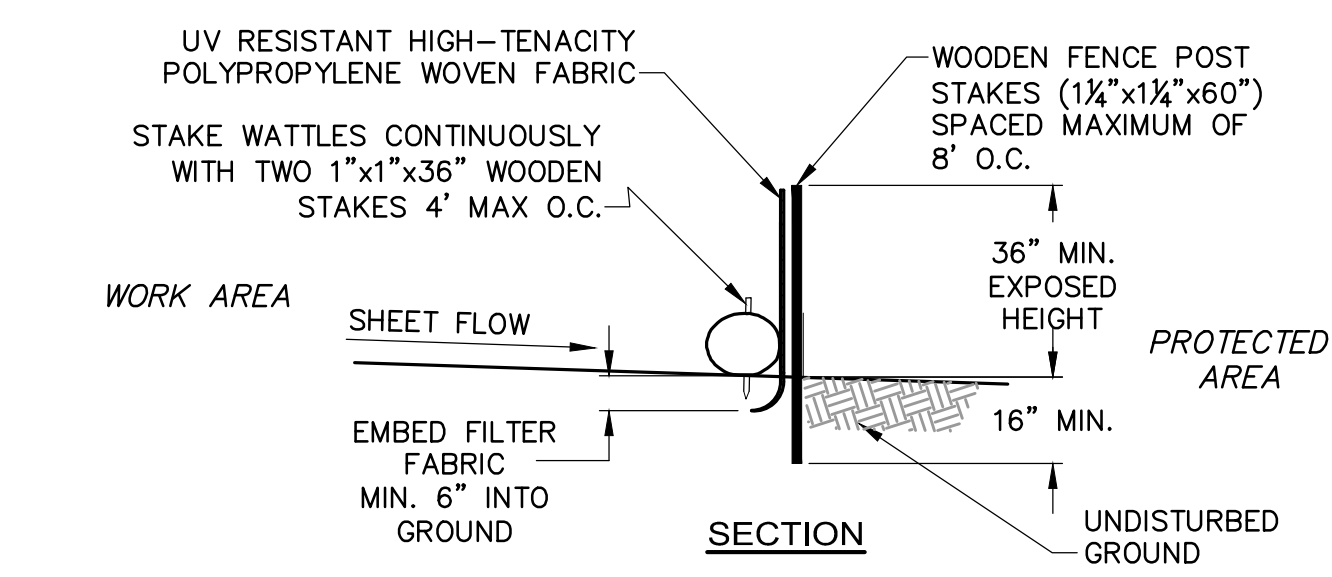
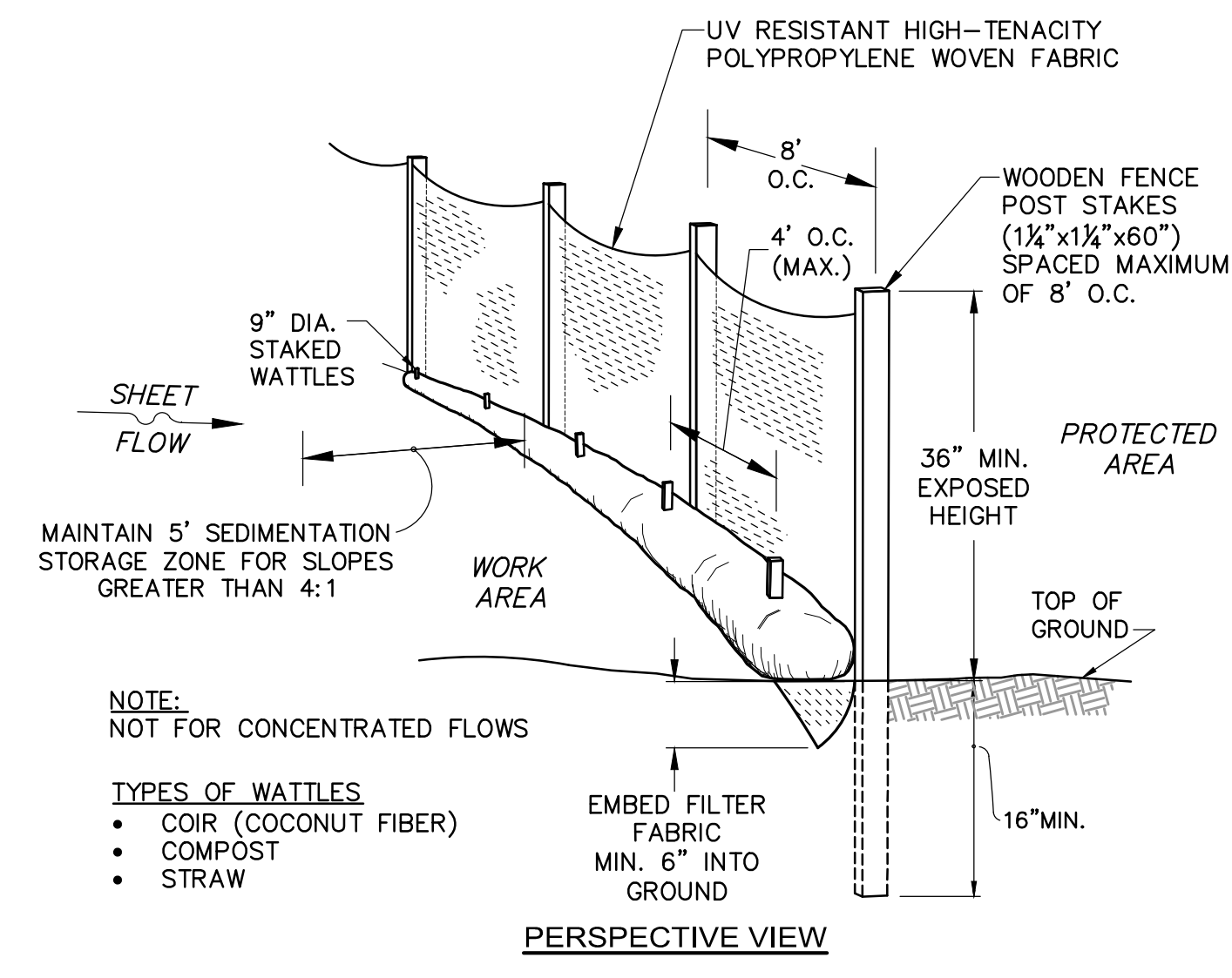


**TEMPORARY CONSTRUCTION CHAIN LINK FENCE WITH BALLAST BASE**  
 NOT TO SCALE

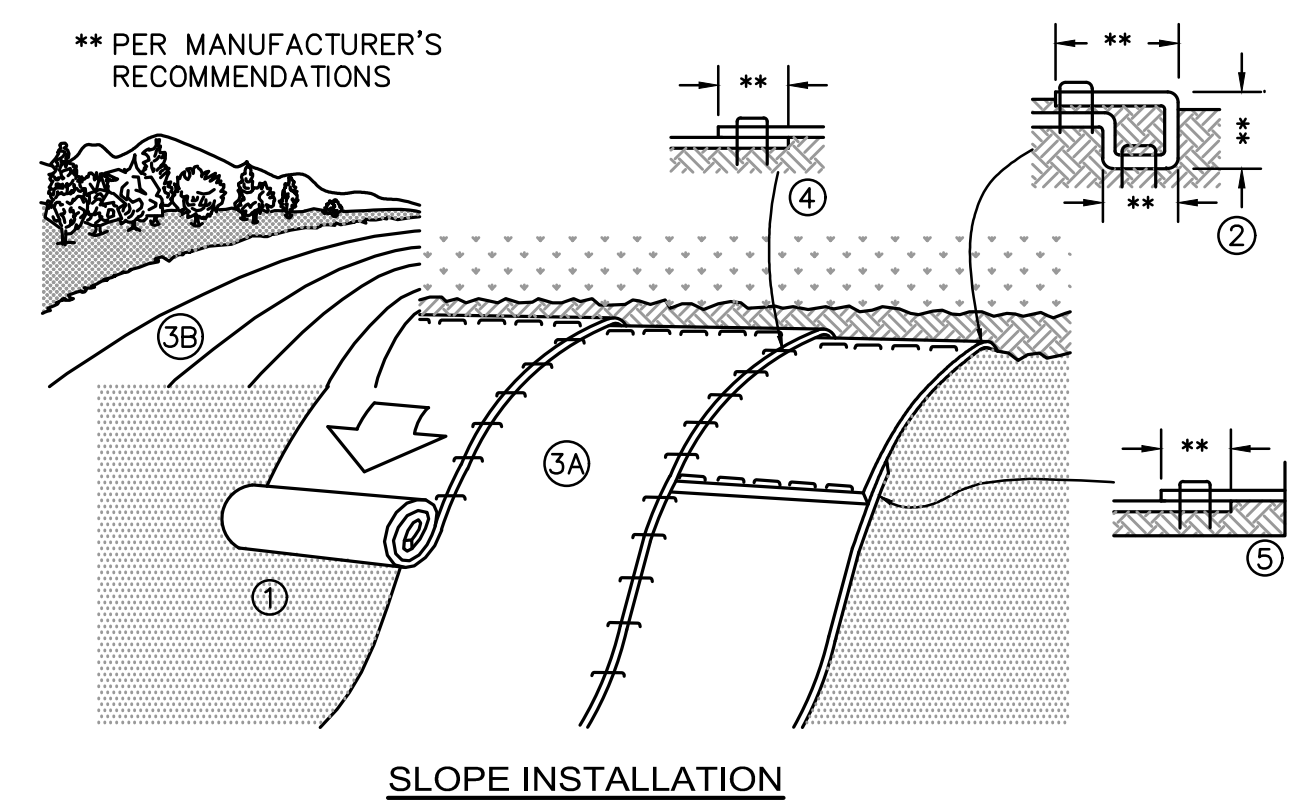
- NOTES**
1. END, GATE AND CORNER POSTS SHALL BE BRACED TO ADJACENT LINE POSTS. (MORE THAN 30' CHANGE IN DIRECTION CONSTITUTES A CORNER)
  2. FABRIC SHALL BE 0.148" GAUGE MIN. WIRE, WOVEN INTO APPROXIMATELY 2" DIAMOND MESH.
  3. ZINC-COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH PRIME WESTERN SPELTER OR EQUAL.
  4. ALUMINUM COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH ALUMINUM ALLOY.
  5. LINE POSTS SHALL BE 2 1/2" O.D. END OR CORNER POSTS SHALL BE 3" O.D.
  6. THE CONTRACTOR IS RESPONSIBLE FOR SURFACE RESTORATION ONCE THE FENCE IS REMOVED.
  7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE TEMPORARY CONSTRUCTION FENCE AT THE CONCLUSION OF THE PROJECT.



