



## City of New Bedford

### Department of Planning, Housing & Community Development

608 Pleasant St, New Bedford, Massachusetts 02740

Telephone: (508) 979.1500 Facsimile: (508) 979.1575

PATRICK J. SULLIVAN  
DIRECTOR

## STAFF COMMENTS

### PLANNING BOARD MEETING

JANUARY 11, 2017

### ADDENDUM TO PREVIOUS STAFF COMMENTS PROVIDED DECEMBER 14, 2016

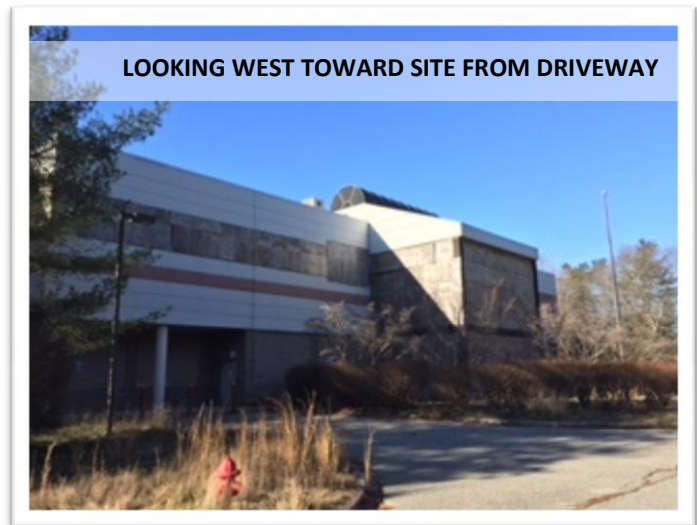
**Case #37-16: SITE PLAN APPROVAL  
MODIFICATION**  
50 Duchaine Boulevard  
Map: 134, Lots: 456, 457, 458 & 459

**Applicant:** Farland Corp.  
401 County Street  
New Bedford, MA 02740

**Owner:** NSTAR Electric Co.  
247 Station Drive  
Westwood, MA 02090

#### Overview of Request

This is a request to consider Site Plan modification for approved **Case #03-16** for a liquid waste disposal and recycling facility, located at 50 Duchaine Boulevard in New Bedford Business Park in the Industrial C (I-C) zoning district. The proposed use has been changed to energy supplier corporate office, having 167,105 +/- SF with associated parking and loading, at the existing developed 58+/- acre site.



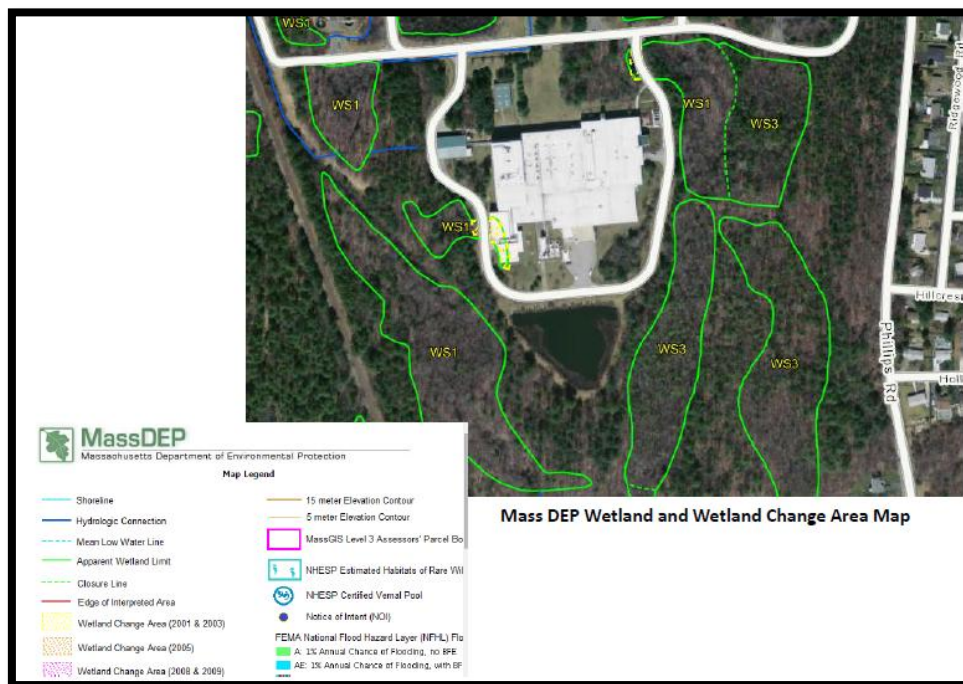
On January 13, 2016 the Planning Board approved a proposal by Parallel Products, Inc., for a liquid waste disposal and recycling facility. Parallel Products of New England reprocesses empty plastic and aluminum beverage containers that come from redemption centers in bottle bill states throughout the New England area. Manufacturing and Light Manufacturing defining this proposal are uses permitted by right in the Industrial C zoning district.

On October 28, 2016 SM Real Estate, LLC conveyed interest in the parcel known as 50 Duchaine Boulevard to NSTAR Electric Company. Rebranded as "Eversource Energy", **Eversource** is recognized as New England's largest energy provider, serving more than 3.6 million electric and natural gas customers in CT, MA and NH. Business, or professional office, and warehouse use are allowed by right in the Industrial C zoning district. The Protective New Bedford Business Park Covenants imposed by the Industrial Foundation permit the use of the land for the purpose of corporate headquarters and offices.

## Existing Conditions

This 58+/- acre parcel is recognized as the site of the former Polaroid Corporation, which was conveyed to Konarka Technologies, Inc., prior to current ownership. The parcel is found at the southern terminus off Duchaine Boulevard via a looped road in the New Bedford Business Park. The existing structure is vacant.

A recent site visit by staff finds common excavation of the vegetation underway at the north side of the building.



Wetlands border the site and are comprised of Wooded Swamp Deciduous Trees (WS1) and Wooded Swamp Mixed Trees (WS3). Due to changes in the stormwater design, parking and proposed use, 50 Duchaine Boulevard requires a new filing with the Conservation Commission to obtain a new Order of Conditions. To date, this new Notice of Intent has not been filed with the Conservation Commission.

## Proposed Conditions

At the time this report was written, staff was awaiting a narrative describing the modified proposal.

## Appendix C-Table of Parking & Loading Regulations

USE	PARKING REQUIREMENTS	LOADING REQUIREMENTS
Businesses engaged in the warehousing and distribution of goods & materials including building & construction contractors, equipment & supplies on premises, motor freight terminal, facilities for storing & servicing of motor vehicles used in conducting a business or public transportation, industrial machinery & equipment, grain, petroleum products & junkyards.	One (1) space per 1500 sq. ft. of gross floor area up to 15,000 sq. ft. Thereafter, one (1) additional space for each 5,000 sq. ft. or portion thereof in excess of 15,000 sq. ft., plus one (1) space for each vehicle utilized in the business.	Two (2) loading spaces for each building containing 10,000 sq. ft. of gross floor area. Thereafter, one (1) additional loading space shall be required for each additional 25,000 sq. ft. of gross floor area or for each fifteen (15) feet of dock, platform or opening in the building where the loading or unloading of commodities is intended to occur, whichever is the greatest.
Offices: General, professional, business, banks, medical clinics and laboratories, radio and television stations; office of non-profit educational, cultural, or charitable organizations	One (1) space per each 200 sq. ft. of gross floor area but not less than two (2) spaces for each business unit intended to occupy the premises. After 10,000 sq. ft. of gross floor area, one space for every 1,000 sq. ft. of gross floor area	One (1) loading space for each building containing 10,000 sq. ft. or more of gross floor area. Two (2) loading spaces for 100,000 sq. ft. or more of gross floor area

**Parking.** The applicant states the project proposal for **warehouse use** requires forty-one (41) parking spaces under New Bedford ordinance. However, the principal use is described on the cover sheet of the plan set as Energy Supplier Corporate **Offices**. Total parking space requirement for the combined use is 248. Site layout plan sheet notes there are 74 proposed, secure fleet vehicle parking spaces, 208 proposed employee parking spaces,

three (3) spaces at the west building elevation, and seven (7) ADA accessible parking spaces for a total of 292. Parking space length is shown as a dimension of eighteen (18) feet, which do not meet city stipulations of nine feet (9) by twenty (20) feet. While it appears there is land available to satisfy city regulations, the applicant should present revised plans showing the required dimensional parking space.

**Demand and Operations.** The number of customers per day, number of employees, hours and days of operation, and hours and frequency of deliveries are to be determined.

The applicant has omitted a project cost estimate date for completion for the proposed project, as stipulated under §5452.

#### **Site Plan Review**

The submittal is shown as the Site Plan for 50 Duchaine Blvd (Assessors Map 134, Lots 456, 457, 458 and 459) New Bedford, MA dated November 18, 2016 prepared for Eversource Energy, P.O. Box 100085-N2, Duluth, GA 30096 by Thompson Farland 398 County Street, New Bedford, MA 02740, consisting of nine (9) sheets; and

Light Plan, dated 11/16/2016, prepared for Eversource Parking Lot, Building & Roadway, by *nelight*, consisting of one (1) sheet; and

Architectural Plans, dated 11/18/2016, prepared for Eversource, New Bedford, MA, by The SLAM Collaborative, Glastonbury, CT, consisting of three (3) sheets.

Recommended plan revisions are noted as follow:

- **Cover Sheet - Sheet 1 of 9**
  - Revise the number of parking spaces provided using City ordinance regulations of nine (9) feet by twenty (20) feet.
- **Notes & Legend - Sheet 2 of 9**
  - Under General Construction Notes at No. 19, add “and City Planner”.
  - Under General Planting Notes, add **Period of planting:** March 15-May 15 and September 15-November 15, weather permitting.
- **Existing Conditions - Sheet 3 of 9**

Applicant to Provide: 21E Contaminated Site Information, if applicable.  
Restrictive Covenant Doc No. 57647
- **Layout - Sheet 4 of 9**
  - Parking spaces are not dimensioned per municipal code under §3150.
- **Grading & Utility-Sheet 5 of 9**
  - Applicant to Provide: Any Utility Easement(s).  
See Comments from DPI.
- **Landscape – Sheet 6 of 9**
  - Significant excavation has been performed at the north elevation of the building, reducing the green cover in preparation of paved parking area. Minimal landscape design has been presented to remedy this loss of vegetation.
  - Given the north south orientation of the site redevelopment, the board may wish to consider requiring the applicant add landscape to islands and increase number of plantings to provide for transpiration due to reduction of green space.
  - The Landscape Plan shall have a note stating period of planting to be March 15-May 15 and September 15-November 15, weather permitting.
- **Detail - Sheet 7 of 9**
- **Detail - Sheet 8 of 9**

- **Modified Layout Plan - Sheet 9 of 9**

The Alta Survey for Phase One and Two Environmental findings should be provided, if applicable.

### Review Comments

As required under city ordinance, the case submittal documents were distributed to City Clerk, City Solicitor, Health Department, Inspectional Services, Engineering, Public Infrastructure, Conservation Commission, Fire Department and School Department.

- *The Conservation Commission comments that the applicant has filed a new Notice of Intent with the Conservation Commission. The initial hearing was held on December 27<sup>th</sup>, 2016. The Commission made a motion to send this project to their peer review engineer (Nitsch Engineering) for a stormwater review for compliance with the MADEP Stormwater Standards. The Commission requested that the transformer area have a separate catchment system so that nothing from the transformer area enters the stormwater management system. The Commission also requested that the proposed chain link fence to surround the site allow for a six inch opening all along the bottom for the passage of small wildlife. Con Com will forward you the review comments from Nitsch once they are received.*
- The Department of Public Infrastructure has provided comments for the Planning Board's consideration (Attachment 10).

Outside of this, no further comments from city offices were received in this matter.

### Master Plan Goal

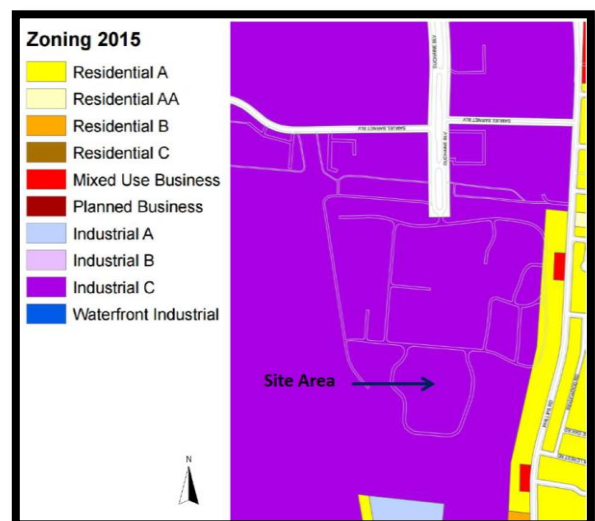
The application for site plan approval under consideration by the Planning Board as part of the development proposal by Eversource meets the criteria set forth under A City Master Plan: New Bedford 2020 in that the proposal supports existing business as part of the strategic approach for economic development.

### For Board Member Consideration

The proposal for Site Plan Approval is consistent with the master plan's goal to expand workforce opportunities as improves the neighborhood setting and communicates a positive message for business development.

Having reviewed this request, the existing character of the surrounding properties and thresholds for approval of a site plan review, staff recommends the approval of this application with the following conditions:

- ☐ The applicant/owners shall comply with the stipulations set forth by the City of New Bedford Department of Public Infrastructure.
- ☐ The applicant/owners shall comply with the stipulations set forth by the City of New Bedford Department of Environmental Stewardship and Conservation Commission.
- ☐ The applicant shall revise plans for omissions and clarification as noted under Staff Comment Site Plan Review.
- ☐ The applicant shall revise the site layout plan for parking dimension that satisfies municipal code.
- ☐ The applicant shall provide additional documents as noted under Staff Comment Site Plan Review.