**PERIMETER PROTECTION BARRIER SILT FENCE DETAIL**  
 NOT TO SCALE

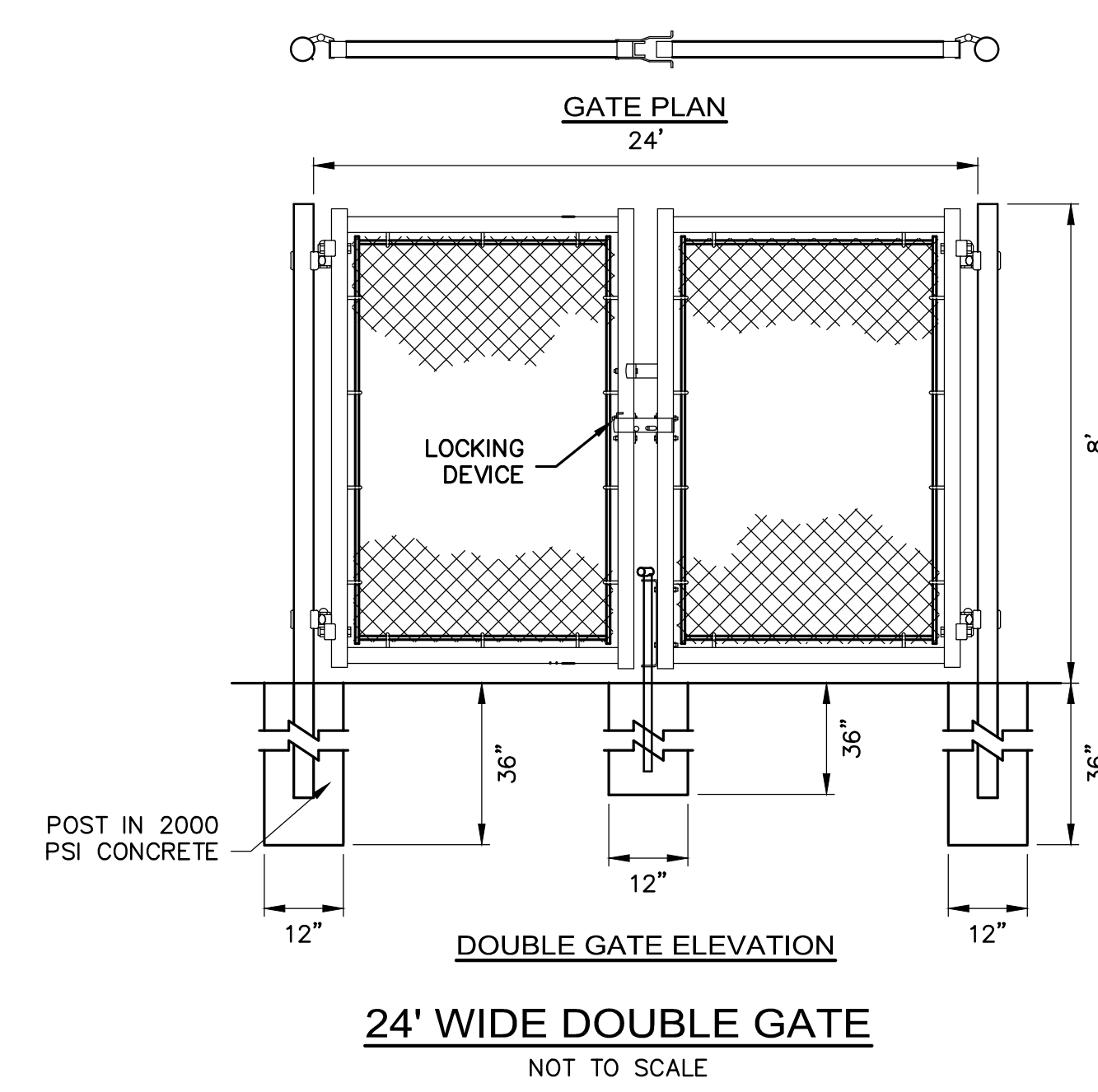


**PERIMETER PROTECTION BARRIER SILT FENCE DETAIL WITH WATTLES**  
 NOT TO SCALE

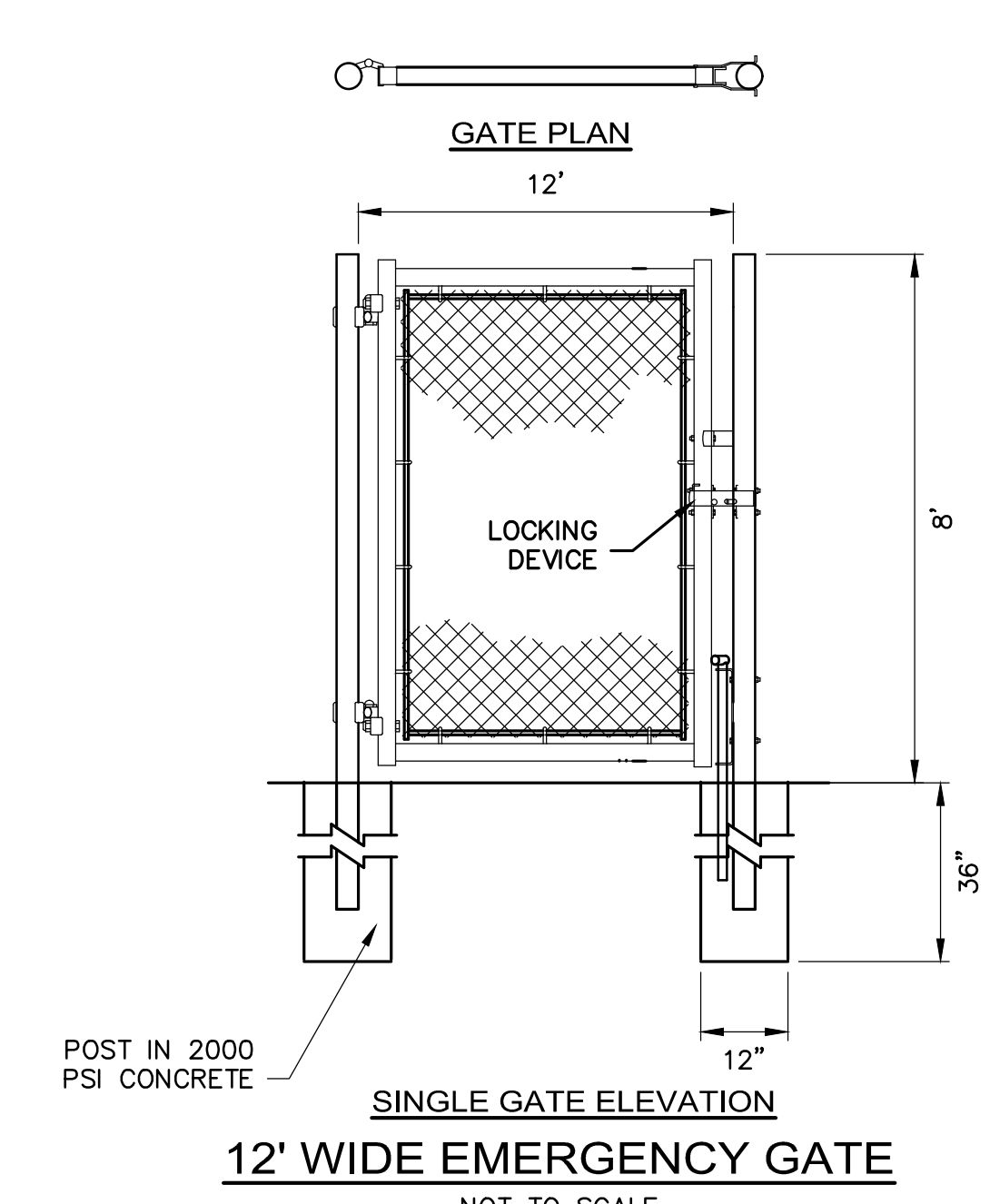


- NOTES:**
1. PREPARE SOIL BEFORE INSTALLING EROSION CONTROL BLANKETS (ECB's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
  2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE ECB'S IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING PORTION OF ECB'S BACK OVER SEED AND COMPACTED SOIL. SECURE ECB'S OVER COMPACTED SOIL WITH A ROW OF STAKES/STAPLES SPACED ACCORDANCE TO THE MANUFACTURER'S RECOMMENDATIONS ACROSS THE WIDTH OF THE ECB'S.
  3. ROLL THE ECB'S DOWN (A) OR HORIZONTALLY (B) ACROSS THE SLOPE. ECB'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL ECB'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAKES/STAPLES IN APPROPRIATE LOCATIONS AS SHOWN ON THE STAKE/STAPLE PATTERN GUIDE.
  4. THE EDGES OF PARALLEL ECB'S MUST BE STAKED/STAPLED WITH OVERLAP DEPENDING ON ECB'S TYPE. SEE THE MANUFACTURER'S RECOMMENDATIONS.
  5. CONSECUTIVE ECB'S SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN OVERLAP (SEE THE MANUFACTURER'S RECOMMENDATIONS). STAKE/STAPLE THROUGH OVERLAPPED AREA, ACROSS ENTIRE ECB'S WIDTH PER MANUFACTURER'S RECOMMENDATIONS.
  6. IN LOOSE SOIL CONDITIONS, THE USE OF STAKE OR STAPLE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE ECB'S.
  7. THE CONTRACTOR SHALL FOLLOW ALL INSTALLATION INSTRUCTIONS AS RECOMMENDED BY THE MANUFACTURER.

**TEMPORARY EROSION CONTROL BLANKET FOR STEEP SLOPES DETAIL**  
 NOT TO SCALE



**24' WIDE DOUBLE GATE**  
 NOT TO SCALE



**12' WIDE EMERGENCY GATE**  
 NOT TO SCALE

**SITE EROSION & SEDIMENTATION CONTROL DETAILS**

YESHIVA OHR ISRAEL  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

PREPARED FOR  
**YESHIVA OHR ISRAEL**  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

REV.	COMMENTS	DATE

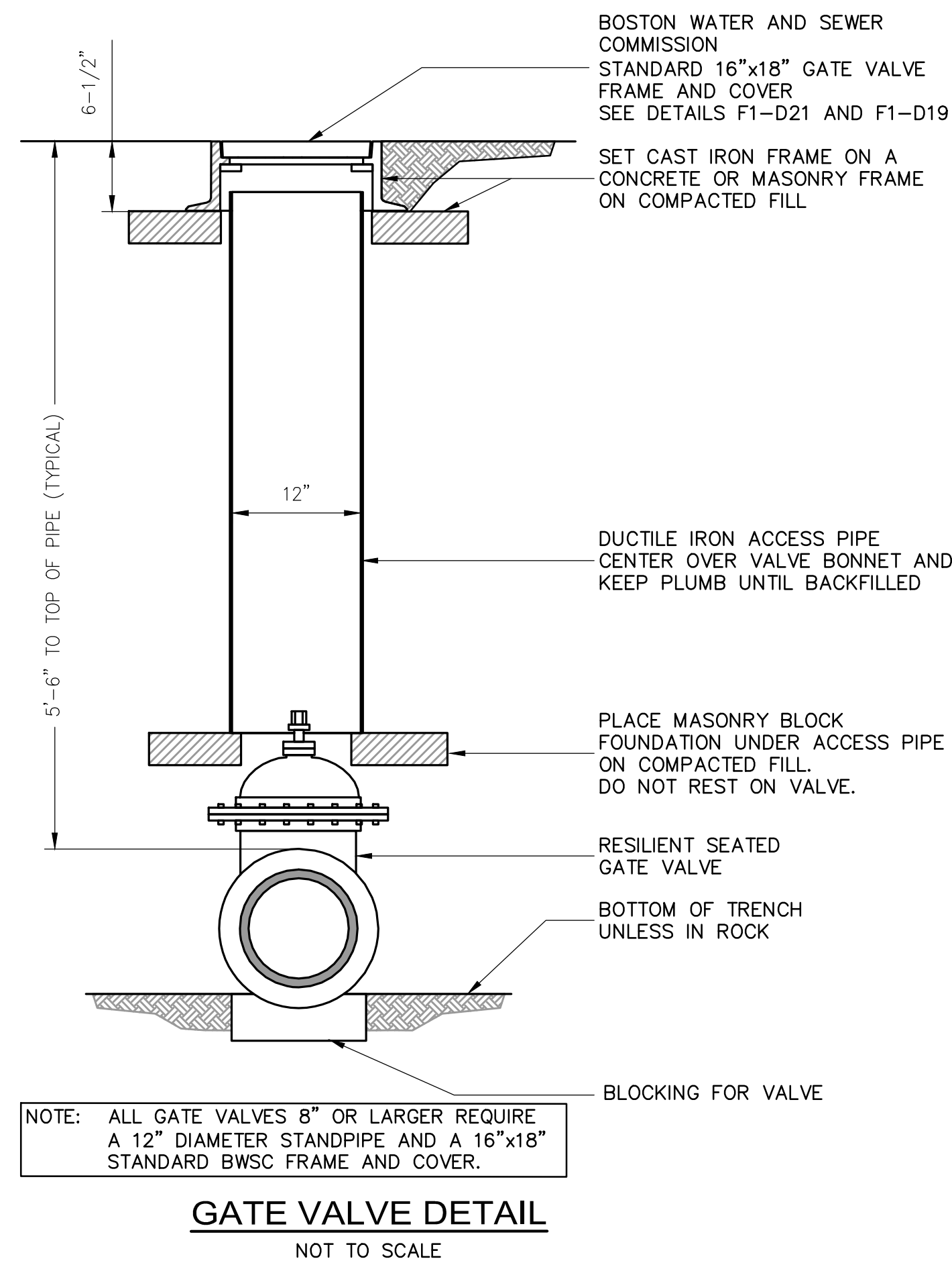
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SCALE:	AS NOTED
DATE:	08/09/2019
PROJECT MANAGER:	WRM
SURVEYOR:	NITSCH
DRAFTED BY:	SB
CHECKED BY:	WRM

WILLIAM R. MINKER  
 CIVIL ENGINEER  
 8/7/2019

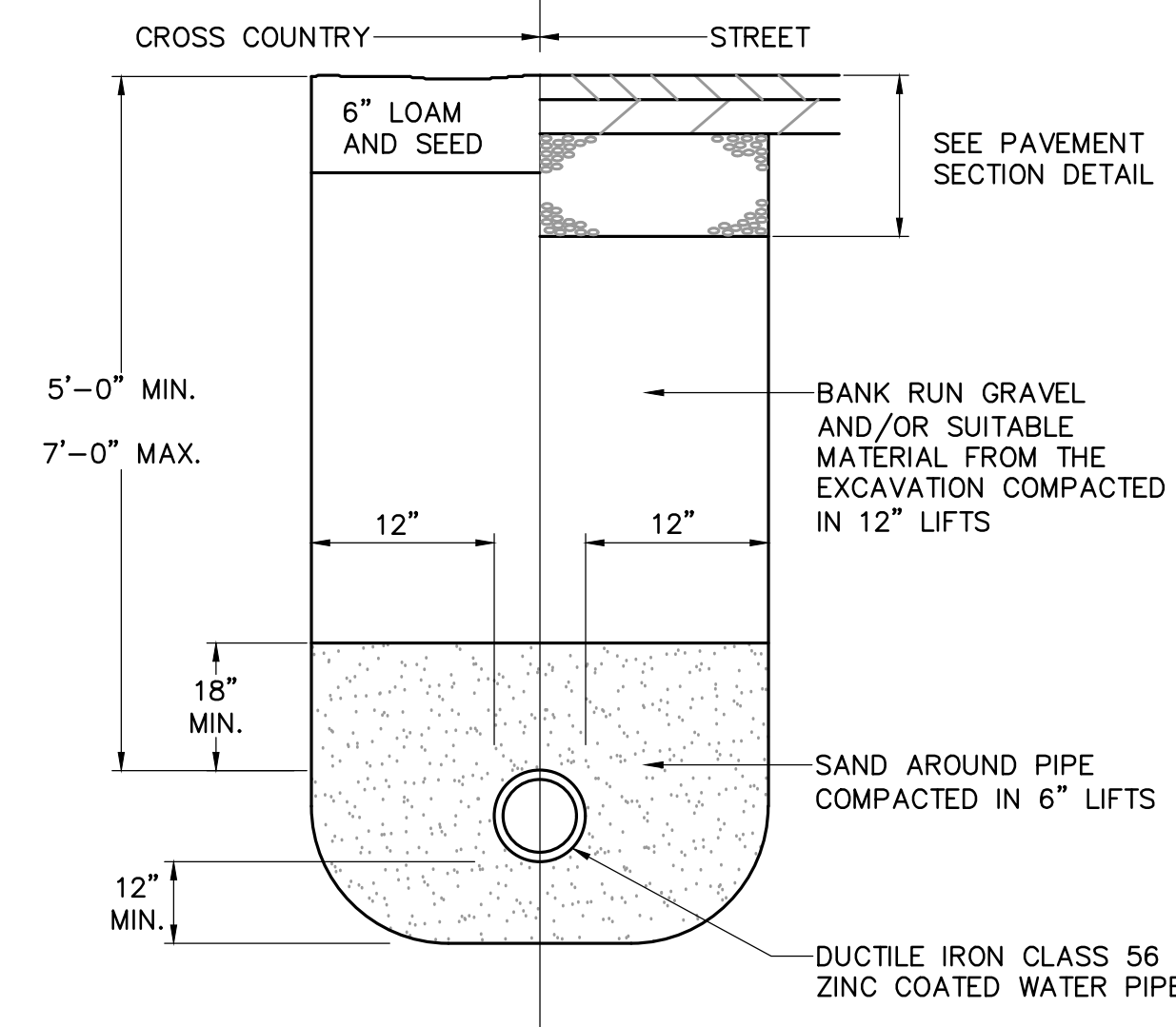
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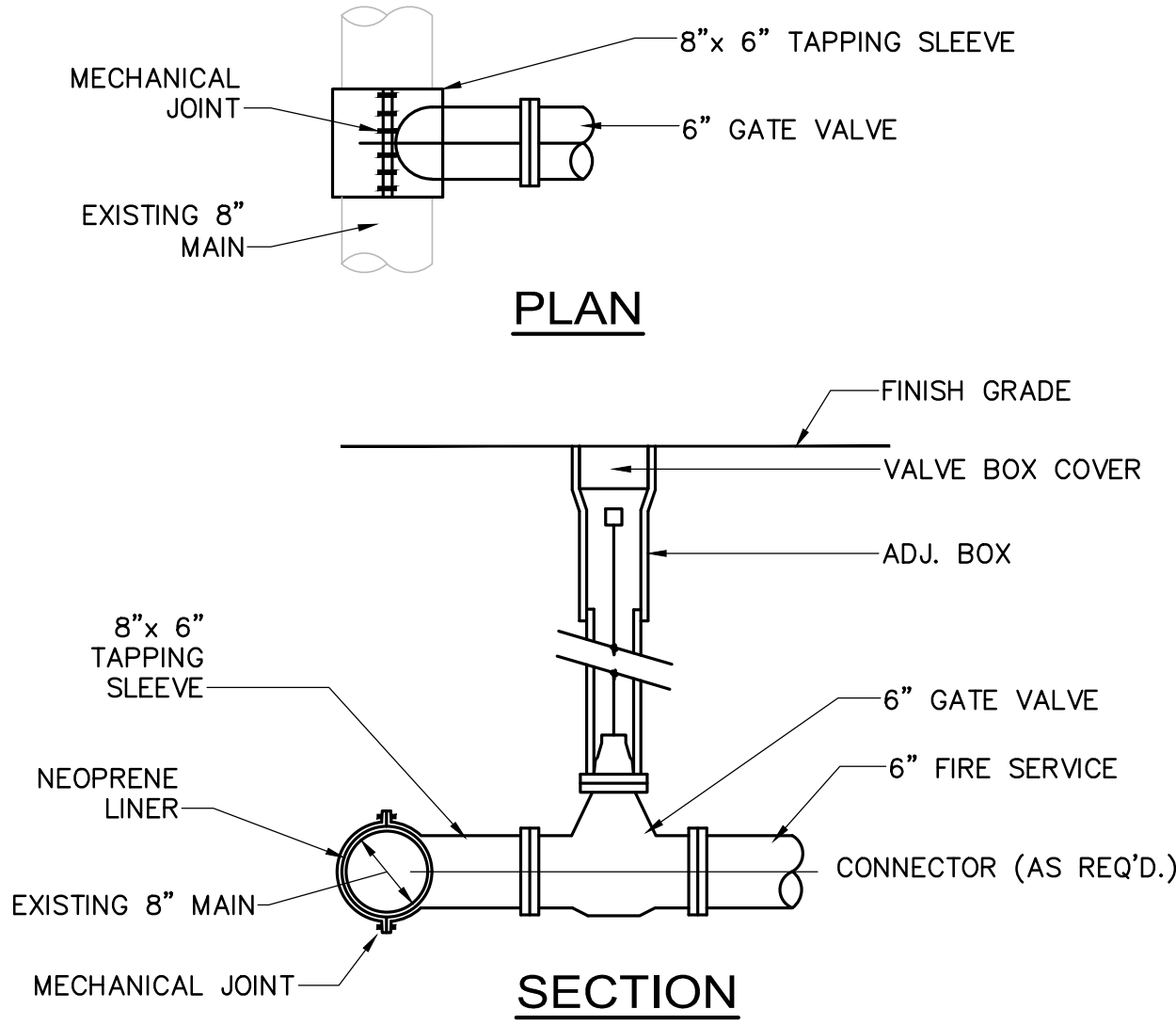




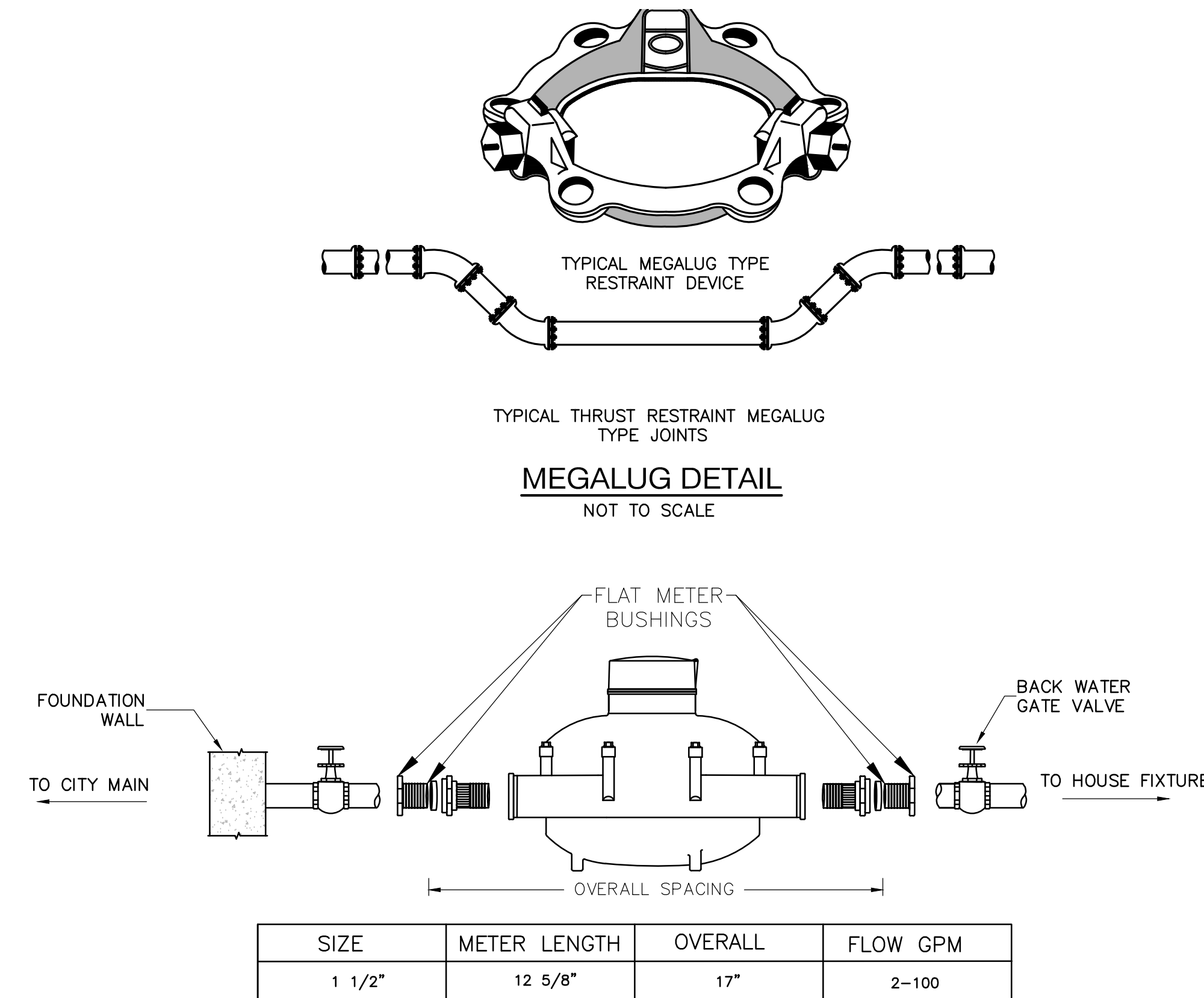
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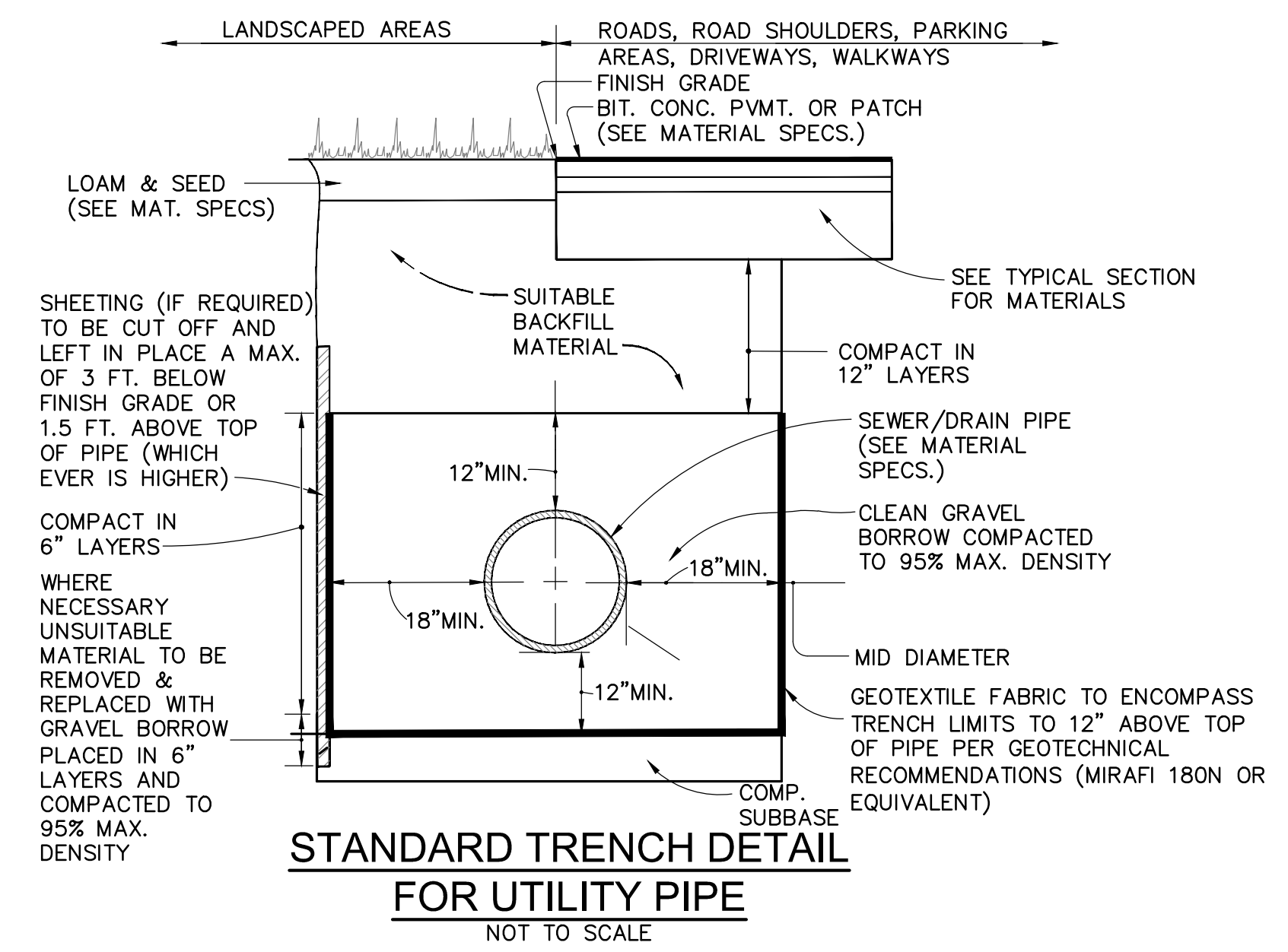
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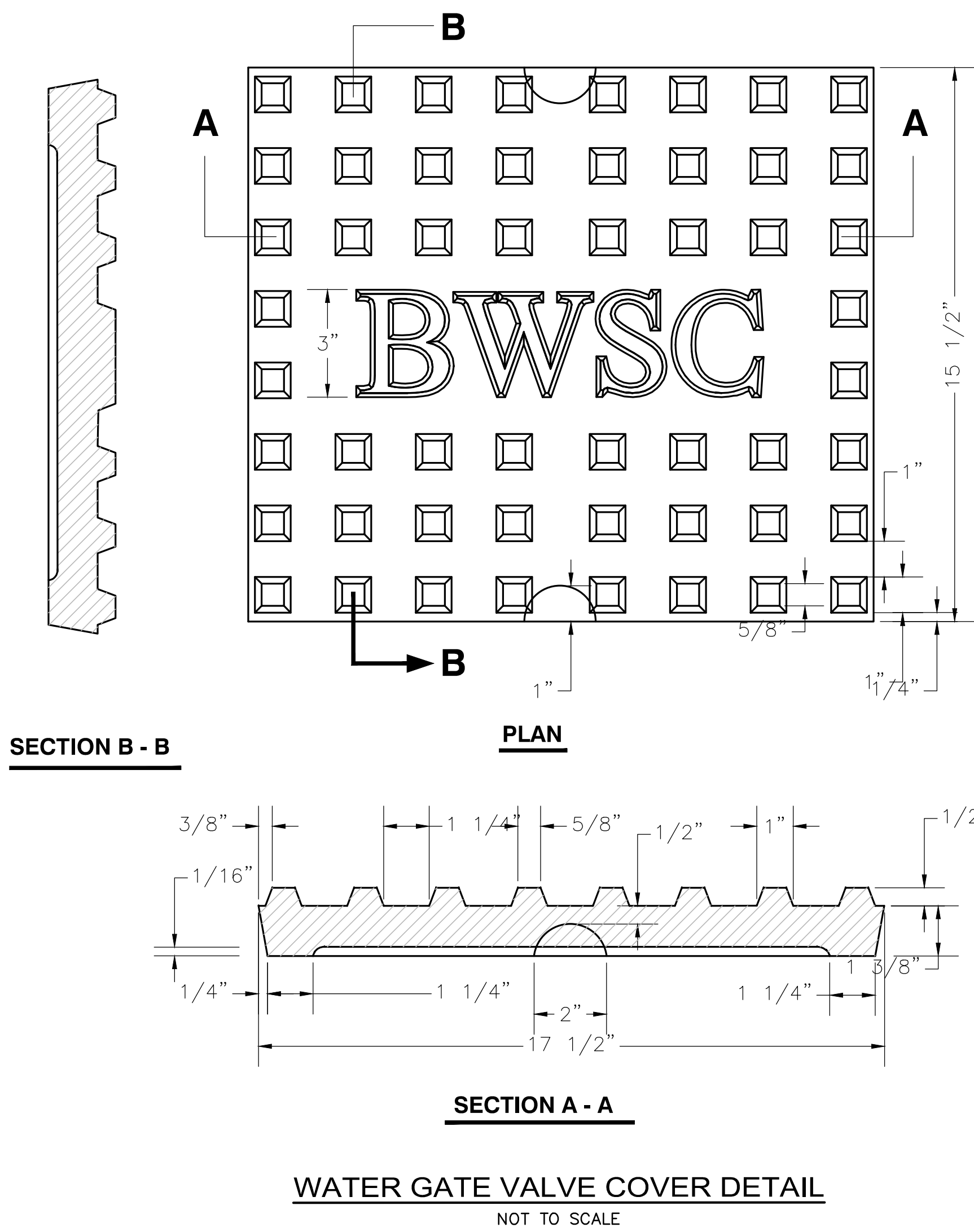
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**BWSC METER SPACING DETAIL**  
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**STANDARD TRENCH DETAIL FOR UTILITY PIPE**  
NOT TO SCALE



**WATER GATE VALVE COVER DETAIL**  
NOT TO SCALE

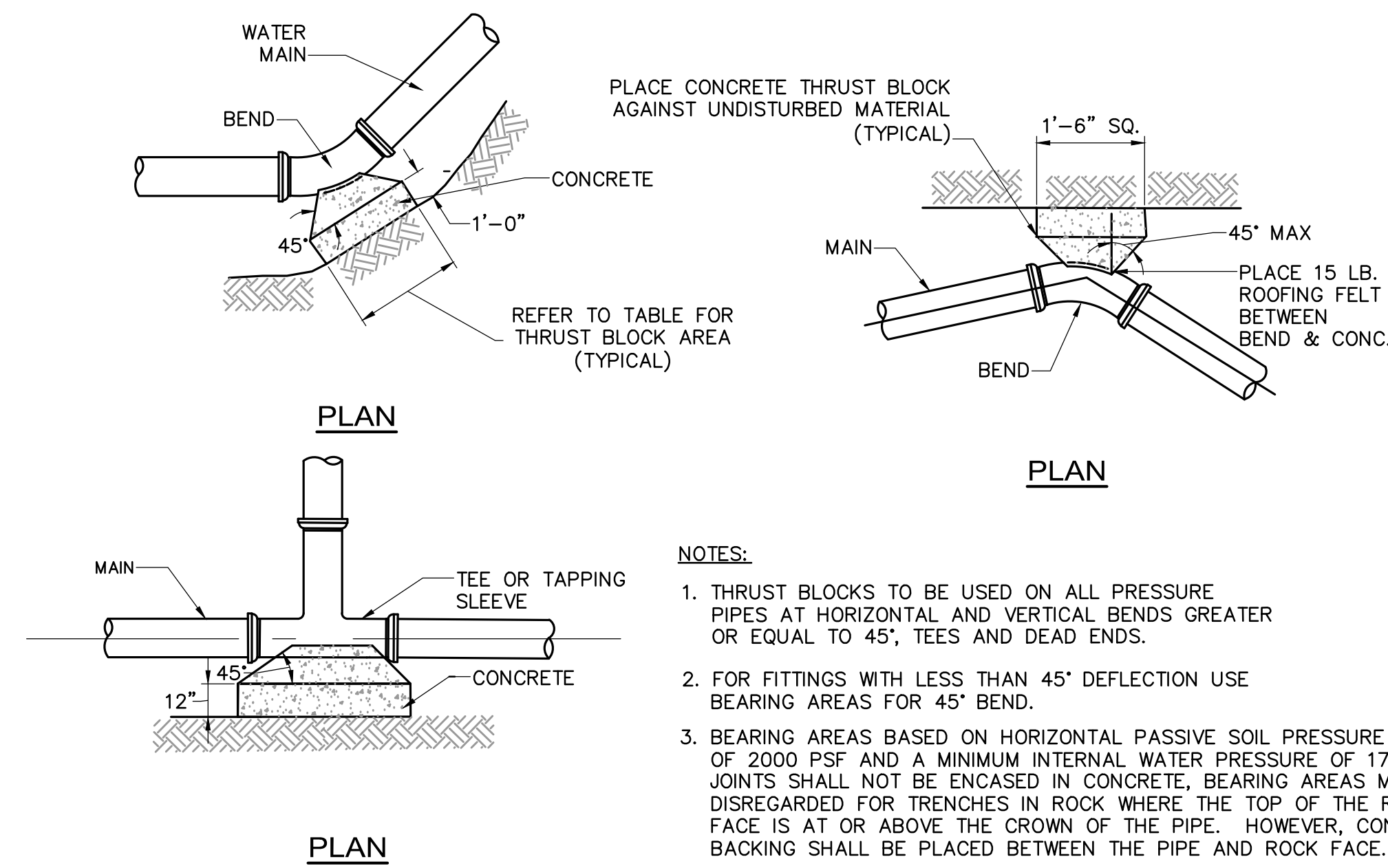
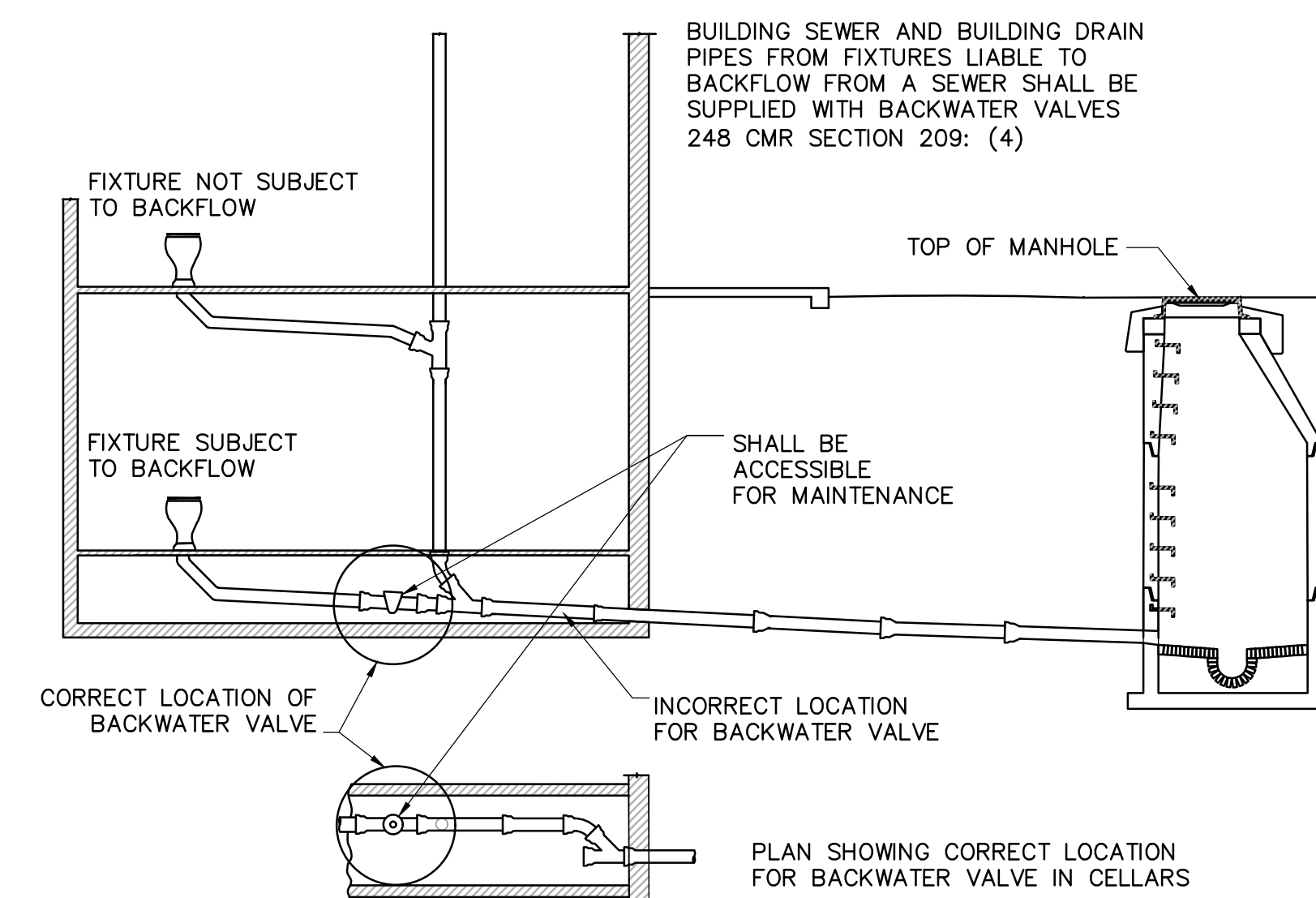


TABLE OF BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR FITTING. \*

SIZE OF MAIN (INCHES)	90° BEND (S.F.)	45° BEND (S.F.)	DEAD END (S.F.)
4	2.3	1.3	1.6
6	4.7	2.5	3.3
8	8.0	4.5	6.0
12	17.0	9.5	12.0

**THRUST BLOCK DETAILS**  
NOT TO SCALE



**STANDARD BACKWATER VALVE**  
NOT TO SCALE

NOTE: ALL PLUMBING FIXTURES BELOW THE LEVEL OF THE TOP OF THE MANHOLE OF THE SEWER SERVING THE FIXTURE(S) SHALL BE CONSIDERED AS BEING SUBJECT TO BACKFLOW AND SHALL BE SUPPLIED WITH BACKWATER VALVES.