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**Attachments:**

1. Minutes of the January 13, 2016 Planning Board
2. Decision - Case #03-16
3. Site Plan Approval Application
4. Letter of Authorization
5. Bristol County (S.D) Registry of Deeds Bk 1159, Pg 271 (Certificate 23855)
6. Land Plan Book 81, Page 78
7. Bristol County (S.D) Registry of Deeds Certificate 24085
8. Land Plans 36318-C
9. New Bedford Business Park CC & R's
10. Department of Public Infrastructure Comments dated 12/08/2016
11. Plan Set
12. Notice of Intent





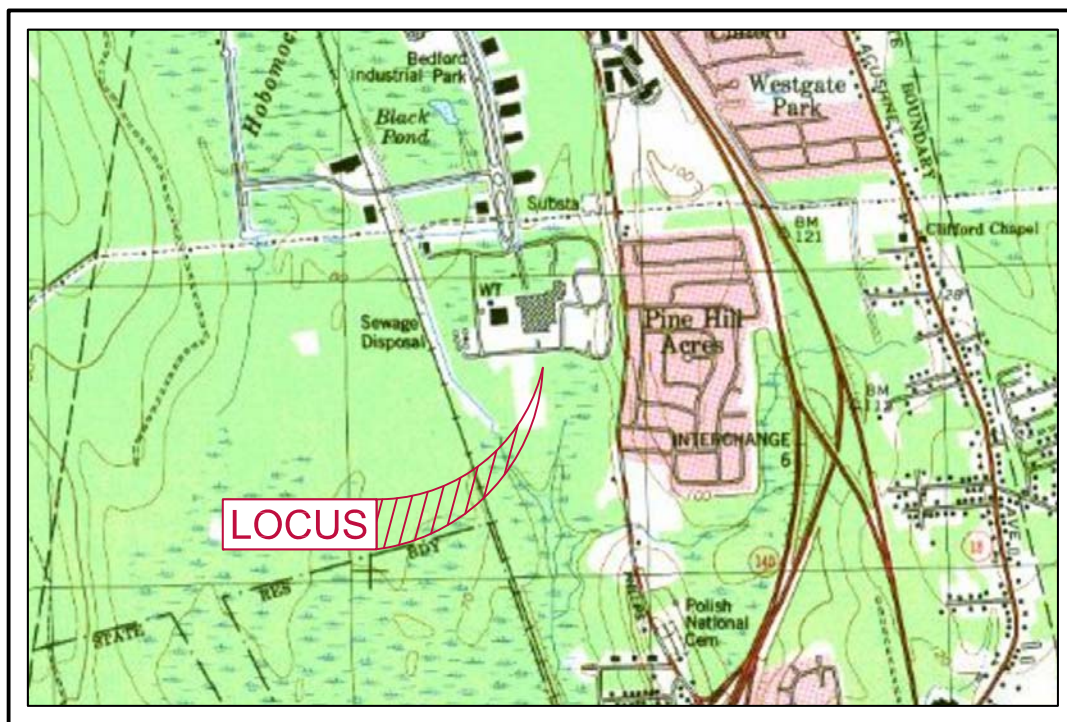
ENGINEERING A BETTER TOMORROW

ENGINEERING | SITE WORK | LAND SURVEYING

# NOTICE OF INTENT

## SITE PLAN

ASSESSORS MAP 134 - LOTS 456, 457, 458 & 459  
50 DUCHAINE BOULEVARD  
NEW BEDFORD, MASSACHUSETTS



PREPARED FOR:

NSTAR ENERGY COMPANY  
274 STATION DRIVE  
WESTWOOD, MA 02090

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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

New Bedford

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):

50 Duchaine Boulevard

a. Street Address

New Bedford

b. City/Town

02745

c. Zip Code

Latitude and Longitude:

41° 42' 49.65"

d. Latitude

70° 57' 04.92"

e. Longitude

Map 134

f. Assessors Map/Plat Number

Lots 456, 457, 458 & 459

g. Parcel /Lot Number

2. Applicant:

a. First Name

b. Last Name

NStar Energy Company

c. Organization

274 Station Drive

d. Street Address

Westwood

e. City/Town

MA

f. State

02090

g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

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

a. First Name

b. Last Name

Nstar Electric Company

c. Organization

247 Station Drive

d. Street Address

Westwood

e. City/Town

MA

f. State

02090

g. Zip Code

h. Phone Number

i. Fax Number

j. Email address

4. Representative (if any):

Christian

a. First Name

Farland

b. Last Name

Farland Corp.

c. Company

401 County Street

d. Street Address

New Bedford

e. City/Town

MA

f. State

02740

g. Zip Code

(508) 717-3479

h. Phone Number

i. Fax Number

cfarland@farlandcorp.com

j. Email address

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

\$1000.00

a. Total Fee Paid

\$487.50

b. State Fee Paid

\$512.50

c. City/Town Fee Paid





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**A. General Information** (continued)

6. General Project Description:

Site improvements to existing developed land including: additional parking for employees & company vehicles, additional docks and expansion of the existing parking spaces.

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 checked="" 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 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 CMR 10.24(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:

Bristol

a. County

24085

b. Certificate # (if registered land)

c. Book

d. Page Number

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

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

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



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

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

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

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

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
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 BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings



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### C. Other Applicable Standards and Requirements

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

#### Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

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

- a. ☐ Yes ☒ No **If yes, include proof of mailing or hand delivery of NOI to:**

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

October 1, 2008

b. Date of map

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

- c. Submit Supplemental Information for Endangered Species Review\*

1. ☐ Percentage/acreage of property to be altered:

(a) within wetland Resource Area

percentage/acreage

(b) outside Resource Area

percentage/acreage

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

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

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

(b) ☐ Photographs representative of the site

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

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





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

- (c) ☐ MESA filing fee (fee information available at [http://www.mass.gov/dfwele/dfw/nhosp/regulatory\\_review/mesa/esa\\_fee\\_schedule.htm](http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/mesa/esa_fee_schedule.htm)).  
Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

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

- (d) ☐ Vegetation cover type map of site
- (e) ☐ Project plans showing Priority & Estimated Habitat boundaries
- (f) OR Check One of the Following
1. ☐ Project is exempt from MESA review.  
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, [http://www.mass.gov/dfwele/dfw/nhosp/regulatory\\_review/esa/esa\\_exemptions.htm](http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/esa/esa_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  
1213 Purchase Street – 3rd Floor  
New Bedford, MA 02740-6694  
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.



**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

New Bedford

City/Town

**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.

Site Plan - 50 Duchaine Boulevard

a. Plan Title

Farland Corp.

Christian A. Farland P.E.

b. Prepared By

c. Signed and Stamped by

November 18, 2016

1"=40'

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.
6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
8. ☒ Attach NOI Wetland Fee Transmittal Form
9. ☒ Attach Stormwater Report, if needed.

**E. Fees**

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

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

5363

12/08/16

2. Municipal Check Number

3. Check date

5362

12/08/16

4. State Check Number

5. Check date

Farland Corp.

Farland Corp.

6. Payor name on check: First Name

7. Payor name on check: Last Name



## 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

New Bedford

City/Town

### F. Signatures and Submittal Requirements

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

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

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

#### For Conservation Commission:

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

#### For MassDEP:

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

#### Other:

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

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





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:

50 Duchaine Boulevard

a. Street Address

5362

c. Check number

New Bedford

b. City/Town

\$487.50

d. Fee amount

### 2. Applicant Mailing Address:

a. First Name

NStar Energy Company

c. Organization

274 Station Drive

d. Mailing Address

Westwood

e. City/Town

MA

f. State

02090

g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

### 3. Property Owner (if different):

a. First Name

NStar Energy Company

c. Organization

274 Station Drive

d. Mailing Address

Westwood

e. City/Town

MA

f. State

02090

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  
**NOI Wetland Fee Transmittal Form**  
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 2b.) Parking Lot	1	\$500.00	\$500.00
Category 2g.) Source Discharge	1	\$500.00	\$500.00
Step 5/Total Project Fee:			\$1,000.00

**Step 6/Fee Payments:**

Total Project Fee:	\$1,000.00
	a. Total Fee from Step 5
State share of filing Fee:	\$487.50
	b. 1/2 Total Fee <b>less</b> \$12.50
City/Town share of filing Fee:	\$512.50
	c. 1/2 Total Fee <b>plus</b> \$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.)

November 22, 2016

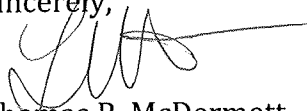
Christian A. Farland, P.E., LEED AP  
Principal Engineer and President  
Farland Corporation  
401 County Street  
New Bedford, MA 02740

Dear Mr. Farland,

Please accept this document as your Letter of Authorization to act as agent for Eversource Energy with regards to application submissions and Commission hearings for the 50 Duchaine Boulevard, New Bedford, MA project.

Please let me know if you have any questions.

Sincerely,



Thomas R. McDermott  
Manager – Facilities Operations  
860-665-4531  
[Thomas.r.mcdermott@eversource.com](mailto:Thomas.r.mcdermott@eversource.com)

c: C. Ellithorpe  
D. Crowe  
D. Swanson  
W. Pacheco  
S. Madhusudhan  
B. Rhodes



2016 00120078

Cert: 24085 Doc: DEED BS  
Registered: 10/28/2016 02:28 PM**QUITCLAIM DEED**

SM Real Estate, LLC, a Delaware limited liability company, having a mailing address of c/o Parallel Products of New England, Inc., 969 Shawmut Avenue, New Bedford, MA 02746

for consideration paid, and in full consideration of Eight Million Dollars and 00/100 (\$8,000,000.00)

hereby grants to NSTAR Electric Company, a Massachusetts corporation, having a mailing address of 247 Station Drive, Westwood, MA 02090

***with Quitclaim Covenants***

the land known and numbered as 50 Duchaine Boulevard in the City of New Bedford, Bristol County, Massachusetts, and as more particularly described on Exhibit A attached hereto, together with any improvements thereon,

subject to all matters of record so far as same are in force and applicable.

For reference to Grantor's title, see deed dated February 2, 2016 from Multilayer Coating Technologies, LLC, which deed was recorded with the Bristol South District Registry of Deeds on February 2, 2016 at Book 11599, Page 271 and filed with the Bristol South District of the Land Court on February 2, 2016 as Document No. 118467, as noted on Certificate No. ~~23855~~ 23855.

Grantor warrants that this conveyance does not represent a conveyance of all or substantially all the assets of the Grantor in the Commonwealth of Massachusetts.

*[Remainder of page intentionally left blank; Signature page follows]*

Property Address: 50 Duchaine Boulevard, New Bedford, Bristol County, Massachusetts 02745



EXECUTED as a sealed instrument this 28 day of October, 2016.

GRANTOR:

SM REAL ESTATE, LLC

By: [Signature]

Timothy Cusson, Authorized Signatory  
a/k/a Tim Cusson

COMMONWEALTH OF MASSACHUSETTS

Suffolk, ss.

On this 28 day of October 2016, before me, the undersigned notary public, personally appeared Timothy Cusson, who proved to me through satisfactory evidence of identification, which was a driver's license, personally known to me, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose as an authorized signatory of SM Real Estate, LLC.

[Signature]

Notary Public

My Commission Expires

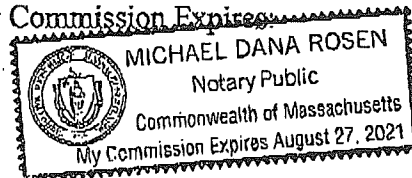
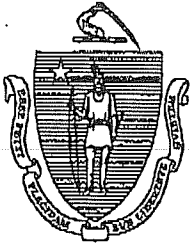


EXHIBIT A

Lot 5 on Land Court Plan 36318C filed with Ctf. 22029 B. 125, P. 100 entitled "Plan of Land, Being a Subdivision of Lot 1, Shown on Land Court Plan #36318-B Duchaine Boulevard and Phillips Road, New Bedford, Massachusetts Prepared for Multilayer Coating Technologies, LLC", dated January 6, 2009, revised through March 25, 2009, by Cullinan Engineering.



William Francis Galvin  
Secretary of the  
Commonwealth

*The Commonwealth of Massachusetts*  
*Secretary of the Commonwealth*  
*State House, Boston, Massachusetts 02133*

October 20, 2016

TO WHOM IT MAY CONCERN:

I hereby certify that a certificate of registration of a Foreign Limited Liability Company was filed in this office by

**SM REAL ESTATE, LLC**

in accordance with the provisions of Massachusetts General Laws Chapter 156C on **October 22, 2015**.

I further certify that said Limited Liability Company has filed all annual reports due and paid all fees with respect to such reports; that said Limited Liability Company has not filed a certificate of cancellation or withdrawal; and that, said Limited Liability Company is in good standing with this office.

I also certify that the names of all managers listed in the most recent filing are: **JASON STEIN**

I further certify that the name of persons authorized to act with respect to real property instruments listed in the most recent filings are: **JASON STEIN, EUGENE KIESEL, DAVID KENNEY, TIM CUSSON**



In testimony of which,

I have hereunto affixed the

Great Seal of the Commonwealth

on the date first above written.

*William Francis Galvin*

Secretary of the Commonwealth

# Delaware

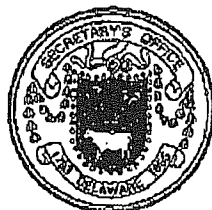
Page 1

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "SM REAL ESTATE, LLC" IS DULY FORMED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE TWENTY-FOURTH DAY OF OCTOBER, A.D. 2016.

AND I DO HEREBY FURTHER CERTIFY THAT THE SAID "SM REAL ESTATE, LLC" WAS FORMED ON THE NINTH DAY OF SEPTEMBER, A.D. 2015.

AND I DO HEREBY FURTHER CERTIFY THAT THE ANNUAL TAXES HAVE BEEN PAID TO DATE.



5814740 8300

SR# 20166331134

You may verify this certificate online at [corp.delaware.gov/authver.shtml](http://corp.delaware.gov/authver.shtml)

A handwritten signature in black ink, appearing to read "JBULLOCK", is written over a horizontal line. Below the line, the text "Jeffrey W. Bullock, Secretary of State" is printed in a small font.

Authentication: 203211988

Date: 10-24-16

# STORMWATER REPORT CHECKLIST



# Checklist for Stormwater Report

## A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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



# Checklist for Stormwater Report

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## 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

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Signature and Date

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## Checklist

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

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



# Checklist for Stormwater Report

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## Checklist (continued)

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

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

### Standard 1: No New Untreated Discharges

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





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

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

### Standard 3: Recharge

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

<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 propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

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

### Standard 6: Critical Areas

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



# Checklist for Stormwater Report

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## Checklist (continued)

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

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

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

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

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



# Checklist for Stormwater Report

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## Checklist (continued)

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

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

### Standard 9: Operation and Maintenance Plan

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

### Standard 10: Prohibition of Illicit Discharges

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

# STORMWATER MANAGEMENT REPORT

# **STORMWATER MANAGEMENT REPORT AND HYDROLOGIC ANALYSIS**

**Proposed Site Plan – 50 Duchaine Boulevard  
(Assessors Map 134, Lots 456, 457, 458, and 459)  
New Bedford, Massachusetts**

## **Project Summary**

The project area associated with this proposed development is located at the southern terminus of Duchaine Boulevard in the New Bedford Business Park in northern New Bedford. The site is comprised of several tax parcels, including Lots 456, 457, 458, and 459 on Assessor's Map 134, and consists of approximately fifty-eight (58) acres. The proposed project area comprises only a small portion of the total parcel area. Much of the parcel area, including the entire proposed project area, is located in the city's Industrial C zoning district. The site currently contains a large un-occupied warehouse style building with associated parking, loading, and landscaped areas. Access to the site is gained from a looped road off of Duchaine Boulevard, over which access easements have been provided.

The applicant is seeking permission to provide parking, loading, and drainage improvements to the project site. In order to attenuate the increased stormwater runoff generated by the proposed impervious site coverage and to provide the appropriate level of water quality treatment, additional stormwater management practices have been proposed. Proposed structural BMP's include sediment forebay, water quality inlets, sub-surface recharge structures and infiltration basins.

## **Methodology**

Drainage computations were performed using the Natural Resources Conservation Services (NRCS) TR-20 method and HydroCAD® Drainage Calculation Software to determine the change in the existing and post-development runoff rates from each drainage area for the 2-, 10-, and 100-year 24 hour storm events. The limits of the work proposed to complete the project fall within an area subject to protection by the Wetlands Protection Act, therefore, compliance with DEP Stormwater Management Standards is required. Sketches of the existing and proposed watershed areas, HydroCAD® Report, and copies of the calculation sheets are included as appendices to this report.

## **Existing Conditions**

The soils underlying the site are identified in the Natural Resources Conservation Service (NRCS) Soil Survey of Bristol County (*see Exhibit D*). The site soils are

classified as 256B (Deerfield loamy sand, Hydrologic Soils Group [HSG] "A"), 651 (Udorthents, smoothed, HSG "A"), 39A (Scarboro mucky fine sandy loam, HSG "A/D"), and 51A (Swansea muck, HSG "B/D")

Soil testing was performed by Thompson Farland, Inc. under the direction of John Marchand, P.E. on November 25, 2015 to confirm the soil survey and determine the soil suitability for on-site stormwater management purposes.

The deep test-holes were performed to a depth of approximately 3-1/2 feet to 7-1/2 feet to determine the seasonal high groundwater elevation. Mottling was encountered at depths varying from 20" to 56", and standing water was encountered at all test holes. The locations of the testholes are shown on the site plan.

## **Stormwater Management Overview**

### Existing Conditions:

The project site has been divided into eight existing subcatchment drainage areas, which discharge to one design point. The design point chosen for this site is the limit of the bordering vegetated wetlands surrounding the site to the east, south, and west. A number of depressions located inside the site driveway, which discharge runoff through culverts either directly toward the BVW or toward an existing stormwater "wet basin" at the south end of the site via a piped drainage system, have been incorporated into the existing drainage model. Although this basin is a wetland resource area, it does provide peak rate attenuation for runoff which is directed to it. Existing outlet controls within the wet basin have been incorporated into the model, and the outflow from the pond is combined with the runoff toward the BVW to provide a total flow to the design point.