**WATER UTILITY DETAILS**

YESHIVA OHR ISRAEL  
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 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

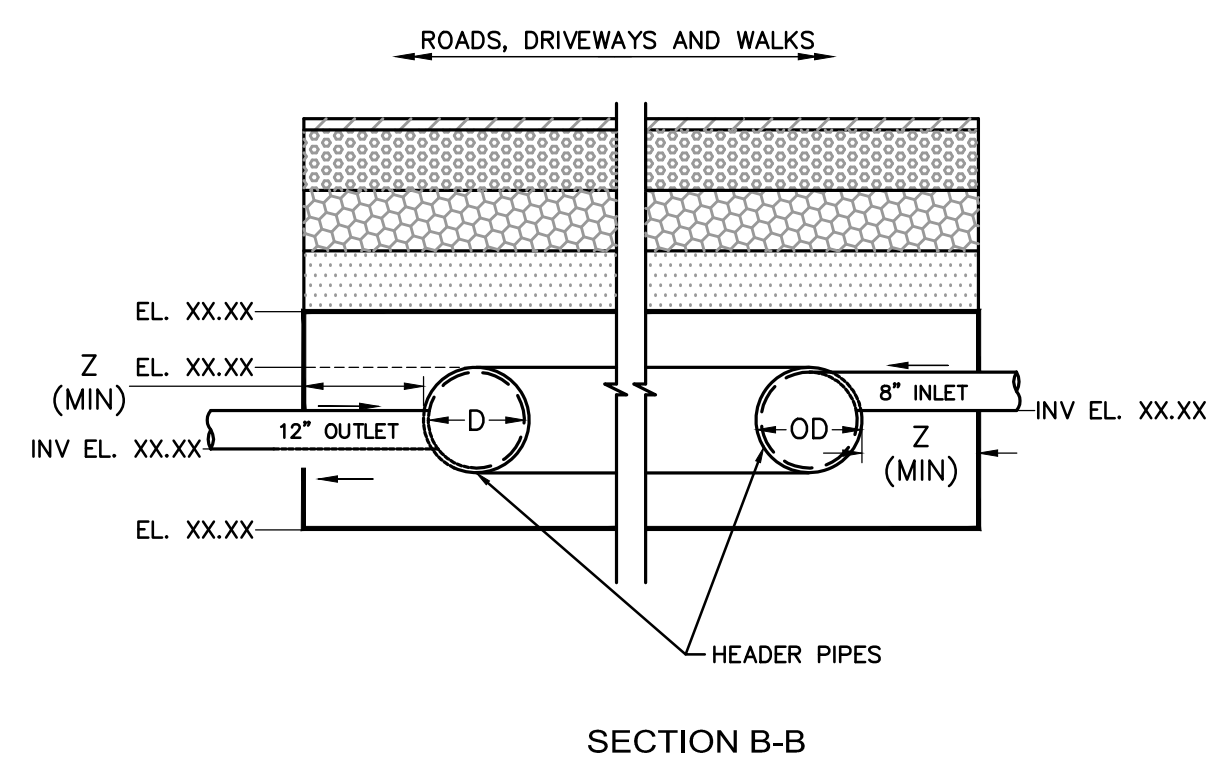
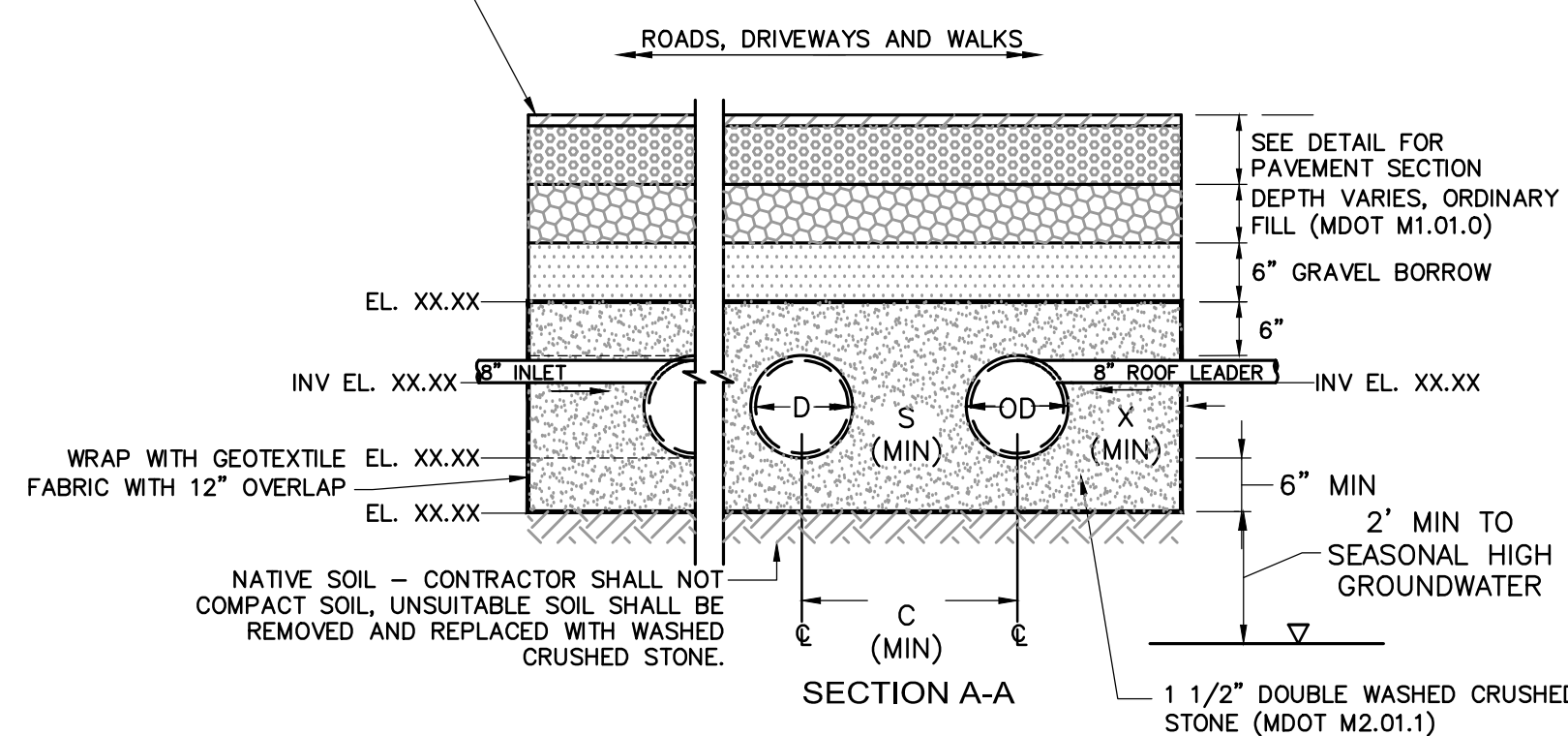
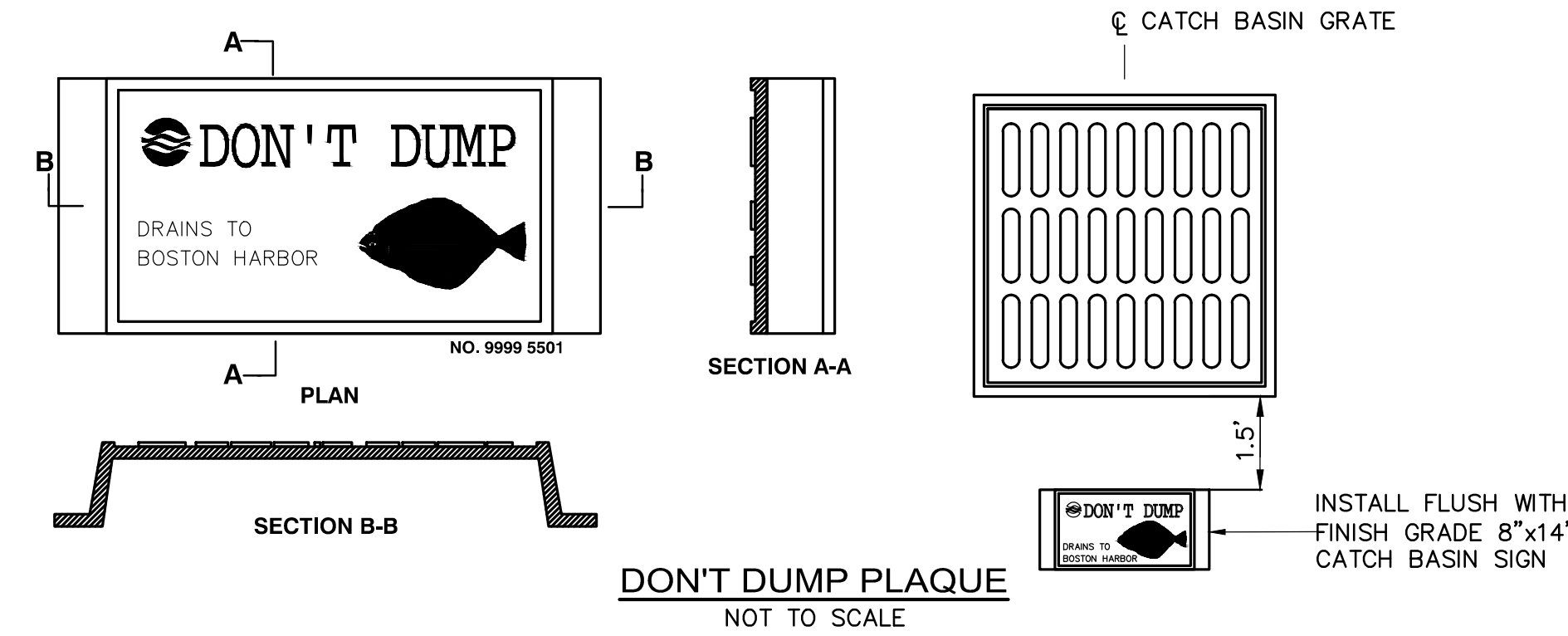
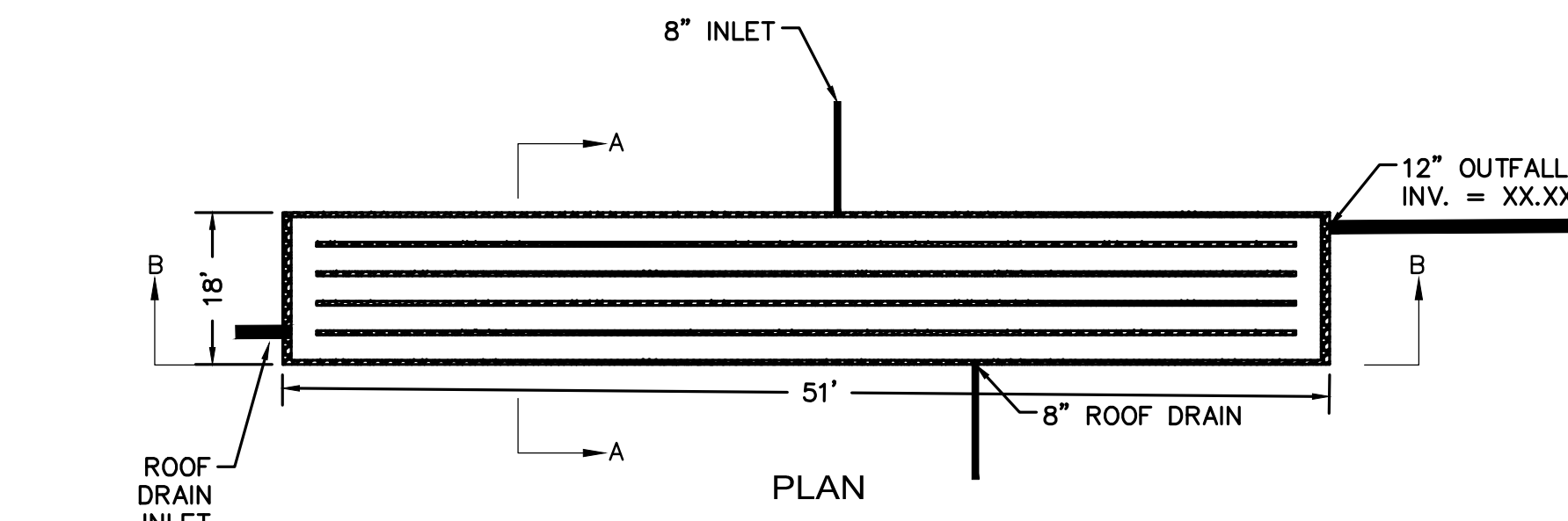
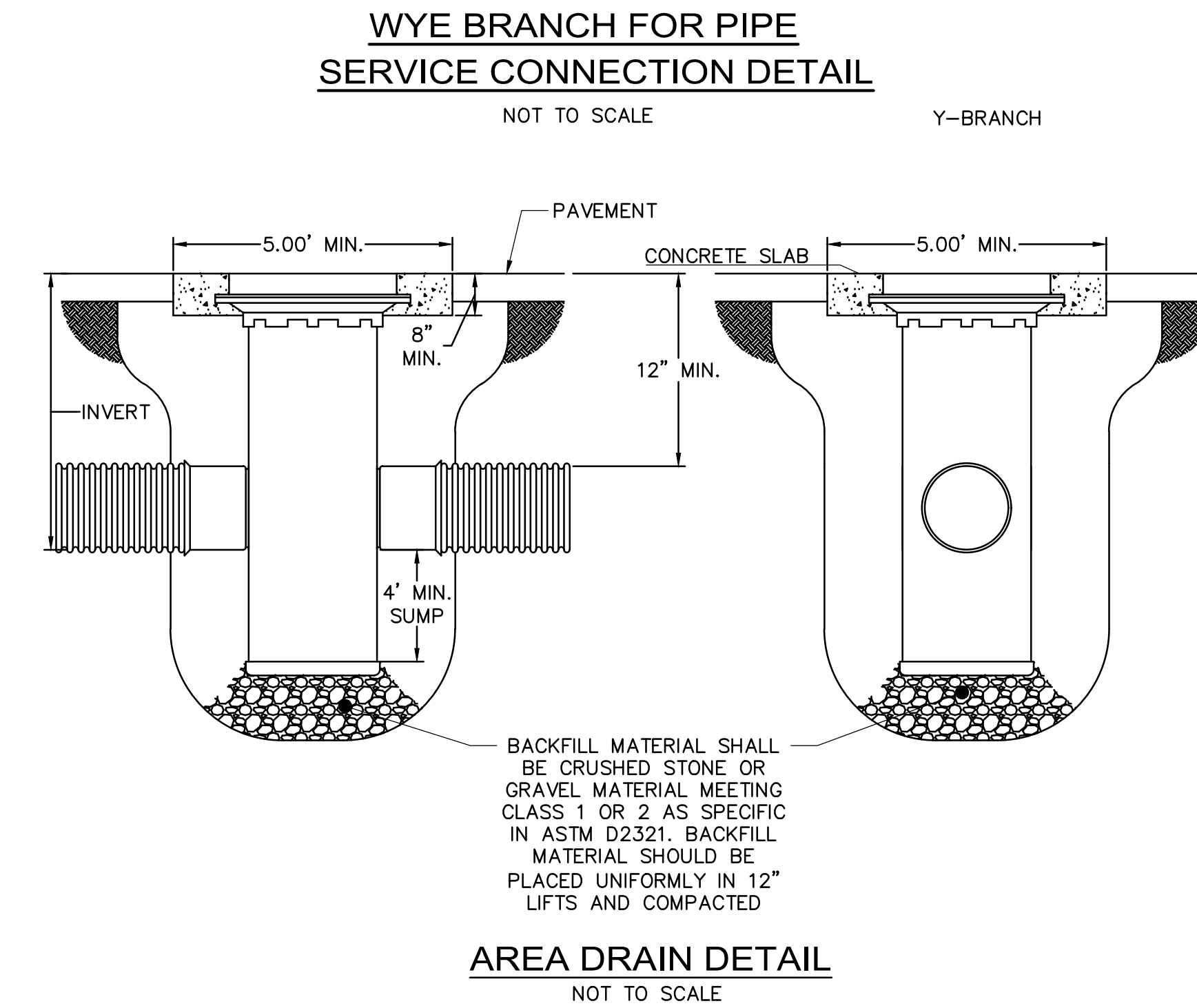
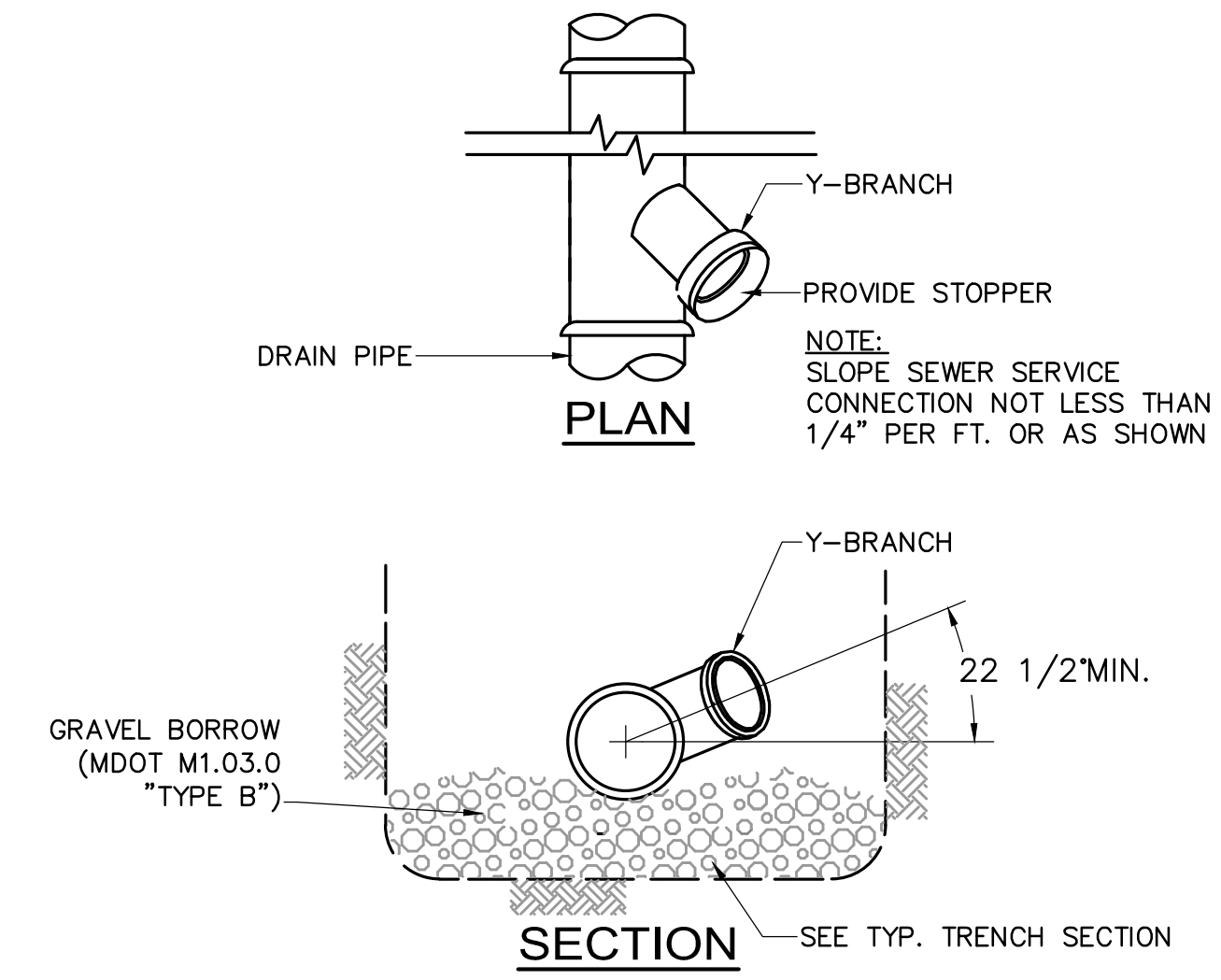
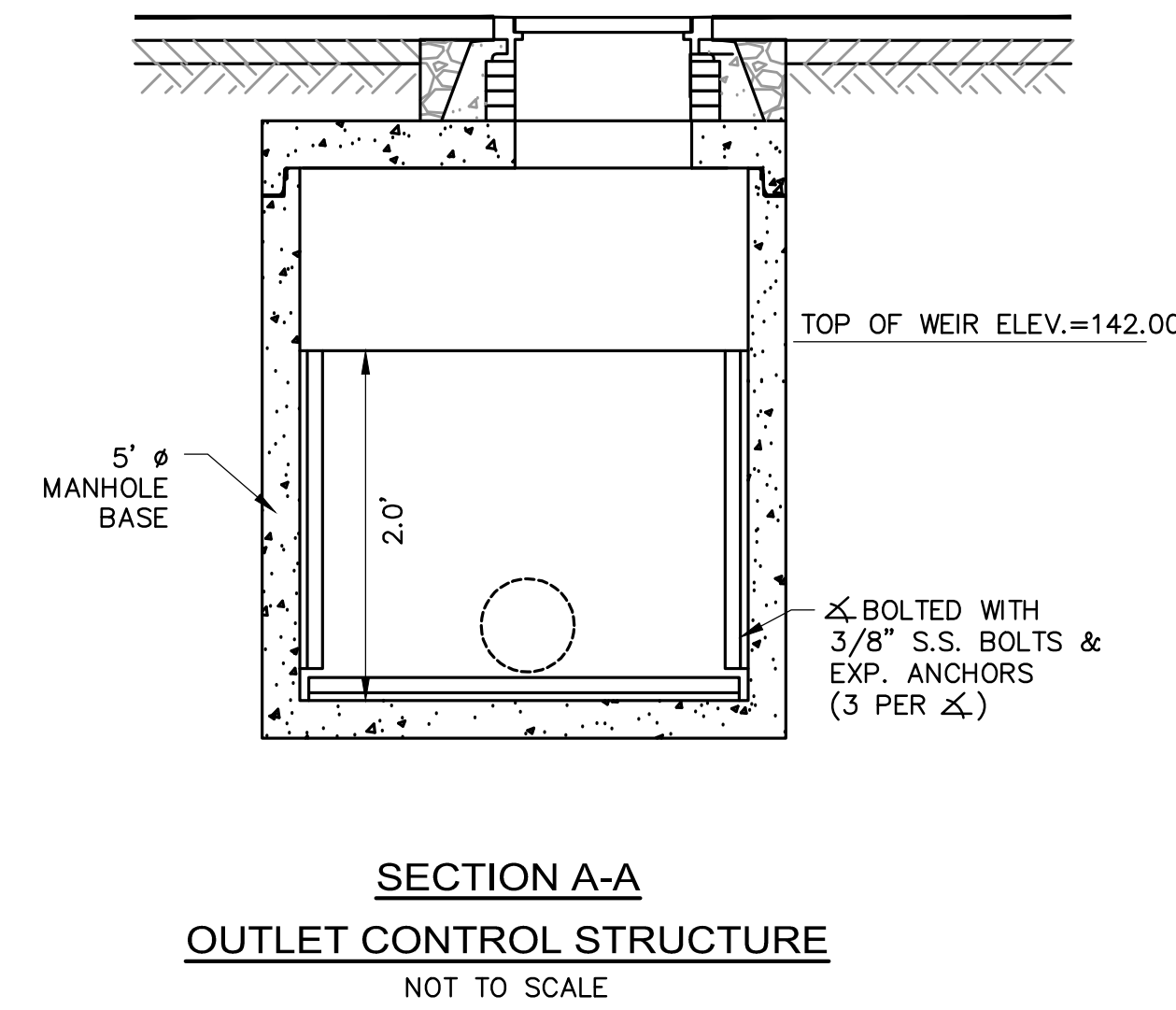
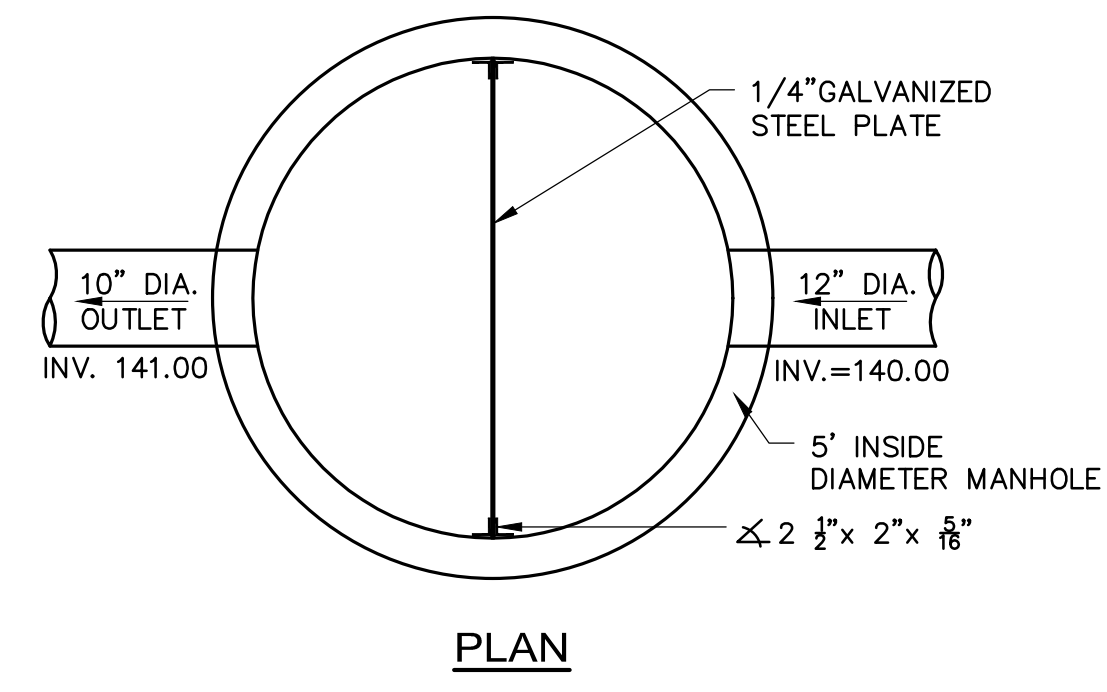
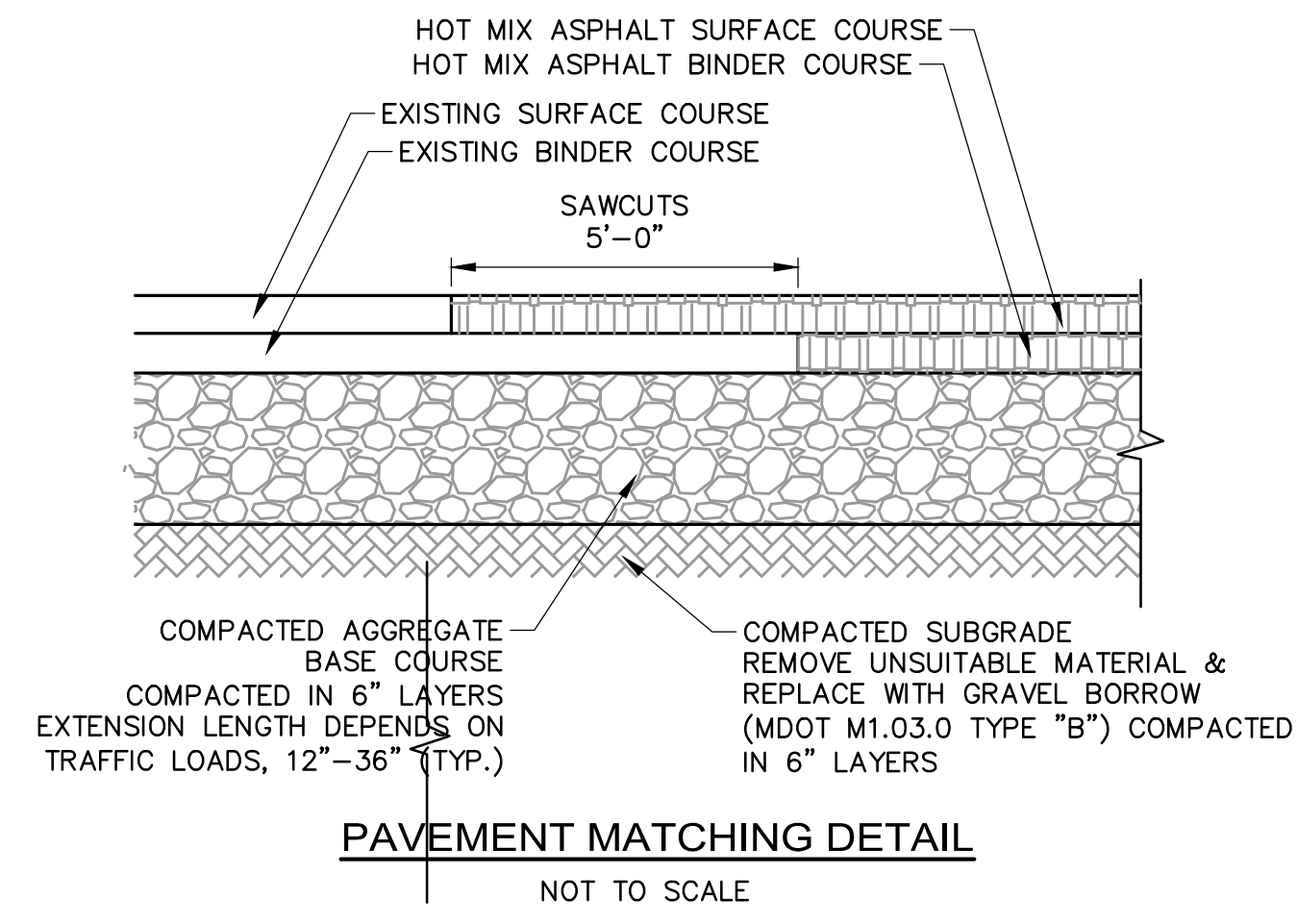
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 FILE: 13302CDT  
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 PROJECT MANAGER: WRM  
 SURVEYOR: NITSCH  
 DRAFTED BY: SB  
 CHECKED BY: WRM