### Proposed Conditions:

Under proposed conditions, fourteen subcatchment areas have been included in the drainage model. New paved areas behind (south of) the existing building sheds runoff overland toward a proposed infiltration basins, located between the existing driveway and the proposed paved area. Pretreatment is achieved through two sediment forebays at each basin. A portion is drained to a stormceptor catch basin which leads to a culvert sub-surface recharge system. The new paved areas in front (north) of the existing building shed runoff toward two proposed infiltration basins, located between the existing roadway and the proposed paved areas. Each of these basins is pretreated through two sediment forebays. The infiltration basin at the northwesterly side will then discharge toward another proposed infiltration basin, located between the existing driveway and the bordering vegetated wetland surrounding the site. Each of these basins is also designed to collect runoff from direct runoff from portions of the proposed paved surface.



The proposed infiltration basins have been designed in accordance with the DEP Stormwater Handbook. In accordance with the Stormwater Handbook, the rate mitigation facilities have been engineered to reduce post-development runoff rates from pre-development conditions.

## **Stormwater Management Standards**

### **Standard 1:**

- Under proposed conditions, there will be no new untreated discharges or erosion in wetland areas. Drainage outfalls from the two infiltration basins which discharge toward the existing BVW are provided with rip-rap spillways to help control velocity and erosion at the outlet. Stormwater discharges have been held below erodible velocities. This standard has been met.

### **Standard 2:**

- The design of the stormwater system was designed for the post-development conditions to handle all storms' peak discharges and runoff volume to include the 2 and 10-year storm events. An evaluation of peak discharges from the 100-year storm 24-hour storm event demonstrates that although a small increase in the peak discharge rate occurs, the discharge will not result in increased off-site flooding due to the short duration of increased rate and the overall reduced volume of runoff. The site drainage system was designed in consideration of the structural standards and techniques of the Best Management Practices (BMP) and Low Impact Development (LID) outlined in the "Stormwater Management Handbook".

The results of site drainage calculations are presented in the following Tables. The results are based upon evaluation of Pre-development conditions and the design of proposed surface drainage systems for the Post-development condition. These results show the Post-Development offsite runoff rates are reduced to less than the Pre-development conditions for the two-year and ten-year storm events, thus meeting the BMP guidelines for this site development.

<b>Table 1 - Comparison of Pre- versus Post-Development Offsite Runoff toward BVW Resource Area</b>						
<b>Frequency Storm</b>	<b>2-Year</b>		<b>10-Year</b>		<b>100-Year</b>	
	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)
Pre-Development	0.78	0.809	3.53	1.873	11.86	3.896
Post-Development	0.63	0.669	3.15	1.500	10.42	3.238

<b>Table 2 - Comparison of Pre- versus Post-Development Offsite Runoff toward Existing On-site Basin Resource Area</b>						
Frequency Storm	2-Year		10-Year		100-Year	
	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)
Pre-Development	0.62	0.678	1.50	1.424	3.46	2.686
Post-Development	0.59	0.647	1.41	1.301	3.42	2.552

\*See **Exhibit F** for supporting hydrologic calculations

### Standard 3:

- The proposed infiltration basins and subsurface recharge system has been designed to recharge some of the anticipated stormwater runoff from all of the new impervious area and from some of the existing impervious area. The required Recharge Volume has been calculated using the Static Method and calculations are provided in **Exhibit G**. We note that the required Recharge Volume was calculated for the entire impervious area on-site, including existing paved and roof areas which are proposed to remain unaltered during construction. As a partial re-development project, this Standard is required to be met to the maximum extent practicable for these existing areas. The proposed design, however, provides the required recharge volume within the proposed basins. Drawdown Calculations have also been provided in **Exhibit H**. This standard has been met.

### Standard 4:

- The proposed stormwater management systems for this project have been designed to remove 80% of the average annual post construction load of Total Suspended Solids in accordance with this standard, as shown in calculations provided in **Exhibit J**. Suitable practices for source control and pollution prevention have been identified in a long-term pollution prevention plan in **Exhibit M**. Structural BMPs have been designed to capture the required water quality volume (**Exhibit I**) determined in accordance with the Stormwater Handbook. We again note that a significant amount of the total on-site post-development impervious area is from existing impervious ground cover. As a partial redevelopment project, runoff from these areas is required to be treated to the maximum extent practicable. Although the water quality volume provided in the proposed infiltration BMPs exceeds the required volume based upon the new impervious area, it does not fully comply with the required volume based on the total site impervious. Given the existing drainage system elevation and the groundwater conditions on-site, providing additional water quality volume for the runoff from the existing impervious areas is not practicable. This standard has been met.

**Standard 5:**

- As a utility company facility, the proposed use is not a Land Use with Higher Potential Pollutant Load. Stormwater discharges are proposed to be treated by the specific structural BMPs determined to be suitable for treating runoff from such land uses. Sediment Forebays and Infiltration Basins are appropriate BMPs for use with Land Uses with Higher Potential Pollutant Load. Stormwater treatment has been designed to provide 44% TSS removal prior to discharge to the infiltration BMPs, and BMPs have been designed to treat 1.0 inch of runoff times the total new impervious are at the post-development site. This standard has been met

**Standard 6:**

- The site does not discharge within the Zone II or IWPA of a public water supply, nor does it discharge near or to any critical areas. This standard does not apply.

**Standard 7:**

- This project is a partial re-development project. Much of the site is currently paved or covered with impervious cover. Those areas where new impervious coverage is proposed have been designed to meet all of the required Stormwater Standards. Those areas where existing impervious is proposed to remain will be allowed to maintain existing drainage patterns, where much of the runoff from the existing driveway area is directed through an existing piped drainage system to an existing stormwater basin resource area at the rear of the site, which attenuates the runoff prior to discharge to the BVW. Due to the water table present on-site, it is not feasible to fully meet all Standards for the existing impervious conditions.

**Standard 8:**

- We have provided for Construction Period Pollution in accordance with the regulations. A formal Construction Period Pollution Prevention Plan will be submitted prior to construction.

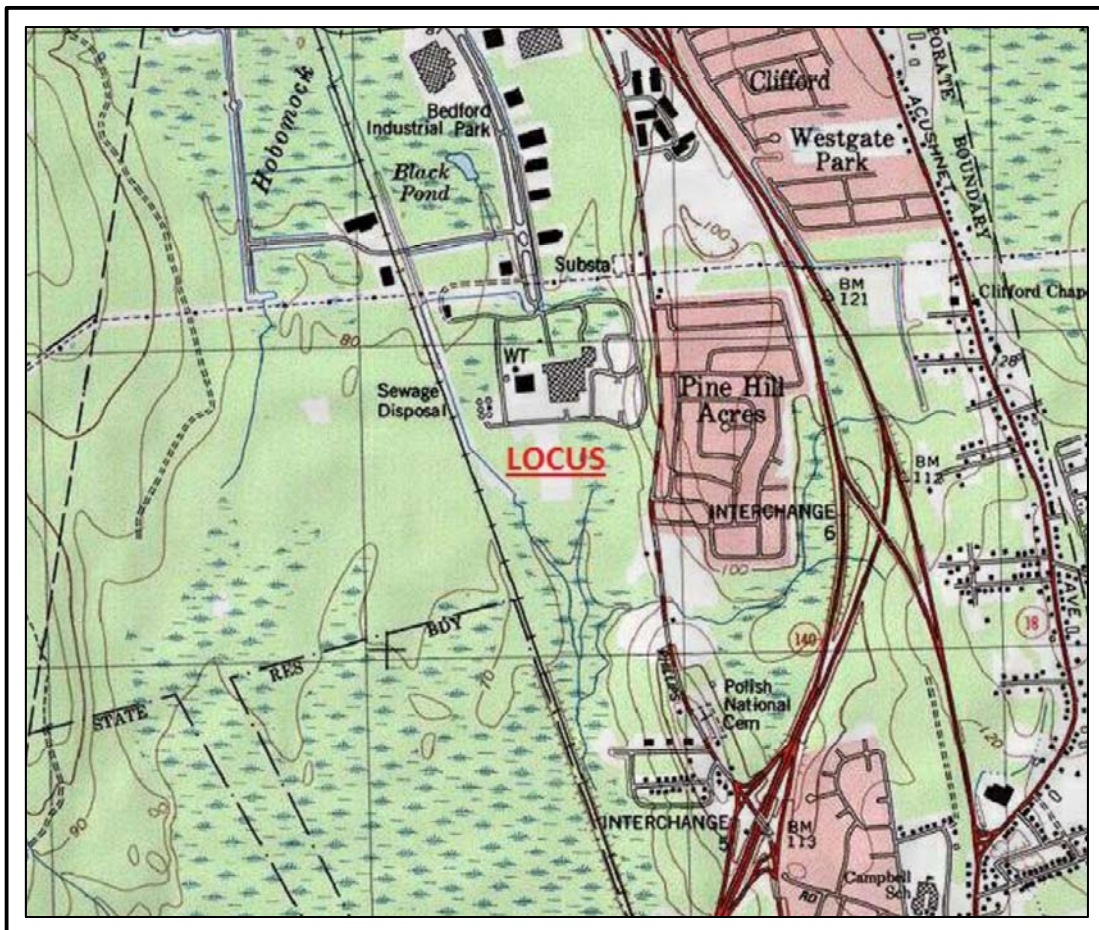
**Standard 9:**

- A long-term operation and maintenance plan has been prepared to ensure that stormwater management systems function as designed. (**Exhibit L**)

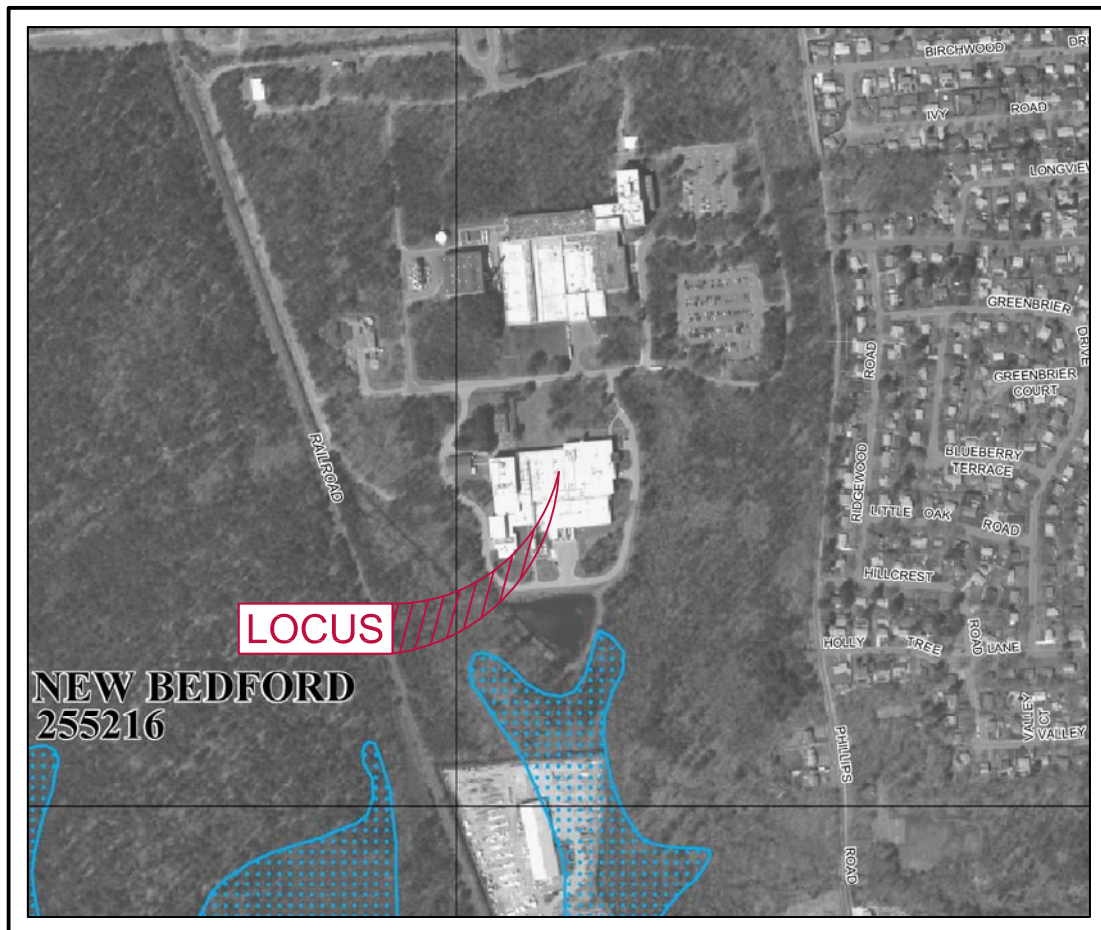
**Standard 10:**

- We are not proposing any illicit discharges as defined in the Stormwater Management Regulations. See attached letter in **Exhibit N**

# TOPO! VERSION 2.1.0



# FIRM MAP PANEL # 25005C0379F

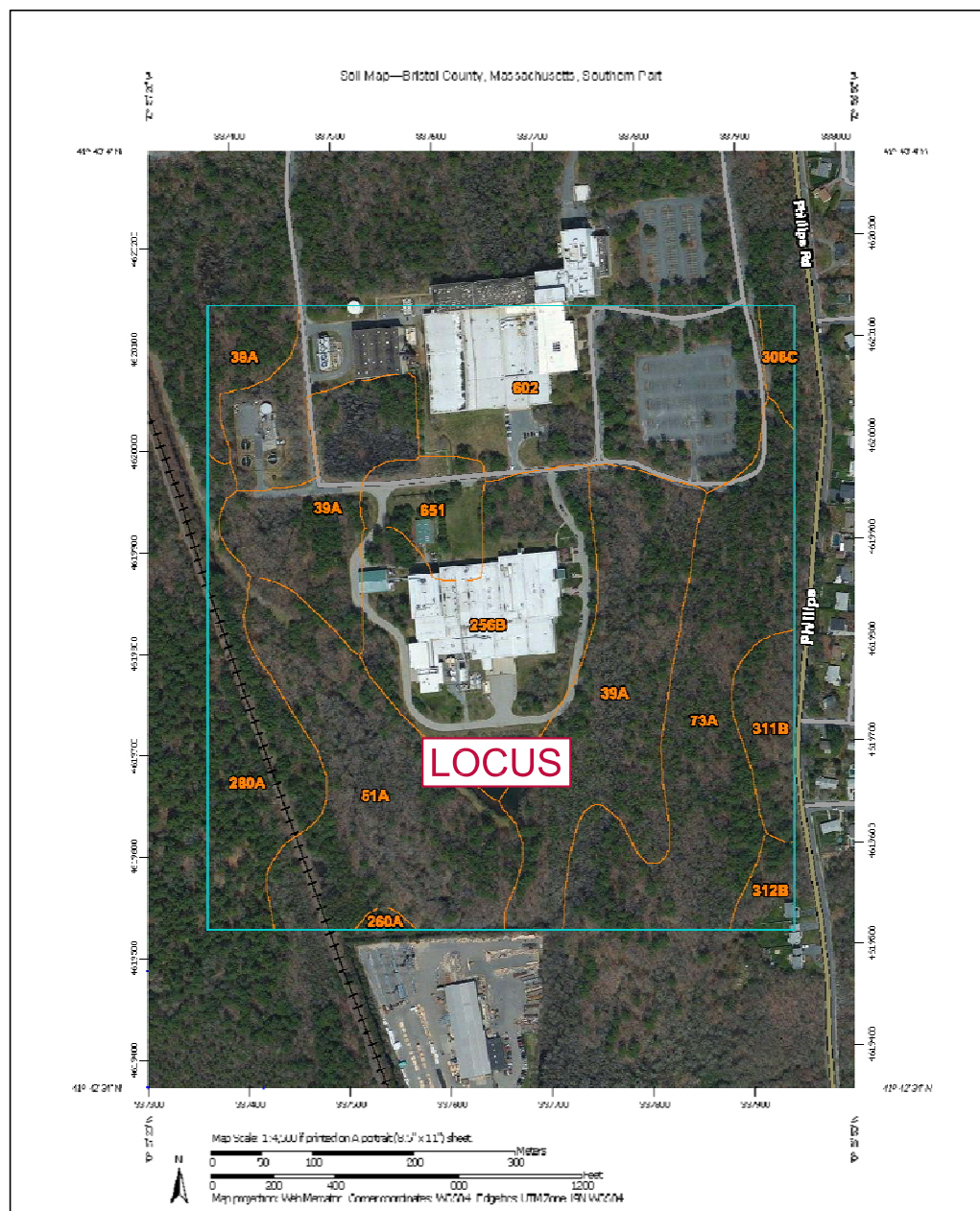




# NHESP PRIORITY & ESTIMATED HABITAT MAP 2008

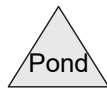
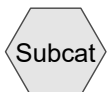
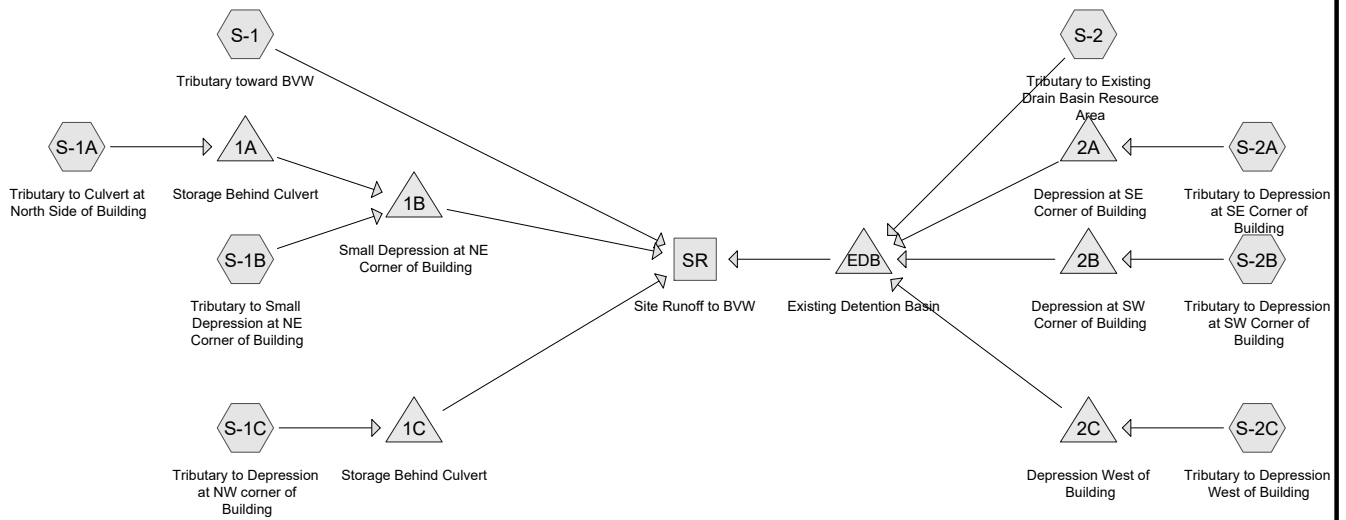


# NRCS SOIL MAP





# HYDROLOGIC CALCULATIONS & WATERSHED PLANS



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment S-1: Tributary toward BVW** Runoff Area=271,470 sf 8.63% Impervious Runoff Depth=0.13"  
Flow Length=170' Tc=18.7 min CN=48 Runoff=0.11 cfs 0.065 af

**Subcatchment S-1A: Tributary to Culvert at** Runoff Area=88,339 sf 2.15% Impervious Runoff Depth=0.20"  
Flow Length=250' Tc=15.0 min CN=51 Runoff=0.11 cfs 0.033 af

**Subcatchment S-1B: Tributary to Small** Runoff Area=4,113 sf 15.95% Impervious Runoff Depth=1.11"  
Tc=6.0 min CN=73 Runoff=0.12 cfs 0.009 af

**Subcatchment S-1C: Tributary to** Runoff Area=39,365 sf 4.83% Impervious Runoff Depth=0.49"  
Flow Length=150' Slope=0.0100 '/' Tc=19.1 min CN=60 Runoff=0.24 cfs 0.037 af

**Subcatchment S-2: Tributary to Existing** Runoff Area=224,061 sf 82.07% Impervious Runoff Depth=2.64"  
Tc=6.0 min CN=93 Runoff=15.35 cfs 1.131 af

**Subcatchment S-2A: Tributary to** Runoff Area=43,001 sf 0.00% Impervious Runoff Depth=0.17"  
Flow Length=320' Tc=14.2 min CN=50 Runoff=0.04 cfs 0.014 af

**Subcatchment S-2B: Tributary to** Runoff Area=116,742 sf 78.33% Impervious Runoff Depth=2.45"  
Flow Length=180' Tc=6.8 min CN=91 Runoff=7.33 cfs 0.546 af

**Subcatchment S-2C: Tributary to** Runoff Area=23,604 sf 1.63% Impervious Runoff Depth=0.38"  
Tc=6.0 min CN=57 Runoff=0.12 cfs 0.017 af

**Reach SR: Site Runoff to BVW** Inflow=0.78 cfs 0.809 af  
Outflow=0.78 cfs 0.809 af

**Pond 1A: Storage Behind Culvert** Peak Elev=75.76' Storage=1 cf Inflow=0.11 cfs 0.033 af  
Discarded=0.01 cfs 0.004 af Primary=0.10 cfs 0.030 af Outflow=0.11 cfs 0.033 af

**Pond 1B: Small Depression at NE Corner of** Peak Elev=75.63' Storage=1 cf Inflow=0.13 cfs 0.039 af  
Discarded=0.00 cfs 0.001 af Primary=0.13 cfs 0.037 af Outflow=0.13 cfs 0.039 af

**Pond 1C: Storage Behind Culvert** Peak Elev=77.67' Storage=10 cf Inflow=0.24 cfs 0.037 af  
Discarded=0.06 cfs 0.009 af Primary=0.18 cfs 0.027 af Outflow=0.24 cfs 0.037 af

**Pond 2A: Depression at SE Corner of Building** Peak Elev=74.00' Storage=1 cf Inflow=0.04 cfs 0.014 af  
Discarded=0.00 cfs 0.001 af Primary=0.04 cfs 0.013 af Outflow=0.04 cfs 0.014 af

**Pond 2B: Depression at SW Corner of** Peak Elev=75.75' Storage=2,926 cf Inflow=7.33 cfs 0.546 af  
Discarded=0.82 cfs 0.124 af Primary=3.22 cfs 0.422 af Outflow=4.04 cfs 0.546 af

**Pond 2C: Depression West of Building** Peak Elev=75.71' Storage=13 cf Inflow=0.12 cfs 0.017 af  
Discarded=0.07 cfs 0.012 af Primary=0.04 cfs 0.006 af Outflow=0.11 cfs 0.017 af

**Pond EDB: Existing Detention Basin** Peak Elev=72.51' Storage=51,486 cf Inflow=18.24 cfs 1.572 af  
Outflow=0.62 cfs 0.678 af

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*Type III 24-hr 2-yr Rainfall=3.40"*

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**Total Runoff Area = 18.611 ac   Runoff Volume = 1.853 af   Average Runoff Depth = 1.19"**  
**62.55% Pervious = 11.641 ac   37.45% Impervious = 6.970 ac**

**Summary for Subcatchment S-1: Tributary toward BVW**

Runoff = 0.11 cfs @ 13.78 hrs, Volume= 0.065 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
150,613	30	Woods, Good, HSG A
43,177	55	Woods, Good, HSG B
50,419	68	<50% Grass cover, Poor, HSG A
2,419	79	<50% Grass cover, Poor, HSG B
* 20,948	98	Existing Pavement
* 899	98	Existing Roof
* 1,574	98	Existing Concrete
* 1,421	77	Gravel & Rubble Stockpiles
271,470	48	Weighted Average
248,049		Pervious Area
23,421		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b> Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-1A: Tributary to Culvert at North Side of Building**

Runoff = 0.11 cfs @ 12.53 hrs, Volume= 0.033 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
43,289	30	Woods, Good, HSG A
32,140	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 11,009	77	Gravel & Rubble Stockpiles
88,339	51	Weighted Average
86,438		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
6.7	200	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
15.0	250	Total			

**Summary for Subcatchment S-1B: Tributary to Small Depression at NE Corner of Building**

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.009 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
3,457	68	<50% Grass cover, Poor, HSG A
* 656	98	Existing Concrete
4,113	73	Weighted Average
3,457		Pervious Area
656		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-1C: Tributary to Depression at NW corner of Building**

Runoff = 0.24 cfs @ 12.37 hrs, Volume= 0.037 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
17,356	45	Woods, Poor, HSG A
15,021	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 5,087	77	Gravel & Rubble Stockpiles
39,365	60	Weighted Average
37,464		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
3.3	100	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
19.1	150	Total			

**Summary for Subcatchment S-2: Tributary to Existing Drain Basin Resource Area**

Runoff = 15.35 cfs @ 12.09 hrs, Volume= 1.131 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
	33,511	68	<50% Grass cover, Poor, HSG A
	6,652	79	<50% Grass cover, Poor, HSG B
*	50,058	98	Existing Pavement
*	62,168	98	Existing Roof
*	11,517	98	Existing Concrete
*	60,155	98	Existing Basin @ Elev=71.7
	224,061	93	Weighted Average
	40,163		Pervious Area
	183,898		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

### Summary for Subcatchment S-2A: Tributary to Depression at SE Corner of Building

Runoff = 0.04 cfs @ 12.55 hrs, Volume= 0.014 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
20,814	30	Woods, Good, HSG A
22,187	68	<50% Grass cover, Poor, HSG A
43,001	50	Weighted Average
43,001		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		<b>Sheet Flow, AB</b>
					Grass: Dense n= 0.240 P2= 3.40"
1.3	80	0.0200	0.99		<b>Shallow Concentrated Flow, BC</b>
					Short Grass Pasture Kv= 7.0 fps
4.9	190	0.0170	0.65		<b>Shallow Concentrated Flow, CD</b>
					Woodland Kv= 5.0 fps
14.2	320	Total			

### Summary for Subcatchment S-2B: Tributary to Depression at SW Corner of Building

Runoff = 7.33 cfs @ 12.10 hrs, Volume= 0.546 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"



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Type III 24-hr 2-yr Rainfall=3.40"

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	Area (sf)	CN	Description
	25,300	68	<50% Grass cover, Poor, HSG A
*	1,222	98	Existing Concrete
*	90,220	98	Existing Roof
	116,742	91	Weighted Average
	25,300		Pervious Area
	91,442		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.40"
1.8	130	0.0280	1.17		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
6.8	180	Total			

**Summary for Subcatchment S-2C: Tributary to Depression West of Building**

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
	7,393	30	Woods, Good, HSG A
	15,827	68	<50% Grass cover, Poor, HSG A
*	384	98	Existing Roof
	23,604	57	Weighted Average
	23,220		Pervious Area
	384		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.611 ac, 37.45% Impervious, Inflow Depth &gt; 0.52" for 2-yr event

Inflow = 0.78 cfs @ 15.23 hrs, Volume= 0.809 af

Outflow = 0.78 cfs @ 15.23 hrs, Volume= 0.809 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond 1A: Storage Behind Culvert**

Inflow Area = 2.028 ac, 2.15% Impervious, Inflow Depth = 0.20" for 2-yr event

Inflow = 0.11 cfs @ 12.53 hrs, Volume= 0.033 af

Outflow = 0.11 cfs @ 12.53 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.3 min

Discarded = 0.01 cfs @ 12.53 hrs, Volume= 0.004 af

Primary = 0.10 cfs @ 12.53 hrs, Volume= 0.030 af

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Type III 24-hr 2-yr Rainfall=3.40"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.76' @ 12.53 hrs Surf.Area= 54 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.033 af (100% of inflow)

Center-of-Mass det. time= 0.1 min ( 987.6 - 987.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.70'	11,295 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.70	2	2.0	0	0	2
76.00	954	345.0	100	100	9,474
77.00	27,508	674.0	11,195	11,295	36,157

Device	Routing	Invert	Outlet Devices
#1	Primary	75.70'	<b>4.00' W x 2.00' H x 31.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.66' S= 0.0013 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.70'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 12.53 hrs HW=75.76' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.10 cfs @ 12.53 hrs HW=75.76' TW=75.63' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.10 cfs @ 0.56 fps)**Summary for Pond 1B: Small Depression at NE Corner of Building**

Inflow Area = 2.122 ac, 2.77% Impervious, Inflow Depth = 0.22" for 2-yr event  
 Inflow = 0.13 cfs @ 12.49 hrs, Volume= 0.039 af  
 Outflow = 0.13 cfs @ 12.49 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.1 min  
 Discarded = 0.00 cfs @ 12.49 hrs, Volume= 0.001 af  
 Primary = 0.13 cfs @ 12.49 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.63' @ 12.49 hrs Surf.Area= 15 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.039 af (100% of inflow)

Center-of-Mass det. time= 0.1 min ( 957.1 - 957.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.54'	457 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.54	2	2.0	0	0	2
76.00	193	85.0	33	33	577
77.00	709	107.0	424	457	927

Device	Routing	Invert	Outlet Devices
#1	Primary	75.54'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.53' S= 0.0002 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.54'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.00 cfs @ 12.49 hrs HW=75.63' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.13 cfs @ 12.49 hrs HW=75.63' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.13 cfs @ 0.47 fps)

### Summary for Pond 1C: Storage Behind Culvert

Inflow Area = 0.904 ac, 4.83% Impervious, Inflow Depth = 0.49" for 2-yr event  
 Inflow = 0.24 cfs @ 12.37 hrs, Volume= 0.037 af  
 Outflow = 0.24 cfs @ 12.39 hrs, Volume= 0.037 af, Atten= 0%, Lag= 1.2 min  
 Discarded = 0.06 cfs @ 12.39 hrs, Volume= 0.009 af  
 Primary = 0.18 cfs @ 12.39 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 77.67' @ 12.39 hrs Surf.Area= 310 sf Storage= 10 cf

Plug-Flow detention time= 0.4 min calculated for 0.037 af (100% of inflow)

Center-of-Mass det. time= 0.4 min ( 924.9 - 924.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	77.58'	4,907 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.58	2	2.0	0	0	2
78.00	5,752	313.0	821	821	7,798
78.50	10,860	398.0	4,086	4,907	12,611

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 77.54' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	77.58'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.39 hrs HW=77.67' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=0.18 cfs @ 12.39 hrs HW=77.67' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.18 cfs @ 0.65 fps)

**Summary for Pond 2A: Depression at SE Corner of Building**

Inflow Area = 0.987 ac, 0.00% Impervious, Inflow Depth = 0.17" for 2-yr event  
 Inflow = 0.04 cfs @ 12.55 hrs, Volume= 0.014 af  
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.00 cfs @ 12.55 hrs, Volume= 0.001 af  
 Primary = 0.04 cfs @ 12.55 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 74.00' @ 12.55 hrs Surf.Area= 13 sf Storage= 1 cf

Plug-Flow detention time= 0.3 min calculated for 0.014 af (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 998.3 - 998.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	73.90'	33,995 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.90	2	2.0	0	0	2
74.00	10	10.0	1	1	10
75.00	8,304	644.0	2,867	2,868	33,007
76.00	16,851	655.0	12,328	15,196	34,316
77.00	20,817	705.0	18,799	33,995	39,770

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	<b>12.0" x 44.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.55' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	73.91'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 3 sf