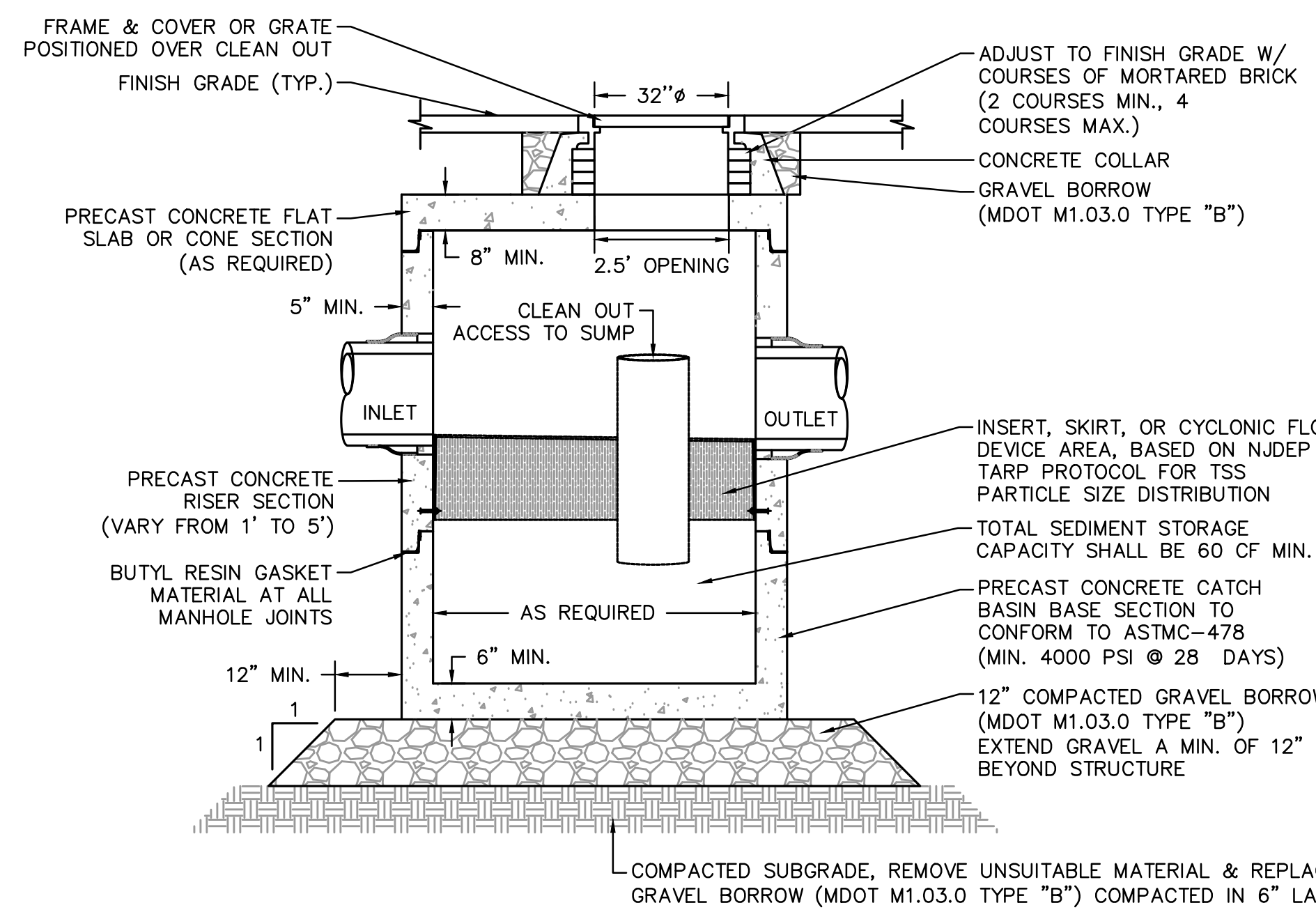
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**C-201**





**UNDERGROUND INFILTRATION SYSTEM DETAIL**  
NOT TO SCALE



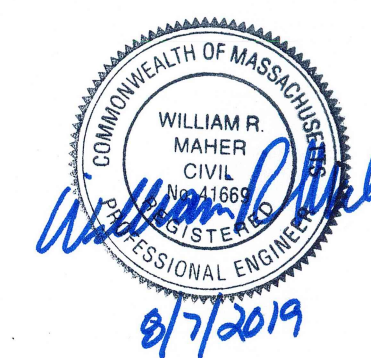
- NOTE:**
1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
  2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE OIL CLEANOUT PIPE.
  3. STRUCTURE DESIGNED FOR H2O LOADING

STRUCTURE NAME	MINIMUM WQF	PEAK FLOW RATE*	MAXIMUM SEDIMENT STORAGE CAPACITY
WQS #1	0.40 CFS	5.5 CFS	46 CF

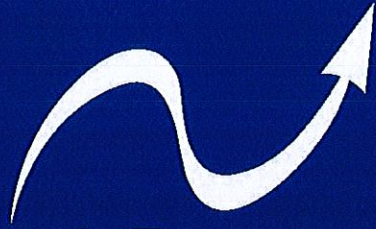
\* PEAK FLOW RATE BASED ON RATIONAL ANALYSIS FOR A 25-YEAR STORM EVENT. STRUCTURE SHALL BE ABLE TO PASS PEAK FLOW RATE WITHOUT CAUSING A BACKWATER CONDITION.