**Discarded OutFlow** Max=0.00 cfs @ 12.55 hrs HW=74.00' (Free Discharge)  
 ↳ **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.04 cfs @ 12.55 hrs HW=74.00' TW=72.34' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Barrel Controls 0.04 cfs @ 1.35 fps)

**Summary for Pond 2B: Depression at SW Corner of Building**

Inflow Area = 2.680 ac, 78.33% Impervious, Inflow Depth = 2.45" for 2-yr event  
 Inflow = 7.33 cfs @ 12.10 hrs, Volume= 0.546 af  
 Outflow = 4.04 cfs @ 12.23 hrs, Volume= 0.546 af, Atten= 45%, Lag= 8.1 min  
 Discarded = 0.82 cfs @ 12.23 hrs, Volume= 0.124 af  
 Primary = 3.22 cfs @ 12.23 hrs, Volume= 0.422 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 75.75' @ 12.23 hrs Surf.Area= 4,264 sf Storage= 2,926 cf

Plug-Flow detention time= 5.2 min calculated for 0.546 af (100% of inflow)  
 Center-of-Mass det. time= 5.2 min ( 806.2 - 801.0 )

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Type III 24-hr 2-yr Rainfall=3.40"

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Volume	Invert	Avail.Storage	Storage Description		
#1	74.35'	14,436 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.35	2	2.0	0	0	2
75.00	2,273	200.0	508	508	3,185
76.00	5,058	288.0	3,574	4,081	6,612
77.00	7,587	358.0	6,280	10,361	10,224
77.50	8,725	416.0	4,075	14,436	13,802

Device	Routing	Invert	Outlet Devices		
#1	Primary	74.35'	<b>12.0" x 45.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.99' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections		
#2	Discarded	74.35'	<b>8.270 in/hr Exfiltration over Surface area</b>		

**Discarded OutFlow** Max=0.82 cfs @ 12.23 hrs HW=75.75' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.82 cfs)**Primary OutFlow** Max=3.22 cfs @ 12.23 hrs HW=75.75' TW=72.21' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 3.22 cfs @ 4.10 fps)**Summary for Pond 2C: Depression West of Building**

Inflow Area = 0.542 ac, 1.63% Impervious, Inflow Depth = 0.38" for 2-yr event  
 Inflow = 0.12 cfs @ 12.14 hrs, Volume= 0.017 af  
 Outflow = 0.11 cfs @ 12.22 hrs, Volume= 0.017 af, Atten= 8%, Lag= 4.5 min  
 Discarded = 0.07 cfs @ 12.22 hrs, Volume= 0.012 af  
 Primary = 0.04 cfs @ 12.22 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.71' @ 12.22 hrs Surf.Area= 343 sf Storage= 13 cf

Plug-Flow detention time= 1.2 min calculated for 0.017 af (100% of inflow)

Center-of-Mass det. time= 1.2 min ( 930.9 - 929.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.60'	15,028 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.60	2	2.0	0	0	2
76.00	4,193	270.0	572	572	5,803
77.00	7,571	341.0	5,799	6,371	9,269
78.00	9,791	412.0	8,657	15,028	13,540

Device	Routing	Invert	Outlet Devices		
#1	Primary	75.60'	<b>12.0" x 37.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 75.30' S= 0.0081 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections		

#2 Discarded 75.60' **8.270 in/hr Exfiltration over Surface area****Discarded OutFlow** Max=0.07 cfs @ 12.22 hrs HW=75.71' (Free Discharge)└─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)**Primary OutFlow** Max=0.04 cfs @ 12.22 hrs HW=75.71' TW=72.20' (Dynamic Tailwater)└─**1=Culvert** (Barrel Controls 0.04 cfs @ 1.39 fps)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 9.353 ac, 67.68% Impervious, Inflow Depth = 2.02" for 2-yr event  
 Inflow = 18.24 cfs @ 12.09 hrs, Volume= 1.572 af  
 Outflow = 0.62 cfs @ 16.19 hrs, Volume= 0.678 af, Atten= 97%, Lag= 245.8 min  
 Primary = 0.62 cfs @ 16.19 hrs, Volume= 0.678 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 72.51' @ 16.19 hrs Surf.Area= 66,085 sf Storage= 51,486 cf

Plug-Flow detention time= 537.1 min calculated for 0.678 af (43% of inflow)  
 Center-of-Mass det. time= 415.0 min ( 1,211.5 - 796.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

Device	Routing	Invert	Outlet Devices			
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections			
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64			

**Primary OutFlow** Max=0.62 cfs @ 16.19 hrs HW=72.51' TW=0.00' (Dynamic Tailwater)└─**1=Culvert** (Barrel Controls 0.62 cfs @ 2.31 fps)└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment S-1: Tributary toward BVW** Runoff Area=271,470 sf 8.63% Impervious Runoff Depth=0.51"  
Flow Length=170' Tc=18.7 min CN=48 Runoff=1.43 cfs 0.267 af

**Subcatchment S-1A: Tributary to Culvert at** Runoff Area=88,339 sf 2.15% Impervious Runoff Depth=0.66"  
Flow Length=250' Tc=15.0 min CN=51 Runoff=0.75 cfs 0.112 af

**Subcatchment S-1B: Tributary to Small** Runoff Area=4,113 sf 15.95% Impervious Runoff Depth=2.12"  
Tc=6.0 min CN=73 Runoff=0.23 cfs 0.017 af

**Subcatchment S-1C: Tributary to** Runoff Area=39,365 sf 4.83% Impervious Runoff Depth=1.19"  
Flow Length=150' Slope=0.0100 '/' Tc=19.1 min CN=60 Runoff=0.75 cfs 0.089 af

**Subcatchment S-2: Tributary to Existing** Runoff Area=224,061 sf 82.07% Impervious Runoff Depth=4.00"  
Tc=6.0 min CN=93 Runoff=22.75 cfs 1.715 af

**Subcatchment S-2A: Tributary to** Runoff Area=43,001 sf 0.00% Impervious Runoff Depth=0.61"  
Flow Length=320' Tc=14.2 min CN=50 Runoff=0.32 cfs 0.050 af

**Subcatchment S-2B: Tributary to** Runoff Area=116,742 sf 78.33% Impervious Runoff Depth=3.79"  
Flow Length=180' Tc=6.8 min CN=91 Runoff=11.12 cfs 0.846 af

**Subcatchment S-2C: Tributary to** Runoff Area=23,604 sf 1.63% Impervious Runoff Depth=1.00"  
Tc=6.0 min CN=57 Runoff=0.52 cfs 0.045 af

**Reach SR: Site Runoff to BVW** Inflow=3.53 cfs 1.873 af  
Outflow=3.53 cfs 1.873 af

**Pond 1A: Storage Behind Culvert** Peak Elev=75.88' Storage=25 cf Inflow=0.75 cfs 0.112 af  
Discarded=0.07 cfs 0.011 af Primary=0.68 cfs 0.101 af Outflow=0.75 cfs 0.112 af

**Pond 1B: Small Depression at NE Corner of** Peak Elev=75.78' Storage=6 cf Inflow=0.78 cfs 0.118 af  
Discarded=0.01 cfs 0.003 af Primary=0.77 cfs 0.115 af Outflow=0.78 cfs 0.118 af

**Pond 1C: Storage Behind Culvert** Peak Elev=77.75' Storage=63 cf Inflow=0.75 cfs 0.089 af  
Discarded=0.20 cfs 0.023 af Primary=0.54 cfs 0.067 af Outflow=0.74 cfs 0.089 af

**Pond 2A: Depression at SE Corner of Building** Peak Elev=74.17' Storage=22 cf Inflow=0.32 cfs 0.050 af  
Discarded=0.06 cfs 0.005 af Primary=0.26 cfs 0.045 af Outflow=0.32 cfs 0.050 af

**Pond 2B: Depression at SW Corner of** Peak Elev=76.27' Storage=5,525 cf Inflow=11.12 cfs 0.846 af  
Discarded=1.09 cfs 0.190 af Primary=4.18 cfs 0.656 af Outflow=5.26 cfs 0.846 af

**Pond 2C: Depression West of Building** Peak Elev=75.82' Storage=97 cf Inflow=0.52 cfs 0.045 af  
Discarded=0.25 cfs 0.029 af Primary=0.17 cfs 0.017 af Outflow=0.42 cfs 0.045 af

**Pond EDB: Existing Detention Basin** Peak Elev=72.83' Storage=72,985 cf Inflow=26.40 cfs 2.433 af  
Outflow=1.50 cfs 1.424 af

**15500PRE**

*Type III 24-hr 10-yr Rainfall=4.80"*

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**Total Runoff Area = 18.611 ac   Runoff Volume = 3.142 af   Average Runoff Depth = 2.03"**  
**62.55% Pervious = 11.641 ac   37.45% Impervious = 6.970 ac**



**Summary for Subcatchment S-1: Tributary toward BVW**

Runoff = 1.43 cfs @ 12.45 hrs, Volume= 0.267 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
150,613	30	Woods, Good, HSG A
43,177	55	Woods, Good, HSG B
50,419	68	<50% Grass cover, Poor, HSG A
2,419	79	<50% Grass cover, Poor, HSG B
* 20,948	98	Existing Pavement
* 899	98	Existing Roof
* 1,574	98	Existing Concrete
* 1,421	77	Gravel & Rubble Stockpiles
271,470	48	Weighted Average
248,049		Pervious Area
23,421		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b> Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-1A: Tributary to Culvert at North Side of Building**

Runoff = 0.75 cfs @ 12.29 hrs, Volume= 0.112 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
43,289	30	Woods, Good, HSG A
32,140	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 11,009	77	Gravel & Rubble Stockpiles
88,339	51	Weighted Average
86,438		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
6.7	200	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
15.0	250	Total			

**Summary for Subcatchment S-1B: Tributary to Small Depression at NE Corner of Building**

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
3,457	68	<50% Grass cover, Poor, HSG A
* 656	98	Existing Concrete
4,113	73	Weighted Average
3,457		Pervious Area
656		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-1C: Tributary to Depression at NW corner of Building**

Runoff = 0.75 cfs @ 12.29 hrs, Volume= 0.089 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
17,356	45	Woods, Poor, HSG A
15,021	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 5,087	77	Gravel & Rubble Stockpiles
39,365	60	Weighted Average
37,464		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
3.3	100	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
19.1	150	Total			

**Summary for Subcatchment S-2: Tributary to Existing Drain Basin Resource Area**

Runoff = 22.75 cfs @ 12.08 hrs, Volume= 1.715 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
	33,511	68	<50% Grass cover, Poor, HSG A
	6,652	79	<50% Grass cover, Poor, HSG B
*	50,058	98	Existing Pavement
*	62,168	98	Existing Roof
*	11,517	98	Existing Concrete
*	60,155	98	Existing Basin @ Elev=71.7
	224,061	93	Weighted Average
	40,163		Pervious Area
	183,898		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

### Summary for Subcatchment S-2A: Tributary to Depression at SE Corner of Building

Runoff = 0.32 cfs @ 12.30 hrs, Volume= 0.050 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
20,814	30	Woods, Good, HSG A
22,187	68	<50% Grass cover, Poor, HSG A
43,001	50	Weighted Average
43,001		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		<b>Sheet Flow, AB</b> Grass: Dense n= 0.240 P2= 3.40"
1.3	80	0.0200	0.99		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
4.9	190	0.0170	0.65		<b>Shallow Concentrated Flow, CD</b> Woodland Kv= 5.0 fps
14.2	320	Total			

### Summary for Subcatchment S-2B: Tributary to Depression at SW Corner of Building

Runoff = 11.12 cfs @ 12.10 hrs, Volume= 0.846 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

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Type III 24-hr 10-yr Rainfall=4.80"

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	Area (sf)	CN	Description
	25,300	68	<50% Grass cover, Poor, HSG A
*	1,222	98	Existing Concrete
*	90,220	98	Existing Roof
	116,742	91	Weighted Average
	25,300		Pervious Area
	91,442		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.40"
1.8	130	0.0280	1.17		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
6.8	180	Total			

**Summary for Subcatchment S-2C: Tributary to Depression West of Building**

Runoff = 0.52 cfs @ 12.11 hrs, Volume= 0.045 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
	7,393	30	Woods, Good, HSG A
	15,827	68	<50% Grass cover, Poor, HSG A
*	384	98	Existing Roof
	23,604	57	Weighted Average
	23,220		Pervious Area
	384		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.611 ac, 37.45% Impervious, Inflow Depth > 1.21" for 10-yr event  
 Inflow = 3.53 cfs @ 12.45 hrs, Volume= 1.873 af  
 Outflow = 3.53 cfs @ 12.45 hrs, Volume= 1.873 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond 1A: Storage Behind Culvert**

Inflow Area = 2.028 ac, 2.15% Impervious, Inflow Depth = 0.66" for 10-yr event  
 Inflow = 0.75 cfs @ 12.29 hrs, Volume= 0.112 af  
 Outflow = 0.75 cfs @ 12.32 hrs, Volume= 0.112 af, Atten= 0%, Lag= 1.3 min  
 Discarded = 0.07 cfs @ 12.32 hrs, Volume= 0.011 af  
 Primary = 0.68 cfs @ 12.32 hrs, Volume= 0.101 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.88' @ 12.32 hrs Surf.Area= 384 sf Storage= 25 cf

Plug-Flow detention time= 0.3 min calculated for 0.112 af (100% of inflow)

Center-of-Mass det. time= 0.3 min ( 923.6 - 923.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.70'	11,295 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.70	2	2.0	0	0	2
76.00	954	345.0	100	100	9,474
77.00	27,508	674.0	11,195	11,295	36,157

Device	Routing	Invert	Outlet Devices
#1	Primary	75.70'	<b>4.00' W x 2.00' H x 31.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.66' S= 0.0013 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.70'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.07 cfs @ 12.32 hrs HW=75.88' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.07 cfs)**Primary OutFlow** Max=0.68 cfs @ 12.32 hrs HW=75.88' TW=75.78' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.68 cfs @ 1.22 fps)**Summary for Pond 1B: Small Depression at NE Corner of Building**

Inflow Area = 2.122 ac, 2.77% Impervious, Inflow Depth = 0.67" for 10-yr event  
 Inflow = 0.78 cfs @ 12.30 hrs, Volume= 0.118 af  
 Outflow = 0.78 cfs @ 12.30 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.2 min  
 Discarded = 0.01 cfs @ 12.30 hrs, Volume= 0.003 af  
 Primary = 0.77 cfs @ 12.30 hrs, Volume= 0.115 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.78' @ 12.30 hrs Surf.Area= 62 sf Storage= 6 cf

Plug-Flow detention time= 0.1 min calculated for 0.118 af (100% of inflow)

Center-of-Mass det. time= 0.1 min ( 911.7 - 911.6 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.54'	457 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.54	2	2.0	0	0	2
76.00	193	85.0	33	33	577
77.00	709	107.0	424	457	927

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Device	Routing	Invert	Outlet Devices
#1	Primary	75.54'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.53' S= 0.0002 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.54'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 12.30 hrs HW=75.78' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.77 cfs @ 12.30 hrs HW=75.78' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.77 cfs @ 1.08 fps)**Summary for Pond 1C: Storage Behind Culvert**

Inflow Area = 0.904 ac, 4.83% Impervious, Inflow Depth = 1.19" for 10-yr event  
 Inflow = 0.75 cfs @ 12.29 hrs, Volume= 0.089 af  
 Outflow = 0.74 cfs @ 12.34 hrs, Volume= 0.089 af, Atten= 2%, Lag= 2.8 min  
 Discarded = 0.20 cfs @ 12.34 hrs, Volume= 0.023 af  
 Primary = 0.54 cfs @ 12.34 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 77.75' @ 12.34 hrs Surf.Area= 1,044 sf Storage= 63 cf

Plug-Flow detention time= 0.7 min calculated for 0.089 af (100% of inflow)

Center-of-Mass det. time= 0.7 min ( 891.4 - 890.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	77.58'	4,907 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.58	2	2.0	0	0	2
78.00	5,752	313.0	821	821	7,798
78.50	10,860	398.0	4,086	4,907	12,611

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 77.54' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	77.58'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.20 cfs @ 12.34 hrs HW=77.75' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.20 cfs)**Primary OutFlow** Max=0.54 cfs @ 12.34 hrs HW=77.75' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.54 cfs @ 1.03 fps)

**Summary for Pond 2A: Depression at SE Corner of Building**

Inflow Area = 0.987 ac, 0.00% Impervious, Inflow Depth = 0.61" for 10-yr event  
 Inflow = 0.32 cfs @ 12.30 hrs, Volume= 0.050 af  
 Outflow = 0.32 cfs @ 12.35 hrs, Volume= 0.050 af, Atten= 1%, Lag= 3.2 min  
 Discarded = 0.06 cfs @ 12.35 hrs, Volume= 0.005 af  
 Primary = 0.26 cfs @ 12.35 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 74.17' @ 12.35 hrs Surf.Area= 322 sf Storage= 22 cf

Plug-Flow detention time= 0.5 min calculated for 0.050 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 928.5 - 928.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	73.90'	33,995 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.90	2	2.0	0	0	2
74.00	10	10.0	1	1	10
75.00	8,304	644.0	2,867	2,868	33,007
76.00	16,851	655.0	12,328	15,196	34,316
77.00	20,817	705.0	18,799	33,995	39,770

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	<b>12.0" x 44.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.55' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	73.91'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 3 sf

**Discarded OutFlow** Max=0.06 cfs @ 12.35 hrs HW=74.17' (Free Discharge)  
 ↳ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=0.26 cfs @ 12.35 hrs HW=74.17' TW=72.57' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Barrel Controls 0.26 cfs @ 2.29 fps)

**Summary for Pond 2B: Depression at SW Corner of Building**

Inflow Area = 2.680 ac, 78.33% Impervious, Inflow Depth = 3.79" for 10-yr event  
 Inflow = 11.12 cfs @ 12.10 hrs, Volume= 0.846 af  
 Outflow = 5.26 cfs @ 12.27 hrs, Volume= 0.846 af, Atten= 53%, Lag= 10.5 min  
 Discarded = 1.09 cfs @ 12.27 hrs, Volume= 0.190 af  
 Primary = 4.18 cfs @ 12.27 hrs, Volume= 0.656 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 76.27' @ 12.27 hrs Surf.Area= 5,688 sf Storage= 5,525 cf

Plug-Flow detention time= 7.4 min calculated for 0.846 af (100% of inflow)  
 Center-of-Mass det. time= 7.4 min ( 796.3 - 788.9 )

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Volume	Invert	Avail.Storage	Storage Description
#1	74.35'	14,436 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.35	2	2.0	0	0	2
75.00	2,273	200.0	508	508	3,185
76.00	5,058	288.0	3,574	4,081	6,612
77.00	7,587	358.0	6,280	10,361	10,224
77.50	8,725	416.0	4,075	14,436	13,802

Device	Routing	Invert	Outlet Devices
#1	Primary	74.35'	<b>12.0" x 45.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.99' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	74.35'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=1.09 cfs @ 12.27 hrs HW=76.27' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 1.09 cfs)**Primary OutFlow** Max=4.18 cfs @ 12.27 hrs HW=76.27' TW=72.52' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 4.18 cfs @ 5.32 fps)**Summary for Pond 2C: Depression West of Building**

Inflow Area = 0.542 ac, 1.63% Impervious, Inflow Depth = 1.00" for 10-yr event  
 Inflow = 0.52 cfs @ 12.11 hrs, Volume= 0.045 af  
 Outflow = 0.42 cfs @ 12.17 hrs, Volume= 0.045 af, Atten= 20%, Lag= 4.0 min  
 Discarded = 0.25 cfs @ 12.17 hrs, Volume= 0.029 af  
 Primary = 0.17 cfs @ 12.17 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.82' @ 12.17 hrs Surf.Area= 1,286 sf Storage= 97 cf

Plug-Flow detention time= 2.1 min calculated for 0.045 af (100% of inflow)

Center-of-Mass det. time= 2.1 min ( 891.0 - 888.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	75.60'	15,028 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.60	2	2.0	0	0	2
76.00	4,193	270.0	572	572	5,803
77.00	7,571	341.0	5,799	6,371	9,269
78.00	9,791	412.0	8,657	15,028	13,540

Device	Routing	Invert	Outlet Devices
#1	Primary	75.60'	<b>12.0" x 37.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 75.30' S= 0.0081 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections



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#2 Discarded 75.60' **8.270 in/hr Exfiltration over Surface area****Discarded OutFlow** Max=0.25 cfs @ 12.17 hrs HW=75.82' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.25 cfs)**Primary OutFlow** Max=0.17 cfs @ 12.17 hrs HW=75.82' TW=72.43' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.17 cfs @ 2.05 fps)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 9.353 ac, 67.68% Impervious, Inflow Depth = 3.12" for 10-yr event  
 Inflow = 26.40 cfs @ 12.09 hrs, Volume= 2.433 af  
 Outflow = 1.50 cfs @ 14.71 hrs, Volume= 1.424 af, Atten= 94%, Lag= 157.1 min  
 Primary = 1.50 cfs @ 14.71 hrs, Volume= 1.424 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 72.83' @ 14.71 hrs Surf.Area= 67,727 sf Storage= 72,985 cf

Plug-Flow detention time= 474.8 min calculated for 1.424 af (59% of inflow)  
 Center-of-Mass det. time= 368.4 min ( 1,155.7 - 787.3 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

Device	Routing	Invert	Outlet Devices						
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections						
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64						

**Primary OutFlow** Max=1.50 cfs @ 14.71 hrs HW=72.83' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.50 cfs @ 2.96 fps)↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment S-1: Tributary toward BVW** Runoff Area=271,470 sf 8.63% Impervious Runoff Depth=1.49"  
Flow Length=170' Tc=18.7 min CN=48 Runoff=6.22 cfs 0.774 af

**Subcatchment S-1A: Tributary to Culvert at** Runoff Area=88,339 sf 2.15% Impervious Runoff Depth=1.76"  
Flow Length=250' Tc=15.0 min CN=51 Runoff=2.76 cfs 0.297 af

**Subcatchment S-1B: Tributary to Small** Runoff Area=4,113 sf 15.95% Impervious Runoff Depth=3.94"  
Tc=6.0 min CN=73 Runoff=0.44 cfs 0.031 af

**Subcatchment S-1C: Tributary to** Runoff Area=39,365 sf 4.83% Impervious Runoff Depth=2.60"  
Flow Length=150' Slope=0.0100 '/' Tc=19.1 min CN=60 Runoff=1.83 cfs 0.196 af

**Subcatchment S-2: Tributary to Existing** Runoff Area=224,061 sf 82.07% Impervious Runoff Depth=6.17"  
Tc=6.0 min CN=93 Runoff=34.22 cfs 2.645 af

**Subcatchment S-2A: Tributary to** Runoff Area=43,001 sf 0.00% Impervious Runoff Depth=1.67"  
Flow Length=320' Tc=14.2 min CN=50 Runoff=1.28 cfs 0.137 af

**Subcatchment S-2B: Tributary to** Runoff Area=116,742 sf 78.33% Impervious Runoff Depth=5.94"  
Flow Length=180' Tc=6.8 min CN=91 Runoff=16.99 cfs 1.326 af

**Subcatchment S-2C: Tributary to** Runoff Area=23,604 sf 1.63% Impervious Runoff Depth=2.31"  
Tc=6.0 min CN=57 Runoff=1.40 cfs 0.104 af

**Reach SR: Site Runoff to BVW** Inflow=11.86 cfs 3.896 af  
Outflow=11.86 cfs 3.896 af

**Pond 1A: Storage Behind Culvert** Peak Elev=76.11' Storage=267 cf Inflow=2.76 cfs 0.297 af  
Discarded=0.40 cfs 0.032 af Primary=2.24 cfs 0.265 af Outflow=2.65 cfs 0.297 af

**Pond 1B: Small Depression at NE Corner of** Peak Elev=75.99' Storage=32 cf Inflow=2.44 cfs 0.296 af  
Discarded=0.04 cfs 0.005 af Primary=2.41 cfs 0.290 af Outflow=2.44 cfs 0.296 af

**Pond 1C: Storage Behind Culvert** Peak Elev=77.86' Storage=258 cf Inflow=1.83 cfs 0.196 af  
Discarded=0.51 cfs 0.052 af Primary=1.23 cfs 0.144 af Outflow=1.74 cfs 0.196 af

**Pond 2A: Depression at SE Corner of Building** Peak Elev=74.41' Storage=230 cf Inflow=1.28 cfs 0.137 af  
Discarded=0.29 cfs 0.023 af Primary=0.85 cfs 0.114 af Outflow=1.14 cfs 0.137 af

**Pond 2B: Depression at SW Corner of** Peak Elev=77.02' Storage=10,484 cf Inflow=16.99 cfs 1.326 af  
Discarded=1.46 cfs 0.298 af Primary=5.26 cfs 1.029 af Outflow=6.72 cfs 1.326 af

**Pond 2C: Depression West of Building** Peak Elev=75.94' Storage=361 cf Inflow=1.40 cfs 0.104 af  
Discarded=0.59 cfs 0.064 af Primary=0.41 cfs 0.041 af Outflow=1.00 cfs 0.104 af

**Pond EDB: Existing Detention Basin** Peak Elev=73.35' Storage=108,750 cf Inflow=39.33 cfs 3.829 af  
Outflow=3.46 cfs 2.686 af

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*Type III 24-hr 100-yr Rainfall=7.00"*

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**Total Runoff Area = 18.611 ac   Runoff Volume = 5.511 af   Average Runoff Depth = 3.55"**  
**62.55% Pervious = 11.641 ac   37.45% Impervious = 6.970 ac**

**Summary for Subcatchment S-1: Tributary toward BVW**

Runoff = 6.22 cfs @ 12.31 hrs, Volume= 0.774 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
150,613	30	Woods, Good, HSG A
43,177	55	Woods, Good, HSG B
50,419	68	<50% Grass cover, Poor, HSG A
2,419	79	<50% Grass cover, Poor, HSG B
* 20,948	98	Existing Pavement
* 899	98	Existing Roof
* 1,574	98	Existing Concrete
* 1,421	77	Gravel & Rubble Stockpiles
271,470	48	Weighted Average
248,049		Pervious Area
23,421		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b> Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-1A: Tributary to Culvert at North Side of Building**

Runoff = 2.76 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
43,289	30	Woods, Good, HSG A
32,140	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 11,009	77	Gravel & Rubble Stockpiles
88,339	51	Weighted Average
86,438		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
6.7	200	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
15.0	250	Total			

**Summary for Subcatchment S-1B: Tributary to Small Depression at NE Corner of Building**

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
3,457	68	<50% Grass cover, Poor, HSG A
* 656	98	Existing Concrete
4,113	73	Weighted Average
3,457		Pervious Area
656		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-1C: Tributary to Depression at NW corner of Building**

Runoff = 1.83 cfs @ 12.28 hrs, Volume= 0.196 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
17,356	45	Woods, Poor, HSG A
15,021	68	<50% Grass cover, Poor, HSG A
* 1,901	98	Existing Roof
* 5,087	77	Gravel & Rubble Stockpiles
39,365	60	Weighted Average
37,464		Pervious Area
1,901		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		<b>Sheet Flow, AB</b> Woods: Light underbrush n= 0.400 P2= 3.40"
3.3	100	0.0100	0.50		<b>Shallow Concentrated Flow, BC</b> Woodland Kv= 5.0 fps
19.1	150	Total			

**Summary for Subcatchment S-2: Tributary to Existing Drain Basin Resource Area**

Runoff = 34.22 cfs @ 12.08 hrs, Volume= 2.645 af, Depth= 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
	33,511	68	<50% Grass cover, Poor, HSG A
	6,652	79	<50% Grass cover, Poor, HSG B
*	50,058	98	Existing Pavement
*	62,168	98	Existing Roof
*	11,517	98	Existing Concrete
*	60,155	98	Existing Basin @ Elev=71.7
	224,061	93	Weighted Average
	40,163		Pervious Area
	183,898		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

### Summary for Subcatchment S-2A: Tributary to Depression at SE Corner of Building

Runoff = 1.28 cfs @ 12.22 hrs, Volume= 0.137 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
20,814	30	Woods, Good, HSG A
22,187	68	<50% Grass cover, Poor, HSG A
43,001	50	Weighted Average
43,001		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		<b>Sheet Flow, AB</b> Grass: Dense n= 0.240 P2= 3.40"
1.3	80	0.0200	0.99		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
4.9	190	0.0170	0.65		<b>Shallow Concentrated Flow, CD</b> Woodland Kv= 5.0 fps
14.2	320	Total			

### Summary for Subcatchment S-2B: Tributary to Depression at SW Corner of Building

Runoff = 16.99 cfs @ 12.09 hrs, Volume= 1.326 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

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Type III 24-hr 100-yr Rainfall=7.00"

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	Area (sf)	CN	Description
	25,300	68	<50% Grass cover, Poor, HSG A
*	1,222	98	Existing Concrete
*	90,220	98	Existing Roof
	116,742	91	Weighted Average
	25,300		Pervious Area
	91,442		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.40"
1.8	130	0.0280	1.17		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
6.8	180	Total			

**Summary for Subcatchment S-2C: Tributary to Depression West of Building**

Runoff = 1.40 cfs @ 12.10 hrs, Volume= 0.104 af, Depth= 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
	7,393	30	Woods, Good, HSG A
	15,827	68	<50% Grass cover, Poor, HSG A
*	384	98	Existing Roof
	23,604	57	Weighted Average
	23,220		Pervious Area
	384		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.611 ac, 37.45% Impervious, Inflow Depth &gt; 2.51" for 100-yr event

Inflow = 11.86 cfs @ 12.32 hrs, Volume= 3.896 af

Outflow = 11.86 cfs @ 12.32 hrs, Volume= 3.896 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond 1A: Storage Behind Culvert**

Inflow Area = 2.028 ac, 2.15% Impervious, Inflow Depth = 1.76" for 100-yr event

Inflow = 2.76 cfs @ 12.23 hrs, Volume= 0.297 af

Outflow = 2.65 cfs @ 12.28 hrs, Volume= 0.297 af, Atten= 4%, Lag= 3.2 min

Discarded = 0.40 cfs @ 12.28 hrs, Volume= 0.032 af

Primary = 2.24 cfs @ 12.28 hrs, Volume= 0.265 af

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Type III 24-hr 100-yr Rainfall=7.00"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 76.11' @ 12.28 hrs Surf.Area= 2,112 sf Storage= 267 cf

Plug-Flow detention time= 0.7 min calculated for 0.297 af (100% of inflow)

Center-of-Mass det. time= 0.7 min ( 886.6 - 886.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.70'	11,295 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.70	2	2.0	0	0	2
76.00	954	345.0	100	100	9,474
77.00	27,508	674.0	11,195	11,295	36,157

Device	Routing	Invert	Outlet Devices
#1	Primary	75.70'	<b>4.00' W x 2.00' H x 31.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.66' S= 0.0013 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.70'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.40 cfs @ 12.28 hrs HW=76.11' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.40 cfs)**Primary OutFlow** Max=2.24 cfs @ 12.28 hrs HW=76.11' TW=75.99' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 2.24 cfs @ 1.82 fps)**Summary for Pond 1B: Small Depression at NE Corner of Building**

Inflow Area = 2.122 ac, 2.77% Impervious, Inflow Depth = 1.67" for 100-yr event  
 Inflow = 2.44 cfs @ 12.27 hrs, Volume= 0.296 af  
 Outflow = 2.44 cfs @ 12.28 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.04 cfs @ 12.28 hrs, Volume= 0.005 af  
 Primary = 2.41 cfs @ 12.28 hrs, Volume= 0.290 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.99' @ 12.28 hrs Surf.Area= 189 sf Storage= 32 cf