REV.	COMMENTS	DATE

NITSCH PROJECT #	13302
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DATE:	08/09/2019
PROJECT MANAGER:	WRM
SURVEYOR:	NITSCH
DRAFTED BY:	SB
CHECKED BY:	WRM







**Nitsch Engineering**

August 09, 2019

**STORMWATER  
REPORT**

For

**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared for:

**YESHIVA OHR YISRAEL**  
325 Reservoir Road  
Boston, MA 02467

Prepared by:

**NITSCH ENGINEERING, INC.**  
2 Center Plaza, Suite 430  
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Nitsch Project #13302



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  - MassDEP Checklist for Stormwater Report
  - Standard 10: Illicit Discharge Compliance Statement

## 1.0 INTRODUCTION

---

On behalf of the Applicant, Yeshiva Ohr Yisrael, Nitsch Engineering, Inc. is filing the enclosed Notice of Intent (NOI) with the City of Boston Conservation Commission for the proposed construction of a 3-story building addition to the existing on-site High School building, driveway improvements and installation of new utilities and drainage structures within the limits of the project, which are partially located within the buffer zone to bank associated with an Intermittent Stream (subsequently referred to as the "Project") as further discussed in the narrative below. The purpose of this NOI Application is to receive an Order of Conditions from the City of Boston Conservation Commission approving the proposed project under the *Wetlands Protection Act* (M.G.L. c. 131, s. 40, the Act) and its implementing Regulations (310 CMR 10.00, Regulations).

The proposed site improvements within the Buffer Zone/Resource Areas include:

- Construct a 3-story building addition;
- Water, sewer, gas, drainage and electric utility services;
- Landscaping; and
- Associated earthwork and revegetation.

The Project includes several mitigation measures to offset the impacts including, stormwater management system, erosion and sedimentation controls, etc. These mitigation measures are further discussed in the narrative below.

## 2.0 EXISTING CONDITIONS

---

The 0.40+-acre project site is located at 325 Reservoir Road in Boston, MA, which is currently a single-family home used as a high school, with an associated driveway and lawn/patio areas.

Existing utilities within the project limits include a gas line, water line, electric lines, telecom lines and overhead wires. Refer to Appendix A for USGS and Aerial maps of the project site.

Under existing conditions, a portion of the site drainage flows to the easterly side of the site to an existing intermittent stream while the other portion flows West and North to the abutting properties. There are no drainage structures on site or stormwater management systems to provide minimal peak flow mitigation, no groundwater recharge and no water quality treatment and does not meet the current MassDEP Stormwater Management Standards.

### 2.1 NRSC Soil Designations

The Natural Resources Conservation Service Classified the soils within the site as Urban Land and the soils in surrounding areas as Newport-Urban Land complex (Hydrologic Soil Group "B") and Udorthents, Loamy (Hydrologic Soil Group "A") as noted in Table 1 below.

Table 1. NRCS Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
627C	Newport-Urban land complex 3-15% slopes	B
654	Udorthents, loamy	A



## 2.2 Wetland Resource Areas

LEC Environmental Consultants, Inc. delineated the Wetland Resource Areas on the project site which includes an intermittent stream. The Bank associated with an intermittent stream is located on the west side of the site near the MBTA Green Line railroad tracks.

## 3.0 PROPOSED CONDITIONS

### 3.1 Project Description

The Project includes the construction of an approximate 1,911± square foot (sf) footprint building addition and installation of building service utilities and site drainage features within the limits of the project. Portions of the existing driveway will be converted to vegetated areas. Portions of the site that exist as vegetated areas will be converted to either roof areas or other impervious areas such as walkways and a new access driveway along the southwestern portion of the site. Overall, there is an increase in impervious area (Refer to Table 2) of approximately 2,936-sf.

Table 2. Proposed land use for 325 Reservoir Road (in sf)

Land Use	Existing Site (sf)	Proposed Site (sf)	Change
<b>Building Roof</b>	1,898	3,809	+1,911
<b>Pavement</b>	4,828	5,853	+1,025
<b>Total Impervious Area</b>	6,726	9,662	+2,936
<b>Water Surface (Brook)</b>	755	755	0
<b>Total Pervious Area</b>	10,014	7,078	-2,936
Total Area (Total Impervious Area + Total Pervious Area)	17,495	17,495	---

### 3.2 Stormwater Management System

The Stormwater Management system is comprised of a subsurface infiltration system to collect and infiltrate runoff from roof drains and paved surfaces captured via area drains and treated via water quality structure before discharging to the Intermittent Stream on site.

### 3.3 Stormwater Management During Construction

The total disturbed area for the project is not greater than one (1) acre and therefore the project does not need to obtain a National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) through the United States Environmental Protection Agency (EPA).

## **4.0 STORMWATER MANAGEMENT ANALYSIS**

---

### **4.1 Methodology**

Nitsch Engineering completed a hydrologic analysis of the existing project site utilizing Soil Conservation Service (SCS) Runoff Curve Number (CN) methodology. The SCS method calculates the rate at which the runoff reaches the design point considering several factors: the slope and flow lengths of the subcatchment area, the soil type of the subcatchment area, and the type of surface cover in the subcatchment area. HydroCAD Version 10.00 computer modeling software was used in conjunction with the SCS method to determine the peak runoff rates and runoff volumes for the 2-, 10-, 25-, and 100-year, 24-hour storm events. The proposed project site is being analyzed with the same methodology.

The Site was divided into multiple drainage areas, or subcatchments, which drain to the design points along the property boundary and within the site. For each subcatchment area, SCS Runoff Curve Numbers (CNs) were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates and runoff volumes for the 2-, 10-, 25- and 100-year 24-hour storm events were then determined by inputting the drainage areas, CNs, and time of concentration ( $T_c$ ) paths into the HydroCAD model.

### **4.2 HydroCAD Version 10.00**

The HydroCAD computer program uses SCS and TR-20 methods to model drainage systems. TR-20 (Technical Release 20) was developed by the Soil Conservation Service to estimate runoff and peak discharges in small watersheds. TR-20 is generally accepted by engineers and reviewing authorities as the standard method for estimating runoff and peak discharges.

HydroCAD Version 10.00 uses up to four types of components to analyze the hydrology of a given site: subcatchments, reaches, basins, and links. Subcatchments are areas of land that produce surface runoff. The area, weighted CN, and  $T_c$  characterize each individual subcatchment area. Reaches are generally uniform streams, channels, or pipes that convey water from one point to another. A basin is any impoundment that fills with water from one or more sources and empties via an outlet structure. Links are used to introduce hydrographs into a project from another source or to provide a junction for more than one hydrograph within a project. The time span for the model was set for 0-48 hours in order to prevent truncation of the hydrograph.

### **4.3 Precipitation Data**

Nitsch Engineering, Inc. used NOAA Atlas 14 Point Precipitation Frequency Estimates as prepared by the Hydrometeorological Design Studies Center to estimate the rainfall for the 2-year, 10-year, 25-year and 100-year 24-hour storms. The rainfall values that will be used are as follows:

Storm Event	24-hour Rainfall
2-year	3.26 in.
10-year	5.14 in.
25-year	6.32 in.
100-year	8.14 in.

### **4.4 Existing Hydrologic Conditions**

As summarized in Table 2, Nitsch Engineering delineated the project site into one (1) on-site subcatchment (watershed) area discharging to one (1) design point utilizing an existing conditions survey and on-site observations (Refer to Figures DA-EX and DA-PR). The design point (DP) is defined as Off-Site north of the project site. The HydroCAD model for existing conditions is provided in Appendix A.



#### 4.5 Proposed Hydrologic Conditions

The proposed project has been designed to mimic existing hydrologic conditions. The existing watershed area was modified to reflect the proposed topography and roof areas. The HydroCAD model for proposed conditions is provided in Appendix B.

#### 4.6 Peak Flow Rates

The proposed stormwater management system is expected to decrease the proposed peak runoff rates to below the existing rates for Design Point DP-1 for all analyzed storm events. Tables 3 and 4 below summarize the existing and proposed hydrologic analyses for the site at the design point.

Table 3 – Peak Rates of Runoff for Design Point DP-1 (in Cubic Feet per Second [cfs])

Storm Event	2-year	10-year	25-year	100-year
Existing	0.71	1.46	1.95	2.71
Proposed	0.55	1.34	1.82	2.49

Table 4 – Peak Volumes of Runoff for Design Point DP-1 (in Cubic-Feet [cf])

Storm Event	2-year	10-year	25-year	100-year
Existing	2,211	4,533	6,089	8,565
Proposed	1,172	3,118	4,482	6,736

#### 5.0 MassDEP Stormwater Management Standards

The Project is considered a **redevelopment** under the DEP Stormwater Management System. The Site will be designed to meet the MassDEP Stormwater Management Standards to the maximum extent practicable as summarized below:

##### Standard 1: No New Untreated Discharges

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

*The Project is not proposing any new untreated discharges. This standard is met.*

##### Standard 2: Peak Rate Attenuation

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

*Peak rates in the proposed conditions are less than peak rates in existing conditions for discharges to the existing Off-Site (DP-1R). This standard is met to the maximum extent practicable.*

### **Standard 3: Groundwater Recharge**

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

*This standard is met to the maximum extent practicable through the use of an underground infiltration system and a water quality structure.*

### **Standard 4: Water Quality Treatment**

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

- a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
- b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
- c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

*On-site water quality measures are provided to the maximum extent practicable through the use of an underground infiltration system and water quality unit (proprietary separator).*

### **Standard 5: Land Uses with Higher Potential Pollutant Loads**

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

*The project is not associated with any Land Uses with Higher Potential Pollutant Loads. Therefore, this standard is not applicable.*

### **Standard 6: Critical Areas**

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest



and best practical method of treatment. A “storm water discharge” as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

*The Project is not located within any critical area. Therefore, this standard is not applicable.*

#### **Standard 7: Redevelopments**

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

*The project is a redevelopment and will meet all applicable standards to the maximum extent practicable.*

#### **Standard 8: Construction Period Pollution Prevention and Sedimentation Control**

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

*A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) will be developed and implemented during the Notice of Intent permitting process.*

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

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

*A post-construction operation and maintenance plan has been prepared and will be implemented to ensure that stormwater management systems function as designed. Source control and stormwater BMP operation requirements for the academic campus are summarized in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan provided in Appendix E.*

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

All illicit discharges to the stormwater management system are prohibited.

*There will be no illicit discharges to the stormwater management system associated with the Project. An Illicit Discharge Compliance Statement is provided in Appendix F.*

## **6.0 CONCLUSION**

---

In conclusion, the Project's stormwater management system will reduce peak runoff rates and volumes of stormwater through the use of infiltration BMPs and improve the water quality of stormwater being discharged from the Site. The Project is being designed to meet and exceed the MassDEP Stormwater Management Standards to the maximum extent possible.



**FIGURES**

---

DR-EX	Pre-development Subcatchment Plan
DR-PR	Post-development Subcatchment Plan







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- ▲ Land Surveying
- ▲ Transportation Engineering
- ▲ Environmental Engineering
- ▲ Urban Infrastructure
- ▲ Planning
- ▲ GIS

**POSTDEVELOPMENT SUBCATCHMENT AREA MAP**  
 YESHIVA OHR ISRAEL  
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 PREPARED FOR  
**YESHIVA OHR ISRAEL**  
 325 RESERVOIR ROAD, BOSTON, MASSACHUSETTS 02467

REV.	DATE	DESCRIPTION

**DA-PR**



**APPENDIX A**

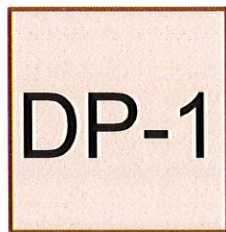
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**Pre-Development Conditions – HydroCAD Calculations**





Site



Off-Site



# 13302 - HydroCAD - Pre

Prepared by Nitsch Engineering

HydroCAD® 10.00-20 s/n 00546 © 2017 HydroCAD Software Solutions LLC

Printed 8/7/2019

Page 2

## Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
10,014	69	50-75% Grass cover, Fair, HSG B (1S)
4,828	98	Unconnected pavement, HSG B (1S)
1,898	98	Unconnected roofs, HSG B (1S)
755	98	Water Surface, HSG B (1S)
<b>17,495</b>	<b>81</b>	<b>TOTAL AREA</b>



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## Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
17,495	HSG B	1S
0	HSG C	
0	HSG D	
0	Other	
<b>17,495</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	10,014	0	0	0	10,014	50-75% Grass cover, Fair
0	4,828	0	0	0	4,828	Unconnected pavement
0	1,898	0	0	0	1,898	Unconnected roofs
0	755	0	0	0	755	Water Surface
<b>0</b>	<b>17,495</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17,495</b>	<b>TOTAL AREA</b>



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Type III 24-hr 1-Inch Rainfall=1.00"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=0.10"  
Tc=6.0 min CN=81 Runoff=0.02 cfs 143 cf

**Reach DP-1: Off-Site**

Inflow=0.02 cfs 143 cf  
Outflow=0.02 cfs 143 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 143 cf Average Runoff Depth = 0.10"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**

**13302 - HydroCAD - Pre**

Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.02 cfs @ 12.27 hrs, Volume= 143 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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



**Summary for Reach DP-1: Off-Site**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 0.10" for 1-Inch event  
Inflow = 0.02 cfs @ 12.27 hrs, Volume= 143 cf  
Outflow = 0.02 cfs @ 12.27 hrs, Volume= 143 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 2-Year Rainfall=3.26"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=1.52"  
Tc=6.0 min CN=81 Runoff=0.71 cfs 2,211 cf

**Reach DP-1: Off-Site**

Inflow=0.71 cfs 2,211 cf  
Outflow=0.71 cfs 2,211 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 2,211 cf Average Runoff Depth = 1.52"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**



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Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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

### Summary for Reach DP-1: Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 1.52" for 2-Year event  
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf  
Outflow = 0.71 cfs @ 12.09 hrs, Volume= 2,211 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



**13302 - HydroCAD - Pre**

Type III 24-hr 10-Year Rainfall=5.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=3.11"  
Tc=6.0 min CN=81 Runoff=1.46 cfs 4,533 cf

**Reach DP-1: Off-Site**

Inflow=1.46 cfs 4,533 cf  
Outflow=1.46 cfs 4,533 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 4,533 cf Average Runoff Depth = 3.11"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**

**13302 - HydroCAD - Pre**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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



**Summary for Reach DP-1: Off-Site**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 3.11" for 10-Year event  
Inflow = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf  
Outflow = 1.46 cfs @ 12.09 hrs, Volume= 4,533 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 25-Year Rainfall=6.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=4.18"  
Tc=6.0 min CN=81 Runoff=1.95 cfs 6,089 cf

**Reach DP-1: Off-Site**

Inflow=1.95 cfs 6,089 cf  
Outflow=1.95 cfs 6,089 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 6,089 cf Average Runoff Depth = 4.18"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**

**13302 - HydroCAD - Pre**

Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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



**Summary for Reach DP-1: Off-Site**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 4.18" for 25-Year event  
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf  
Outflow = 1.95 cfs @ 12.09 hrs, Volume= 6,089 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Pre**

Type III 24-hr 100-Year Rainfall=8.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=17,495 sf 42.76% Impervious Runoff Depth=5.87"  
Tc=6.0 min CN=81 Runoff=2.71 cfs 8,565 cf

**Reach DP-1: Off-Site**

Inflow=2.71 cfs 8,565 cf  
Outflow=2.71 cfs 8,565 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 8,565 cf Average Runoff Depth = 5.87"**  
**57.24% Pervious = 10,014 sf 42.76% Impervious = 7,481 sf**

**13302 - HydroCAD - Pre**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
1,898	98	Unconnected roofs, HSG B
4,828	98	Unconnected pavement, HSG B
10,014	69	50-75% Grass cover, Fair, HSG B
755	98	Water Surface, HSG B
17,495	81	Weighted Average
10,014		57.24% Pervious Area
7,481		42.76% Impervious Area
6,726		89.91% Unconnected

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



### Summary for Reach DP-1: Off-Site

[40] Hint: Not Described (Outflow=Inflow)

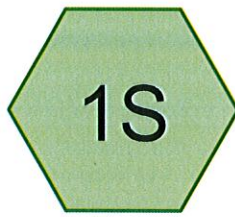
Inflow Area = 17,495 sf, 42.76% Impervious, Inflow Depth = 5.87" for 100-Year event  
Inflow = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf  
Outflow = 2.71 cfs @ 12.09 hrs, Volume= 8,565 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

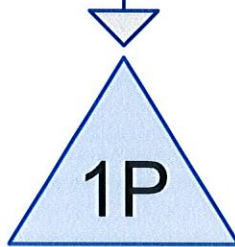
**APPENDIX B**

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**Post-Development Conditions – HydroCAD Calculations**



Site



SIS #1



Off-Site



West Site





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## Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,078	61	>75% Grass cover, Good, HSG B (2S)
3,809	98	Roofs, HSG B (1S)
5,853	98	Unconnected pavement, HSG B (1S)
755	98	Water Surface, HSG B (2S)
<b>17,495</b>	<b>83</b>	<b>TOTAL AREA</b>

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## Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
17,495	HSG B	1S, 2S
0	HSG C	
0	HSG D	
0	Other	
<b>17,495</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	7,078	0	0	0	7,078	>75% Grass cover, Good
0	3,809	0	0	0	3,809	Roofs
0	5,853	0	0	0	5,853	Unconnected pavement
0	755	0	0	0	755	Water Surface
<b>0</b>	<b>17,495</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17,495</b>	<b>TOTAL AREA</b>



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Type III 24-hr 1-Inch Rainfall=1.00"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=0.79"  
Tc=6.0 min CN=98 Runoff=0.20 cfs 637 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=0.00"  
Tc=6.0 min CN=65 Runoff=0.00 cfs 0 cf

**Reach DP-1: Off-Site**

Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 1P: SIS #1**

Peak Elev=140.28' Storage=218 cf Inflow=0.20 cfs 637 cf  
Discarded=0.02 cfs 637 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 637 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 637 cf Average Runoff Depth = 0.44"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 637 cf, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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



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Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 0.00" for 1-Inch event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event  
 Inflow = 0.20 cfs @ 12.08 hrs, Volume= 637 cf  
 Outflow = 0.02 cfs @ 11.75 hrs, Volume= 637 cf, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.02 cfs @ 11.75 hrs, Volume= 637 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 140.28' @ 12.82 hrs Surf.Area= 884 sf Storage= 218 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 73.8 min ( 861.7 - 787.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	528 cf	<b>17.50'W x 50.50'L x 2.75'H Field A</b> 2,431 cf Overall - 670 cf Embedded = 1,761 cf x 30.0% Voids
#2A	140.00'	542 cf	<b>ADS N-12 18" x 12 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 6 rows 15.50' Header x 1.80 sf x 2 = 55.8 cf Inside
		1,070 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>
#3	Primary	142.00'	<b>5.0' long Sharp-Crested Vee/Trap Weir Cv= 2.62 (C= 3.28)</b>

**Discarded OutFlow** Max=0.02 cfs @ 11.75 hrs HW=139.53' (Free Discharge)  
 ↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=139.50' TW=0.00' (Dynamic Tailwater)  
 ↑ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↑ **3=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

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Type III 24-hr 1-Inch Rainfall=1.00"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 6 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

6 Rows x 21.0" Wide + 12.0" Spacing x 5 + 12.0" Side Stone x 2 = 17.50' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

12 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 6 Rows + 15.50' Header x 1.80 sf x 2 = 541.8 cf Chamber Storage

12 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 6 Rows + 15.50' Header x 2.23 sf x 2 = 670.1 cf Displacement

2,431.3 cf Field - 670.1 cf Chambers = 1,761.2 cf Stone x 30.0% Voids = 528.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,070.2 cf = 0.025 af

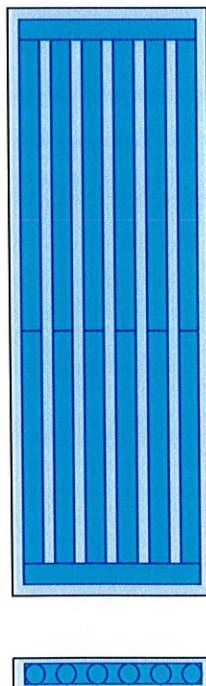
Overall Storage Efficiency = 44.0%

Overall System Size = 50.50' x 17.50' x 2.75'

12 Chambers

90.0 cy Field

65.2 cy Stone





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Type III 24-hr 2-Year Rainfall=3.26"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=3.03"  
Tc=6.0 min CN=98 Runoff=0.70 cfs 2,437 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=0.63"  
Tc=6.0 min CN=65 Runoff=0.11 cfs 411 cf

**Reach DP-1: Off-Site**

Inflow=0.44 cfs 1,172 cf  
Outflow=0.44 cfs 1,172 cf

**Pond 1P: SIS #1**

Peak Elev=141.32' Storage=780 cf Inflow=0.70 cfs 2,437 cf  
Discarded=0.02 cfs 1,677 cf Primary=0.36 cfs 760 cf Outflow=0.39 cfs 2,438 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 2,849 cf Average Runoff Depth = 1.95"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 1S: Site**

Runoff = 0.70 cfs @ 12.08 hrs, Volume= 2,437 cf, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.11 cfs @ 12.11 hrs, Volume= 411 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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



**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 0.80" for 2-Year event  
Inflow = 0.44 cfs @ 12.19 hrs, Volume= 1,172 cf  
Outflow = 0.44 cfs @ 12.19 hrs, Volume= 1,172 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 2-Year Rainfall=3.26"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 3.03" for 2-Year event  
 Inflow = 0.70 cfs @ 12.08 hrs, Volume= 2,437 cf  
 Outflow = 0.39 cfs @ 12.20 hrs, Volume= 2,438 cf, Atten= 45%, Lag= 7.2 min  
 Discarded = 0.02 cfs @ 9.35 hrs, Volume= 1,677 cf  
 Primary = 0.36 cfs @ 12.20 hrs, Volume= 760 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.32' @ 12.20 hrs Surf.Area= 884 sf Storage= 780 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 186.2 min ( 942.2 - 756.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	528 cf	<b>17.50'W x 50.50'L x 2.75'H Field A</b> 2,431 cf Overall - 670 cf Embedded = 1,761 cf x 30.0% Voids
#2A	140.00'	542 cf	<b>ADS N-12 18" x 12 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 6 rows 15.50' Header x 1.80 sf x 2 = 55.8 cf Inside
		1,070 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>
#3	Primary	142.00'	<b>5.0' long Sharp-Crested Vee/Trap Weir Cv= 2.62 (C= 3.28)</b>

**Discarded OutFlow** Max=0.02 cfs @ 9.35 hrs HW=139.53' (Free Discharge)  
 ↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.36 cfs @ 12.20 hrs HW=141.32' TW=0.00' (Dynamic Tailwater)  
 ↑ **2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 1.92 fps)  
 ↑ **3=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

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Type III 24-hr 2-Year Rainfall=3.26"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 6 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

6 Rows x 21.0" Wide + 12.0" Spacing x 5 + 12.0" Side Stone x 2 = 17.50' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

12 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 6 Rows + 15.50' Header x 1.80 sf x 2 = 541.8 cf Chamber Storage

12 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 6 Rows + 15.50' Header x 2.23 sf x 2 = 670.1 cf Displacement

2,431.3 cf Field - 670.1 cf Chambers = 1,761.2 cf Stone x 30.0% Voids = 528.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,070.2 cf = 0.025 af

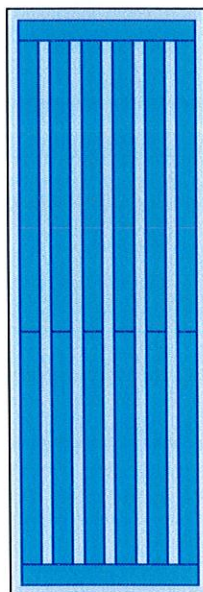
Overall Storage Efficiency = 44.0%

Overall System Size = 50.50' x 17.50' x 2.75'

12 Chambers

90.0 cy Field

65.2 cy Stone





**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=4.90"  
Tc=6.0 min CN=98 Runoff=1.12 cfs 3,948 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=1.75"  
Tc=6.0 min CN=65 Runoff=0.35 cfs 1,141 cf

**Reach DP-1: Off-Site**

Inflow=1.34 cfs 3,118 cf  
Outflow=1.34 cfs 3,118 cf

**Pond 1P: SIS #1**

Peak Elev=141.56' Storage=890 cf Inflow=1.12 cfs 3,948 cf  
Discarded=0.02 cfs 1,970 cf Primary=1.00 cfs 1,978 cf Outflow=1.02 cfs 3,948 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 5,088 cf Average Runoff Depth = 3.49"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 3,948 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.35 cfs @ 12.10 hrs, Volume= 1,141 cf, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.14"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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



**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 2.14" for 10-Year event  
Inflow = 1.34 cfs @ 12.11 hrs, Volume= 3,118 cf  
Outflow = 1.34 cfs @ 12.11 hrs, Volume= 3,118 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 10-Year Rainfall=5.14"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 4.90" for 10-Year event  
 Inflow = 1.12 cfs @ 12.08 hrs, Volume= 3,948 cf  
 Outflow = 1.02 cfs @ 12.12 hrs, Volume= 3,948 cf, Atten= 9%, Lag= 2.1 min  
 Discarded = 0.02 cfs @ 7.79 hrs, Volume= 1,970 cf  
 Primary = 1.00 cfs @ 12.12 hrs, Volume= 1,978 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.56' @ 12.12 hrs Surf.Area= 884 sf Storage= 890 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 146.8 min ( 894.3 - 747.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	528 cf	<b>17.50'W x 50.50'L x 2.75'H Field A</b> 2,431 cf Overall - 670 cf Embedded = 1,761 cf x 30.0% Voids
#2A	140.00'	542 cf	<b>ADS N-12 18" x 12 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 6 rows 15.50' Header x 1.80 sf x 2 = 55.8 cf Inside
		1,070 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	142.00'	<b>5.0' long Sharp-Crested Vee/Trap Weir</b> Cv= 2.62 (C= 3.28)

**Discarded OutFlow** Max=0.02 cfs @ 7.79 hrs HW=139.53' (Free Discharge)  
 ↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.00 cfs @ 12.12 hrs HW=141.56' TW=0.00' (Dynamic Tailwater)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.00 cfs @ 2.55 fps)  
 ↳ **3=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

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Type III 24-hr 10-Year Rainfall=5.14"

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**Pond 1P: SIS #1 - Chamber Wizard Field A**

**Chamber Model = ADS N-12 18" (ADS N-12® Pipe)**

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 6 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

6 Rows x 21.0" Wide + 12.0" Spacing x 5 + 12.0" Side Stone x 2 = 17.50' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

12 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 6 Rows + 15.50' Header x 1.80 sf x 2 = 541.8 cf Chamber Storage

12 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 6 Rows + 15.50' Header x 2.23 sf x 2 = 670.1 cf Displacement

2,431.3 cf Field - 670.1 cf Chambers = 1,761.2 cf Stone x 30.0% Voids = 528.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,070.2 cf = 0.025 af

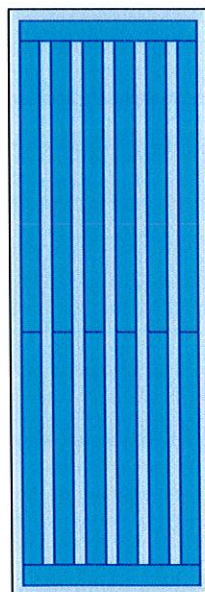
Overall Storage Efficiency = 44.0%

Overall System Size = 50.50' x 17.50' x 2.75'

12 Chambers

90.0 cy Field

65.2 cy Stone





**13302 - HydroCAD - Post**

Type III 24-hr 25-Year Rainfall=6.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site** Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=6.08"  
Tc=6.0 min CN=98 Runoff=1.37 cfs 4,897 cf

**Subcatchment2S: West Site** Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=2.59"  
Tc=6.0 min CN=65 Runoff=0.54 cfs 1,688 cf

**Reach DP-1: Off-Site** Inflow=1.82 cfs 4,482 cf  
Outflow=1.82 cfs 4,482 cf

**Pond 1P: SIS #1** Peak Elev=141.66' Storage=918 cf Inflow=1.37 cfs 4,897 cf  
Discarded=0.02 cfs 2,104 cf Primary=1.29 cfs 2,793 cf Outflow=1.31 cfs 4,897 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 6,585 cf Average Runoff Depth = 4.52"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.37 cfs @ 12.08 hrs, Volume= 4,897 cf, Depth= 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

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Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 1,688 cf, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.32"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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



**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 3.07" for 25-Year event  
Inflow = 1.82 cfs @ 12.10 hrs, Volume= 4,482 cf  
Outflow = 1.82 cfs @ 12.10 hrs, Volume= 4,482 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 25-Year Rainfall=6.32"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 6.08" for 25-Year event  
 Inflow = 1.37 cfs @ 12.08 hrs, Volume= 4,897 cf  
 Outflow = 1.31 cfs @ 12.11 hrs, Volume= 4,897 cf, Atten= 4%, Lag= 1.5 min  
 Discarded = 0.02 cfs @ 6.95 hrs, Volume= 2,104 cf  
 Primary = 1.29 cfs @ 12.11 hrs, Volume= 2,793 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.66' @ 12.11 hrs Surf.Area= 884 sf Storage= 918 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 132.3 min ( 876.7 - 744.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	528 cf	<b>17.50'W x 50.50'L x 2.75'H Field A</b> 2,431 cf Overall - 670 cf Embedded = 1,761 cf x 30.0% Voids
#2A	140.00'	542 cf	<b>ADS N-12 18" x 12 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 6 rows 15.50' Header x 1.80 sf x 2 = 55.8 cf Inside
		1,070 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>
#3	Primary	142.00'	<b>5.0' long Sharp-Crested Vee/Trap Weir Cv= 2.62 (C= 3.28)</b>

**Discarded OutFlow** Max=0.02 cfs @ 6.95 hrs HW=139.53' (Free Discharge)  
 ↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.29 cfs @ 12.11 hrs HW=141.66' TW=0.00' (Dynamic Tailwater)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.29 cfs @ 2.77 fps)  
 ↳ **3=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

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Type III 24-hr 25-Year Rainfall=6.32"

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## Pond 1P: SIS #1 - Chamber Wizard Field A

### Chamber Model = ADS N-12 18" (ADS N-12® Pipe)

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 6 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

6 Rows x 21.0" Wide + 12.0" Spacing x 5 + 12.0" Side Stone x 2 = 17.50' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

12 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 6 Rows + 15.50' Header x 1.80 sf x 2 = 541.8 cf Chamber Storage

12 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 6 Rows + 15.50' Header x 2.23 sf x 2 = 670.1 cf Displacement

2,431.3 cf Field - 670.1 cf Chambers = 1,761.2 cf Stone x 30.0% Voids = 528.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,070.2 cf = 0.025 af

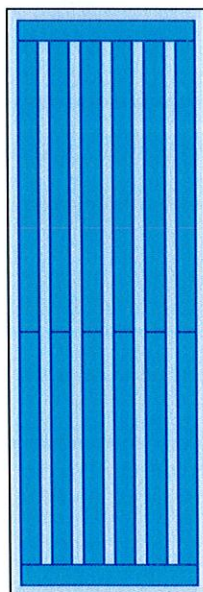
Overall Storage Efficiency = 44.0%

Overall System Size = 50.50' x 17.50' x 2.75'