Plug-Flow detention time= 0.1 min calculated for 0.296 af (100% of inflow)

Center-of-Mass det. time= 0.1 min ( 882.4 - 882.3 )

Volume	Invert	Avail.Storage	Storage Description		
#1	75.54'	457 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.54	2	2.0	0	0	2
76.00	193	85.0	33	33	577
77.00	709	107.0	424	457	927



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Device	Routing	Invert	Outlet Devices
#1	Primary	75.54'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 75.53' S= 0.0002 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	75.54'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.28 hrs HW=75.99' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=2.41 cfs @ 12.28 hrs HW=75.99' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 2.41 cfs @ 1.77 fps)**Summary for Pond 1C: Storage Behind Culvert**

Inflow Area = 0.904 ac, 4.83% Impervious, Inflow Depth = 2.60" for 100-yr event  
 Inflow = 1.83 cfs @ 12.28 hrs, Volume= 0.196 af  
 Outflow = 1.74 cfs @ 12.34 hrs, Volume= 0.196 af, Atten= 5%, Lag= 3.7 min  
 Discarded = 0.51 cfs @ 12.34 hrs, Volume= 0.052 af  
 Primary = 1.23 cfs @ 12.34 hrs, Volume= 0.144 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 77.86' @ 12.34 hrs Surf.Area= 2,662 sf Storage= 258 cf

Plug-Flow detention time= 1.2 min calculated for 0.196 af (100% of inflow)

Center-of-Mass det. time= 1.2 min ( 866.9 - 865.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	77.58'	4,907 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.58	2	2.0	0	0	2
78.00	5,752	313.0	821	821	7,798
78.50	10,860	398.0	4,086	4,907	12,611

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	<b>4.00' W x 2.00' H x 45.0' long Culvert</b> Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 77.54' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	77.58'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.51 cfs @ 12.34 hrs HW=77.86' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.51 cfs)**Primary OutFlow** Max=1.23 cfs @ 12.34 hrs HW=77.86' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.23 cfs @ 1.45 fps)

**Summary for Pond 2A: Depression at SE Corner of Building**

Inflow Area = 0.987 ac, 0.00% Impervious, Inflow Depth = 1.67" for 100-yr event  
 Inflow = 1.28 cfs @ 12.22 hrs, Volume= 0.137 af  
 Outflow = 1.14 cfs @ 12.31 hrs, Volume= 0.137 af, Atten= 11%, Lag= 5.2 min  
 Discarded = 0.29 cfs @ 12.31 hrs, Volume= 0.023 af  
 Primary = 0.85 cfs @ 12.31 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 74.41' @ 12.31 hrs Surf.Area= 1,543 sf Storage= 230 cf

Plug-Flow detention time= 1.4 min calculated for 0.137 af (100% of inflow)  
 Center-of-Mass det. time= 1.4 min ( 889.7 - 888.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	73.90'	33,995 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.90	2	2.0	0	0	2
74.00	10	10.0	1	1	10
75.00	8,304	644.0	2,867	2,868	33,007
76.00	16,851	655.0	12,328	15,196	34,316
77.00	20,817	705.0	18,799	33,995	39,770

Device	Routing	Invert	Outlet Devices		
#1	Primary	73.90'	<b>12.0" x 44.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.55' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections		
#2	Discarded	73.91'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 3 sf		

**Discarded OutFlow** Max=0.29 cfs @ 12.31 hrs HW=74.41' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.29 cfs)

**Primary OutFlow** Max=0.85 cfs @ 12.31 hrs HW=74.41' TW=73.00' (Dynamic Tailwater)  
 ↑**1=Culvert** (Barrel Controls 0.85 cfs @ 3.07 fps)

**Summary for Pond 2B: Depression at SW Corner of Building**

Inflow Area = 2.680 ac, 78.33% Impervious, Inflow Depth = 5.94" for 100-yr event  
 Inflow = 16.99 cfs @ 12.09 hrs, Volume= 1.326 af  
 Outflow = 6.72 cfs @ 12.33 hrs, Volume= 1.326 af, Atten= 60%, Lag= 14.1 min  
 Discarded = 1.46 cfs @ 12.33 hrs, Volume= 0.298 af  
 Primary = 5.26 cfs @ 12.33 hrs, Volume= 1.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 77.02' @ 12.33 hrs Surf.Area= 7,622 sf Storage= 10,484 cf

Plug-Flow detention time= 10.7 min calculated for 1.326 af (100% of inflow)  
 Center-of-Mass det. time= 10.7 min ( 787.9 - 777.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	74.35'	14,436 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.35	2	2.0	0	0	2
75.00	2,273	200.0	508	508	3,185
76.00	5,058	288.0	3,574	4,081	6,612
77.00	7,587	358.0	6,280	10,361	10,224
77.50	8,725	416.0	4,075	14,436	13,802

Device	Routing	Invert	Outlet Devices
#1	Primary	74.35'	<b>12.0" x 45.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 73.99' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Discarded	74.35'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=1.46 cfs @ 12.33 hrs HW=77.02' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 1.46 cfs)**Primary OutFlow** Max=5.26 cfs @ 12.33 hrs HW=77.02' TW=73.01' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 5.26 cfs @ 6.69 fps)**Summary for Pond 2C: Depression West of Building**

Inflow Area = 0.542 ac, 1.63% Impervious, Inflow Depth = 2.31" for 100-yr event  
 Inflow = 1.40 cfs @ 12.10 hrs, Volume= 0.104 af  
 Outflow = 1.00 cfs @ 12.18 hrs, Volume= 0.104 af, Atten= 29%, Lag= 5.0 min  
 Discarded = 0.59 cfs @ 12.18 hrs, Volume= 0.064 af  
 Primary = 0.41 cfs @ 12.18 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.94' @ 12.18 hrs Surf.Area= 3,085 sf Storage= 361 cf

Plug-Flow detention time= 3.2 min calculated for 0.104 af (100% of inflow)

Center-of-Mass det. time= 3.2 min ( 864.1 - 860.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	75.60'	15,028 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.60	2	2.0	0	0	2
76.00	4,193	270.0	572	572	5,803
77.00	7,571	341.0	5,799	6,371	9,269
78.00	9,791	412.0	8,657	15,028	13,540

Device	Routing	Invert	Outlet Devices
#1	Primary	75.60'	<b>12.0" x 37.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 75.30' S= 0.0081 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

#2 Discarded 75.60' **8.270 in/hr Exfiltration over Surface area****Discarded OutFlow** Max=0.59 cfs @ 12.18 hrs HW=75.94' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.59 cfs)**Primary OutFlow** Max=0.41 cfs @ 12.18 hrs HW=75.94' TW=72.85' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.41 cfs @ 2.56 fps)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 9.353 ac, 67.68% Impervious, Inflow Depth = 4.91" for 100-yr event  
 Inflow = 39.33 cfs @ 12.09 hrs, Volume= 3.829 af  
 Outflow = 3.46 cfs @ 13.59 hrs, Volume= 2.686 af, Atten= 91%, Lag= 90.2 min  
 Primary = 3.46 cfs @ 13.59 hrs, Volume= 2.686 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 73.35' @ 13.59 hrs Surf.Area= 70,402 sf Storage= 108,750 cf

Plug-Flow detention time= 433.5 min calculated for 2.686 af (70% of inflow)  
 Center-of-Mass det. time= 341.1 min ( 1,119.8 - 778.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

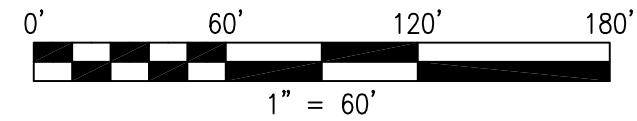
Device	Routing	Invert	Outlet Devices
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=3.46 cfs @ 13.59 hrs HW=73.35' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 2.94 cfs @ 3.75 fps)↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.51 cfs @ 0.54 fps)





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#### REVISIONS

NO.	DESCRIPTION	DATE



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NEW BEDFORD, MA 02740  
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OFFICES IN:

- TAUNTON
- MARLBOROUGH
- WARWICK, RI

DRAWN BY: JKM/MJW

DESIGNED BY: CAF

CHECKED BY: CAF

#### SITE PLAN

50 DUCHAINE BLVD

ASSESSORS MAP 134 LOTS 456, 457, 458 & 459  
NEW BEDFORD, MASSACHUSETTS

PREPARED FOR:  
EVERSOURCE ENERGY  
PO BOX 100085 - N2  
DULUTH, GA 30096

NOVEMBER 18, 2016

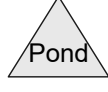
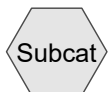
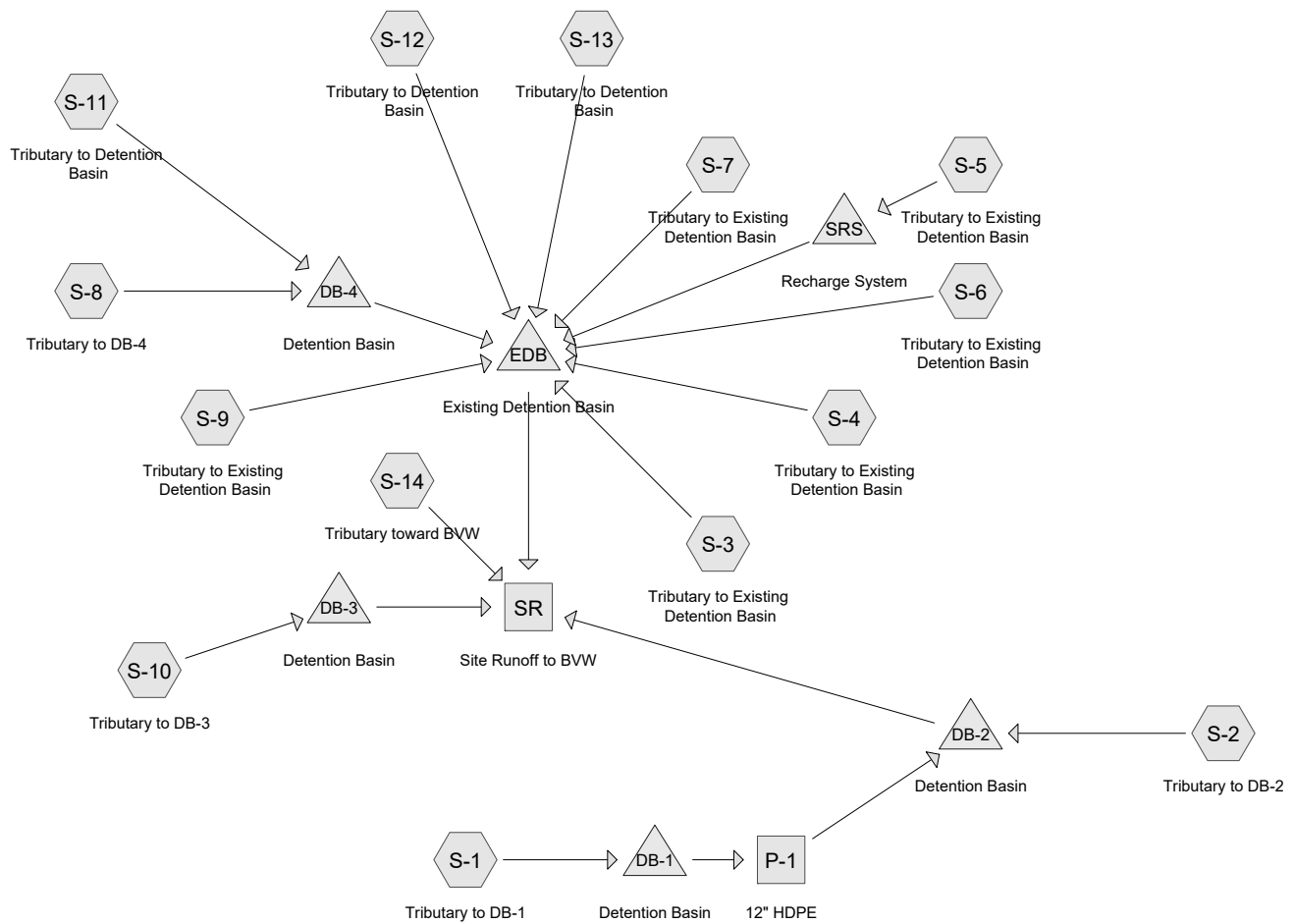
SCALE: 1"=60'

JOB NO. 15-500

LATEST REVISION:

PRE-DEVELOPMENT  
DRAINAGE MAP  
SHEET 3a OF 9





### Drainage Diagram for 15500POST

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**15500POST***Type III 24-hr 2-yr Rainfall=3.40"*

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Page 2

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment S-1: Tributary to DB-1</b>	Runoff Area=84,300 sf 93.30% Impervious Runoff Depth=2.74" Tc=6.0 min CN=94 Runoff=5.93 cfs 0.442 af
<b>Subcatchment S-10: Tributary to DB-3</b>	Runoff Area=58,595 sf 88.26% Impervious Runoff Depth=2.45" Flow Length=280' Tc=16.0 min CN=91 Runoff=2.81 cfs 0.274 af
<b>Subcatchment S-11: Tributary to</b>	Runoff Area=57,081 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=4.33 cfs 0.346 af
<b>Subcatchment S-12: Tributary to</b>	Runoff Area=73,476 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=5.58 cfs 0.445 af
<b>Subcatchment S-13: Tributary to</b>	Runoff Area=60,155 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=4.56 cfs 0.364 af
<b>Subcatchment S-14: Tributary toward BVW</b>	Runoff Area=220,681 sf 0.00% Impervious Runoff Depth=0.05" Flow Length=170' Tc=18.7 min CN=44 Runoff=0.04 cfs 0.023 af
<b>Subcatchment S-2: Tributary to DB-2</b>	Runoff Area=66,800 sf 96.22% Impervious Runoff Depth=2.95" Tc=6.0 min CN=96 Runoff=4.91 cfs 0.377 af
<b>Subcatchment S-3: Tributary to Existing</b>	Runoff Area=55,950 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=4.25 cfs 0.339 af
<b>Subcatchment S-4: Tributary to Existing</b>	Runoff Area=5,350 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=0.41 cfs 0.032 af
<b>Subcatchment S-5: Tributary to Existing</b>	Runoff Area=27,864 sf 85.14% Impervious Runoff Depth=2.26" Tc=6.0 min CN=89 Runoff=1.68 cfs 0.121 af
<b>Subcatchment S-6: Tributary to Existing</b>	Runoff Area=36,210 sf 88.57% Impervious Runoff Depth=2.45" Tc=6.0 min CN=91 Runoff=2.34 cfs 0.169 af
<b>Subcatchment S-7: Tributary to Existing</b>	Runoff Area=15,207 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=1.15 cfs 0.092 af
<b>Subcatchment S-8: Tributary to DB-4</b>	Runoff Area=39,865 sf 79.33% Impervious Runoff Depth=2.01" Tc=6.0 min CN=86 Runoff=2.16 cfs 0.153 af
<b>Subcatchment S-9: Tributary to Existing</b>	Runoff Area=13,301 sf 100.00% Impervious Runoff Depth=3.17" Tc=6.0 min CN=98 Runoff=1.01 cfs 0.081 af
<b>Reach P-1: 12" HDPE</b>	Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af D=12.0" n=0.013 L=70.0' S=0.0050 ' /' Capacity=2.52 cfs Outflow=0.00 cfs 0.000 af
<b>Reach SR: Site Runoff to BVW</b>	Inflow=0.63 cfs 0.669 af Outflow=0.63 cfs 0.669 af

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**Pond DB-1: Detention Basin** Peak Elev=77.23' Storage=12,324 cf Inflow=5.93 cfs 0.442 af  
Discarded=0.28 cfs 0.330 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.330 af