12 Chambers

90.0 cy Field

65.2 cy Stone





**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1S: Site**

Runoff Area=9,662 sf 100.00% Impervious Runoff Depth=7.90"  
Tc=6.0 min CN=98 Runoff=1.77 cfs 6,361 cf

**Subcatchment2S: West Site**

Runoff Area=7,833 sf 9.64% Impervious Runoff Depth=4.01"  
Tc=6.0 min CN=65 Runoff=0.84 cfs 2,616 cf

**Reach DP-1: Off-Site**

Inflow=2.49 cfs 6,736 cf  
Outflow=2.49 cfs 6,736 cf

**Pond 1P: SIS #1**

Peak Elev=141.81' Storage=954 cf Inflow=1.77 cfs 6,361 cf  
Discarded=0.02 cfs 2,241 cf Primary=1.66 cfs 4,120 cf Outflow=1.68 cfs 6,361 cf

**Total Runoff Area = 17,495 sf Runoff Volume = 8,977 cf Average Runoff Depth = 6.16"**  
**40.46% Pervious = 7,078 sf 59.54% Impervious = 10,417 sf**

**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Subcatchment 1S: Site**

Runoff = 1.77 cfs @ 12.08 hrs, Volume= 6,361 cf, Depth= 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
3,809	98	Roofs, HSG B
5,853	98	Unconnected pavement, HSG B
9,662	98	Weighted Average
9,662		100.00% Impervious Area
5,853		60.58% Unconnected

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

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**Summary for Subcatchment 2S: West Site**

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 2,616 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.14"

Area (sf)	CN	Description
7,078	61	>75% Grass cover, Good, HSG B
755	98	Water Surface, HSG B
7,833	65	Weighted Average
7,078		90.36% Pervious Area
755		9.64% Impervious Area

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



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Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Reach DP-1: Off-Site**

Inflow Area = 17,495 sf, 59.54% Impervious, Inflow Depth = 4.62" for 100-Year event  
Inflow = 2.49 cfs @ 12.10 hrs, Volume= 6,736 cf  
Outflow = 2.49 cfs @ 12.10 hrs, Volume= 6,736 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

**13302 - HydroCAD - Post**

Type III 24-hr 100-Year Rainfall=8.14"

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**Summary for Pond 1P: SIS #1**

Inflow Area = 9,662 sf, 100.00% Impervious, Inflow Depth = 7.90" for 100-Year event  
 Inflow = 1.77 cfs @ 12.08 hrs, Volume= 6,361 cf  
 Outflow = 1.68 cfs @ 12.11 hrs, Volume= 6,361 cf, Atten= 5%, Lag= 1.6 min  
 Discarded = 0.02 cfs @ 5.40 hrs, Volume= 2,241 cf  
 Primary = 1.66 cfs @ 12.11 hrs, Volume= 4,120 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 141.81' @ 12.11 hrs Surf.Area= 884 sf Storage= 954 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 114.9 min ( 855.9 - 741.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	139.50'	528 cf	<b>17.50'W x 50.50'L x 2.75'H Field A</b> 2,431 cf Overall - 670 cf Embedded = 1,761 cf x 30.0% Voids
#2A	140.00'	542 cf	<b>ADS N-12 18" x 12 Inside #1</b> Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf Row Length Adjustment= +5.00' x 1.80 sf x 6 rows 15.50' Header x 1.80 sf x 2 = 55.8 cf Inside
		1,070 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.50'	<b>1.020 in/hr Exfiltration over Surface area</b>
#2	Primary	141.00'	<b>10.0" Vert. Orifice/Grate C= 0.600</b>
#3	Primary	142.00'	<b>5.0' long Sharp-Crested Vee/Trap Weir Cv= 2.62 (C= 3.28)</b>

**Discarded OutFlow** Max=0.02 cfs @ 5.40 hrs HW=139.53' (Free Discharge)  
 ↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.66 cfs @ 12.11 hrs HW=141.81' TW=0.00' (Dynamic Tailwater)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.66 cfs @ 3.07 fps)  
 ↳ **3=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

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Type III 24-hr 100-Year Rainfall=8.14"

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## Pond 1P: SIS #1 - Chamber Wizard Field A

### Chamber Model = ADS N-12 18" (ADS N-12® Pipe)

Inside= 18.2"W x 18.2"H => 1.80 sf x 20.00'L = 36.0 cf

Outside= 21.0"W x 21.0"H => 2.23 sf x 20.00'L = 44.5 cf

Row Length Adjustment= +5.00' x 1.80 sf x 6 rows

21.0" Wide + 12.0" Spacing = 33.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +5.00' Row Adjustment +1.75' Header x 2 = 48.50' Row Length +12.0"

End Stone x 2 = 50.50' Base Length

6 Rows x 21.0" Wide + 12.0" Spacing x 5 + 12.0" Side Stone x 2 = 17.50' Base Width

6.0" Base + 21.0" Chamber Height + 6.0" Cover = 2.75' Field Height

12 Chambers x 36.0 cf +5.00' Row Adjustment x 1.80 sf x 6 Rows + 15.50' Header x 1.80 sf x 2 = 541.8 cf Chamber Storage

12 Chambers x 44.5 cf +5.00' Row Adjustment x 2.23 sf x 6 Rows + 15.50' Header x 2.23 sf x 2 = 670.1 cf Displacement

2,431.3 cf Field - 670.1 cf Chambers = 1,761.2 cf Stone x 30.0% Voids = 528.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,070.2 cf = 0.025 af

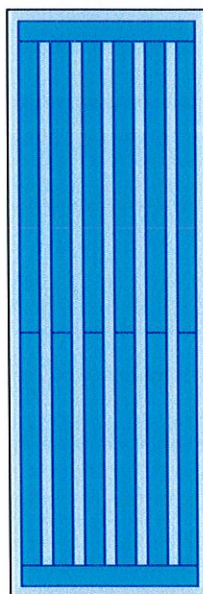
Overall Storage Efficiency = 44.0%

Overall System Size = 50.50' x 17.50' x 2.75'

12 Chambers

90.0 cy Field

65.2 cy Stone





**APPENDIX C**

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**Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan**

## **LONG-TERM POLLUTION PREVENTION PLAN AND STORMWATER OPERATION AND MAINTENANCE PLAN**

Yeshiva Ohr Yisrael, 325 Reservoir Road, Chestnut Hill, MA

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## **1.0 INTRODUCTION**

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The purpose of this document is to specify the pollution prevention measures and stormwater management system operation and maintenance for the Yeshiva Ohr Yisrael School located at 325 Reservoir Road in Chestnut Hill, MA. The Responsible Party indicated below shall implement the management practices outlined in this document and proactively conduct operations at the project site in an environmentally responsible manner. Compliance with this Manual does not in any way dismiss the responsible party, owner, property manager, or occupants from compliance with other applicable federal, state or local laws.

Responsible Party: Rabbi Uri Feldman  
Yeshiva Ohr Yisrael  
325 Reservoir Road, Chestnut Hill, MA  
617-396-8078

This Document has been prepared in compliance with Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which state:

### Standard 4:

The Long Term Pollution Prevention Plan shall include the proper procedures for the following:

- Good housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Storage and use of fertilizers, herbicides, and pesticides
- Pet waste management
- Proper management of deicing chemicals and snow

### Standard 9:

The Long-Term Operation and Maintenance Plan shall at a minimum include:

- Stormwater management system(s) owner(s)
- The party or parties responsible for operation and maintenance, including how future property owners shall be notified of the presence of the stormwater management system and the requirement for operation and maintenance
- The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks
- A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point
- A description and delineation of public safety features
- An estimated operations and maintenance budget



## **2.0 LONG-TERM POLLUTION PREVENTION PLAN**

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The Responsible Party shall implement the following good housekeeping procedures at the project site to reduce the possibility of accidental releases and to reduce safety hazards.

### **2.1 Storage of Hazardous Materials**

To prevent leaks and spills, keep hazardous materials and waste products under cover or inside. Use drip pans or spill containment systems to prevent chemicals from entering the drainage system. Inspect storage areas for materials and waste products at least once per year to determine amount and type of the material on site, and if the material requires disposal.

Securely store liquid petroleum products and other liquid chemicals in federally- and state-approved containers. Restrict access to maintenance personnel and administrators.

### **2.2 Storage of Waste Products**

Collect and store all waste materials in securely lidded dumpster(s) or other secure containers as applicable to the material. Keep dumpster lids closed and the areas around them clean. Do not fill the dumpsters with liquid waste or hose them out. Sweep areas around the dumpster regularly and put the debris in the garbage, instead of sweeping or hosing it into the parking lot. Legally dispose of collected waste on a regular basis.

Segregate liquid wastes, including motor oil, antifreeze, solvents, and lubricants, from solid waste and recycle through hazardous waste disposal companies, whenever possible. Separate oil filters, batteries, tires, and metal filings from grinding and polishing metal parts from common trash items and recycle. These items are not trash and are illegal to dump. Contact a hazardous waste hauler for proper disposal to a hazardous waste collection center.

### **2.3 Spill Prevention and Response**

Implement spill response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other area that could reasonably be expected to discharge to surface or groundwater.

- For minor spills, keep fifty (50) gallon spill control kits and Speedy Dry at all shop and work areas.
- Immediately contact applicable Federal, State, and local agencies for reportable quantities as required by law.
- Immediately perform applicable containment and cleanup procedures following a spill release.
- Promptly remove and dispose of all material collected during the response in accordance with Federal, State and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release, and the ability of the Contractor to perform the required response.
- Reportable quantities of chemicals, fuels, or oils are established under the Clean Water Act and enforced through Massachusetts Department of Environmental Protection (DEP).

### **2.4 Minimize Soil Erosion**

Soil erosion facilitates mechanical transport of nutrients, pathogens, and organic matter to surface water bodies. Repair all areas where erosion is occurring throughout the project site. Stabilize bare soil with riprap, seed, mulch, or vegetation.

## **2.5 Vehicle Washing**

Vehicle washing will not occur on the site.

## **2.6 Maintenance of Lawns, Gardens, and other Landscaped Areas**

Pesticides and fertilizers shall not be used in the landscaped areas associated with the project site and shall not be stored on-site. Dumping of lawn wastes, brush or leaves or other materials or debris is not permitted in any Resource Area. Grass clippings, pruned branches and any other landscaped waste should be disposed of or composted in an appropriate location. No irrigation shall be used in the landscaped areas for this project.

## **2.7 Management of Deicing Chemicals and Snow**

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored on-site. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways. The snow plow contractor shall adhere to these magnesium chloride use and storage requirements.

During typical snow plowing operations, snow shall be pushed to the designated snow removal areas. Snow shall not be stockpiled in wetland resource areas or within the 100-foot Buffer Zone. In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.

Use of sand is permitted only for impervious roadways and parking areas. If sand is applied, the snow plowed from impervious areas shall not be stored on porous asphalt.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris. Street and parking lot sweeping should be followed in accordance with the Operation and Maintenance Plan.

## **2.8 Coordination with other Permits and Requirements**

Certain conditions of other approvals affecting the long-term management of the property shall be considered part of this Long Term Pollution Prevention Plan. The Owner shall become familiar with those documents and comply with the guidelines set forth in those documents.



### **3.0 STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN**

---

#### **3.1 Introduction**

This Operation and Maintenance Plan (O&M Plan) for the Yeshiva Ohr Yisrael site is required under Standard 9 of the 2008 MassDEP Stormwater Handbook to provide best management practices for implementing maintenance activities for the stormwater management system in a manner that minimizes impacts to wetland resource areas.

The Owner shall implement this O&M Plan and proactively conduct operations at the site in an environmentally responsible manner. Compliance with this O&M Plan does not in any way dismiss the Owner from compliance with other applicable Federal, State or local laws.

Routine maintenance during construction and post-development phases of the project, as defined in the Operation and Maintenance Plan, shall be permitted without amendment to the Order of Conditions. A continuing condition in the Certificate of Compliance shall ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

All stormwater best management practices (BMPs) shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority. The Owner shall:

- a. Maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement and disposal (for disposal the log shall indicate the type of material and the disposal location). This is a rolling log in which the responsible party records all operation and maintenance activities for the past three years.
- b. Make this log available to MassDEP and the Conservation Commissions upon request; and
- c. Allow members and agents of the MassDEP and the Conservation Commissions to enter and inspect the premises to evaluate and ensure that the Owner complies with the Operation and Maintenance requirements for each BMP.

#### **3.2 Stormwater Operation and Maintenance Requirements**

Inspect and maintain the stormwater management system as directed below. Refer to the Stormwater Management System Location Map (Figure 1) for the location of each component of the system. Repairs to any component of the system shall be made as soon as possible to prevent any potential pollutants (including silt) from entering the resource areas.

##### Area Drains

Inspect area drains at least once per month and remove debris from the grate. Clean out accumulated sediments at least once per year and more frequently as necessary.

##### Water Quality Units (Proprietary Separators)

Maintain water quality units according the recommendations set forth by the manufacturer. General inspection and maintenance procedures for proprietary devices are provided below:

- Inspect units following completion of construction, prior to being put into service.
- Inspect units at least twice per year following installation and no less than once per year thereafter.



- Inspect units immediately after any oil, fuel or chemical spill.
- All inspections shall include checking the oil level and sediment depth in the unit. Removal of sediments/oils shall occur per manufacturer recommendations.
- A licensed waste management company shall remove captured petroleum waste products from any oil, chemical or fuel spills and dispose.
- OSHA confined space entry protocols shall be followed if entry into the unit is required.

#### Subsurface Detention/Infiltration Structures

Inspect subsurface detention/infiltration structures twice per year. Inspect the inlets and observation ports to determine if there is accumulated sediment within the system. Remove all debris and accumulated sediment that may clog the system. Include mosquito controls.

#### Stormwater Outfalls

Inspect flared end sections and associated riprap spillways at least once per year and after major storm events (rainfall totals greater than 2.5 inches in 24 hours) to ensure that the stability of the outlet area is maintained. Keep the outfall area clear of debris such as trash, branches, and sediment. Make repairs immediately if riprap displacement or downstream channel scour is observed.

### **3.3 Street Sweeping**

Perform street sweeping at least once per month, whenever there is significant debris present on the driveway/basketball court. Sweepings must be handled and disposed of properly according to the Boston Conservation Commission.

### **3.4 Repair of the Stormwater Management System**

The stormwater management system shall be maintained. The repair of any component of the system shall be made as soon as possible to prevent any potential pollutants including silt from entering the resource areas or the existing closed drainage system.

### **3.5 Reporting**

The Owner shall maintain a record of drainage system inspections and maintenance (per this Plan) and submit a yearly report to the Boston Conservation Commission.

**STORMWATER MANAGEMENT SYSTEM INSPECTION FORM**

---

**325 Reservoir Road  
Chestnut Hill, MA**

**Inspected by:** \_\_\_\_\_

**Date:** \_\_\_\_\_

<b>Component</b>	<b>Status/Inspection</b>	<b>Action Taken</b>
Area Drains and Drain Manholes		
Water Quality Units		
Subsurface Infiltration System		
Stormwater Outfalls & Level Spreaders		
General site conditions – evidence of erosion, etc.		

**SUBMIT COPIES OF STORMWATER MANAGEMENT SYSTEM INSPECTION FORM TO THE BOSTON CONSERVATION COMMISSION WITH THE YEARLY REPORT.**

**APPENDIX D**

---

**Stormwater Management Standards Documentation**

MassDEP Checklist for Stormwater Report

Standard 10: Illicit Discharge Compliance Statement





# Checklist for Stormwater Report

## A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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





# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

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

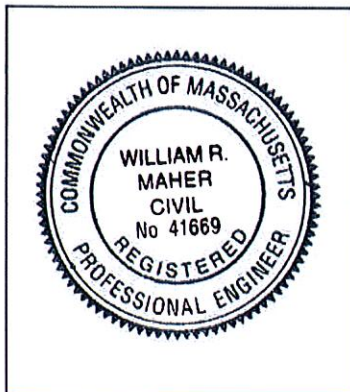
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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

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

### Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



*William R. Maher*

*8/7/2019*

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): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

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





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

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

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

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

### Standard 4: Water Quality

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

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





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

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

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

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

### Standard 6: Critical Areas

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





# Checklist for Stormwater Report

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## Checklist (continued)

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

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

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

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

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



# Checklist for Stormwater Report

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## Checklist (continued)

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

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

### Standard 9: Operation and Maintenance Plan

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

### Standard 10: Prohibition of Illicit Discharges

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



**STANDARD 10: Illicit Discharge Compliance Statement**

Project Name: Yeshiva Ohr Yisrael	Nitsch Project #: 13302
Location: 325 Reservoir Road, Chestnut Hill, MA	Checked by: WRM
Prepared by: WRM	Sheet No. 1 of 1
Date: August 7, 2019	

**Standard 10 states: All illicit discharges to the stormwater management system are prohibited.**

This is to verify:

1. Based on the information available there are no known or suspected illicit discharges to the stormwater management system at Yeshiva Ohr Yisrael site as defined in the MassDEP Stormwater Handbook.
2. The design of the stormwater system includes no proposed illicit discharges.



William R. Maher, PE, LSIT

August 7, 2019

Date