**Pond DB-2: Detention Basin** Peak Elev=76.48' Storage=11,108 cf Inflow=4.91 cfs 0.377 af  
Discarded=0.20 cfs 0.251 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.251 af

**Pond DB-3: Detention Basin** Peak Elev=77.59' Storage=5,928 cf Inflow=2.81 cfs 0.274 af  
Discarded=0.48 cfs 0.265 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.265 af

**Pond DB-4: Detention Basin** Peak Elev=77.95' Storage=13,935 cf Inflow=6.48 cfs 0.499 af  
Discarded=0.44 cfs 0.345 af Primary=0.00 cfs 0.000 af Outflow=0.44 cfs 0.345 af

**Pond EDB: Existing Detention Basin** Peak Elev=72.50' Storage=50,780 cf Inflow=19.29 cfs 1.523 af  
Outflow=0.59 cfs 0.647 af

**Pond SRS: Recharge System** Peak Elev=75.03' Storage=1,203 cf Inflow=1.68 cfs 0.121 af  
Discarded=0.37 cfs 0.121 af Primary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.121 af

**Total Runoff Area = 18.706 ac Runoff Volume = 3.258 af Average Runoff Depth = 2.09"**  
**30.96% Pervious = 5.791 ac 69.04% Impervious = 12.915 ac**



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Type III 24-hr 2-yr Rainfall=3.40"

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**Summary for Subcatchment S-1: Tributary to DB-1**

Runoff = 5.93 cfs @ 12.08 hrs, Volume= 0.442 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
5,650	39	>75% Grass cover, Good, HSG A
65,796	98	Paved parking & roofs
* 12,854	98	Basin
84,300	94	Weighted Average
5,650		Pervious Area
78,650		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-10: Tributary to DB-3**

Runoff = 2.81 cfs @ 12.21 hrs, Volume= 0.274 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
* 8,197	98	Detention Basin
6,877	39	>75% Grass cover, Good, HSG A
* 43,521	98	Proposed Pavement
58,595	91	Weighted Average
6,877		Pervious Area
51,718		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0050	0.06		<b>Sheet Flow, AB</b> Grass: Dense n= 0.240 P2= 3.40"
0.2	15	0.0050	1.06		<b>Shallow Concentrated Flow, BC</b> Grassed Waterway Kv= 15.0 fps
2.0	215	0.0080	1.82		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
16.0	280	Total			

**Summary for Subcatchment S-11: Tributary to Detention Basin**

Runoff = 4.33 cfs @ 12.08 hrs, Volume= 0.346 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

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Type III 24-hr 2-yr Rainfall=3.40"

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	Area (sf)	CN	Description
*	57,081	98	Rooftop
	57,081		Impervious Area

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

**Summary for Subcatchment S-12: Tributary to Detention Basin**

Runoff = 5.58 cfs @ 12.08 hrs, Volume= 0.445 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	73,476	98	Rooftop
	73,476		Impervious Area

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

**Summary for Subcatchment S-13: Tributary to Detention Basin**

Runoff = 4.56 cfs @ 12.08 hrs, Volume= 0.364 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	60,155	98	Detention Basin
	60,155		Impervious Area

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

**Summary for Subcatchment S-14: Tributary toward BVW**

Runoff = 0.04 cfs @ 15.40 hrs, Volume= 0.023 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

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Type III 24-hr 2-yr Rainfall=3.40"

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Area (sf)	CN	Description
122,975	30	Woods, Good, HSG A
49,988	55	Woods, Good, HSG B
47,718	68	<50% Grass cover, Poor, HSG A
220,681	44	Weighted Average
220,681		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b>
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b>
					Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-2: Tributary to DB-2**

Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.377 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
2,522	39	>75% Grass cover, Good, HSG A
35,232	98	Paved parking & roofs
* 29,046	98	Pond
66,800	96	Weighted Average
2,522		Pervious Area
64,278		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-3: Tributary to Existing Detention Basin**

Runoff = 4.25 cfs @ 12.08 hrs, Volume= 0.339 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
55,950	98	Paved parking
55,950		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-4: Tributary to Existing Detention Basin**

Runoff = 0.41 cfs @ 12.08 hrs, Volume= 0.032 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
5,350	98	Paved parking
5,350		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-5: Tributary to Existing Detention Basin**

Runoff = 1.68 cfs @ 12.09 hrs, Volume= 0.121 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
23,724	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
27,864	89	Weighted Average
4,140		Pervious Area
23,724		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-6: Tributary to Existing Detention Basin**

Runoff = 2.34 cfs @ 12.09 hrs, Volume= 0.169 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
32,070	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
36,210	91	Weighted Average
4,140		Pervious Area
32,070		Impervious Area

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Type III 24-hr 2-yr Rainfall=3.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-7: Tributary to Existing Detention Basin**

Runoff = 1.15 cfs @ 12.08 hrs, Volume= 0.092 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
* 15,207	98	Pavement
15,207		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-8: Tributary to DB-4**

Runoff = 2.16 cfs @ 12.09 hrs, Volume= 0.153 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
8,240	39	>75% Grass cover, Good, HSG A
* 18,385	98	Pavement
* 13,240	98	Detention Basin
39,865	86	Weighted Average
8,240		Pervious Area
31,625		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-9: Tributary to Existing Detention Basin**

Runoff = 1.01 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
* 13,301	98	Pavement
13,301		Impervious Area

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Type III 24-hr 2-yr Rainfall=3.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

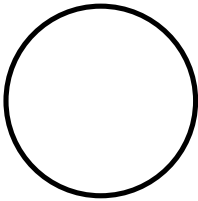
**Summary for Reach P-1: 12" HDPE**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 0.00" for 2-yr event  
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013  
 Length= 70.0' Slope= 0.0050 '/'  
 Inlet Invert= 76.35', Outlet Invert= 76.00'

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.706 ac, 69.04% Impervious, Inflow Depth > 0.43" for 2-yr event  
 Inflow = 0.63 cfs @ 15.69 hrs, Volume= 0.669 af  
 Outflow = 0.63 cfs @ 15.69 hrs, Volume= 0.669 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond DB-1: Detention Basin**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 2.74" for 2-yr event  
 Inflow = 5.93 cfs @ 12.08 hrs, Volume= 0.442 af  
 Outflow = 0.28 cfs @ 14.51 hrs, Volume= 0.330 af, Atten= 95%, Lag= 145.3 min  
 Discarded = 0.28 cfs @ 14.51 hrs, Volume= 0.330 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 77.23' @ 14.51 hrs Surf.Area= 10,787 sf Storage= 12,324 cf

Plug-Flow detention time= 461.8 min calculated for 0.330 af (75% of inflow)  
 Center-of-Mass det. time= 376.9 min ( 1,162.0 - 785.1 )

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Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	28,419 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	9,310	108.0	0	0	9,310
78.00	11,772	416.0	21,034	21,034	22,164
78.60	12,854	454.0	7,385	28,419	24,808
Device	Routing	Invert	Outlet Devices		
#1	Discarded	76.00'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 9,310 sf		
#2	Primary	77.50'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.7' Crest Height		

**Discarded OutFlow** Max=0.28 cfs @ 14.51 hrs HW=77.23' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.28 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=76.35' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond DB-2: Detention Basin**

Inflow Area = 3.469 ac, 94.59% Impervious, Inflow Depth = 1.30" for 2-yr event  
 Inflow = 4.91 cfs @ 12.08 hrs, Volume= 0.377 af  
 Outflow = 0.20 cfs @ 14.94 hrs, Volume= 0.251 af, Atten= 96%, Lag= 171.3 min  
 Discarded = 0.20 cfs @ 14.94 hrs, Volume= 0.251 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 76.48' @ 14.94 hrs Surf.Area= 23,492 sf Storage= 11,108 cf

Plug-Flow detention time= 502.1 min calculated for 0.250 af (67% of inflow)

Center-of-Mass det. time= 405.6 min ( 1,177.9 - 772.3 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	63,404 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	22,409	753.0	0	0	22,409
78.00	27,047	792.0	49,383	49,383	27,447
78.50	29,046	807.0	14,020	63,404	29,397
Device	Routing	Invert	Outlet Devices		
#1	Primary	78.25'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64		
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 22,431 sf		

**Discarded OutFlow** Max=0.20 cfs @ 14.94 hrs HW=76.48' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.20 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond DB-3: Detention Basin

Inflow Area = 1.345 ac, 88.26% Impervious, Inflow Depth = 2.45" for 2-yr event  
 Inflow = 2.81 cfs @ 12.21 hrs, Volume= 0.274 af  
 Outflow = 0.48 cfs @ 12.89 hrs, Volume= 0.265 af, Atten= 83%, Lag= 40.7 min  
 Discarded = 0.48 cfs @ 12.89 hrs, Volume= 0.265 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 77.59' @ 12.89 hrs Surf.Area= 5,292 sf Storage= 5,928 cf

Plug-Flow detention time= 232.1 min calculated for 0.265 af (97% of inflow)  
 Center-of-Mass det. time= 212.2 min ( 1,021.7 - 809.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	11,999 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	2,771	327.0	0	0	2,771
77.00	3,779	346.0	3,262	3,262	3,843
78.00	6,489	429.0	5,073	8,335	8,976
78.50	8,197	477.0	3,663	11,999	12,444
Device	Routing	Invert	Outlet Devices		
#1	Primary	77.75'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64		
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 2,780 sf		

**Discarded OutFlow** Max=0.48 cfs @ 12.89 hrs HW=77.59' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.48 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond DB-4: Detention Basin

Inflow Area = 2.226 ac, 91.50% Impervious, Inflow Depth = 2.69" for 2-yr event  
 Inflow = 6.48 cfs @ 12.09 hrs, Volume= 0.499 af  
 Outflow = 0.44 cfs @ 13.55 hrs, Volume= 0.345 af, Atten= 93%, Lag= 87.9 min  
 Discarded = 0.44 cfs @ 13.55 hrs, Volume= 0.345 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af



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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 77.95' @ 13.55 hrs Surf.Area= 9,669 sf Storage= 13,935 cf

Plug-Flow detention time= 413.2 min calculated for 0.345 af (69% of inflow)

Center-of-Mass det. time= 316.6 min ( 1,091.7 - 775.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	26,719 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	4,552	514.0	0	0	4,552
77.00	7,354	726.0	5,897	5,897	25,481
78.00	9,807	745.0	8,551	14,448	27,823
79.00	14,911	1,028.0	12,270	26,719	67,762

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 7,377 sf
#2	Primary	78.20'	<b>3.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.5' Crest Height

**Discarded OutFlow** Max=0.44 cfs @ 13.55 hrs HW=77.95' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.44 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=71.70' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 8.826 ac, 95.70% Impervious, Inflow Depth = 2.07" for 2-yr event  
 Inflow = 19.29 cfs @ 12.08 hrs, Volume= 1.523 af  
 Outflow = 0.59 cfs @ 15.79 hrs, Volume= 0.647 af, Atten= 97%, Lag= 222.5 min  
 Primary = 0.59 cfs @ 15.79 hrs, Volume= 0.647 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 72.50' @ 15.79 hrs Surf.Area= 66,031 sf Storage= 50,780 cf

Plug-Flow detention time= 578.3 min calculated for 0.646 af (42% of inflow)

Center-of-Mass det. time= 438.4 min ( 1,198.6 - 760.2 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

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Type III 24-hr 2-yr Rainfall=3.40"

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Device	Routing	Invert	Outlet Devices
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=0.59 cfs @ 15.79 hrs HW=72.50' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 0.59 cfs @ 2.29 fps)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond SRS: Recharge System**

Inflow Area = 0.640 ac, 85.14% Impervious, Inflow Depth = 2.26" for 2-yr event  
 Inflow = 1.68 cfs @ 12.09 hrs, Volume= 0.121 af  
 Outflow = 0.37 cfs @ 11.86 hrs, Volume= 0.121 af, Atten= 78%, Lag= 0.0 min  
 Discarded = 0.37 cfs @ 11.86 hrs, Volume= 0.121 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.03' @ 12.50 hrs Surf.Area= 1,944 sf Storage= 1,203 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 17.0 min ( 825.7 - 808.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	1,650 cf	<b>27.00'W x 72.00'L x 3.50'H Prismatic</b> 6,804 cf Overall - 2,679 cf Embedded = 4,125 cf x 40.0% Voids
#2	74.50'	2,679 cf	<b>52.6"W x 34.0"H x 7.50'L Cultec R-V8</b> x 40 Inside #1
		4,329 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	76.50'	<b>8.0" x 42.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 73.00' S= 0.0833 '/' Cc= 0.900 n= 0.013

**Discarded OutFlow** Max=0.37 cfs @ 11.86 hrs HW=74.04' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.37 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=74.00' TW=71.70' (Dynamic Tailwater)↑ **2=Culvert** ( Controls 0.00 cfs)

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment S-1: Tributary to DB-1</b>	Runoff Area=84,300 sf 93.30% Impervious Runoff Depth=4.11" Tc=6.0 min CN=94 Runoff=8.69 cfs 0.663 af
<b>Subcatchment S-10: Tributary to DB-3</b>	Runoff Area=58,595 sf 88.26% Impervious Runoff Depth=3.79" Flow Length=280' Tc=16.0 min CN=91 Runoff=4.27 cfs 0.425 af
<b>Subcatchment S-11: Tributary to</b>	Runoff Area=57,081 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=6.15 cfs 0.498 af
<b>Subcatchment S-12: Tributary to</b>	Runoff Area=73,476 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=7.92 cfs 0.641 af
<b>Subcatchment S-13: Tributary to</b>	Runoff Area=60,155 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=6.48 cfs 0.525 af
<b>Subcatchment S-14: Tributary toward BVW</b>	Runoff Area=220,681 sf 0.00% Impervious Runoff Depth=0.34" Flow Length=170' Tc=18.7 min CN=44 Runoff=0.56 cfs 0.143 af
<b>Subcatchment S-2: Tributary to DB-2</b>	Runoff Area=66,800 sf 96.22% Impervious Runoff Depth=4.33" Tc=6.0 min CN=96 Runoff=7.07 cfs 0.554 af
<b>Subcatchment S-3: Tributary to Existing</b>	Runoff Area=55,950 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=6.03 cfs 0.488 af
<b>Subcatchment S-4: Tributary to Existing</b>	Runoff Area=5,350 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=0.58 cfs 0.047 af
<b>Subcatchment S-5: Tributary to Existing</b>	Runoff Area=27,864 sf 85.14% Impervious Runoff Depth=3.58" Tc=6.0 min CN=89 Runoff=2.61 cfs 0.191 af
<b>Subcatchment S-6: Tributary to Existing</b>	Runoff Area=36,210 sf 88.57% Impervious Runoff Depth=3.79" Tc=6.0 min CN=91 Runoff=3.54 cfs 0.262 af
<b>Subcatchment S-7: Tributary to Existing</b>	Runoff Area=15,207 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=1.64 cfs 0.133 af
<b>Subcatchment S-8: Tributary to DB-4</b>	Runoff Area=39,865 sf 79.33% Impervious Runoff Depth=3.28" Tc=6.0 min CN=86 Runoff=3.48 cfs 0.250 af
<b>Subcatchment S-9: Tributary to Existing</b>	Runoff Area=13,301 sf 100.00% Impervious Runoff Depth=4.56" Tc=6.0 min CN=98 Runoff=1.43 cfs 0.116 af
<b>Reach P-1: 12" HDPE</b>	Avg. Depth=0.28' Max Vel=2.41 fps Inflow=0.44 cfs 0.069 af D=12.0" n=0.013 L=70.0' S=0.0050 '/ Capacity=2.52 cfs Outflow=0.44 cfs 0.069 af
<b>Reach SR: Site Runoff to BVW</b>	Inflow=3.15 cfs 1.500 af Outflow=3.15 cfs 1.500 af

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**Pond DB-1: Detention Basin** Peak Elev=77.66' Storage=17,152 cf Inflow=8.69 cfs 0.663 af  
Discarded=0.39 cfs 0.444 af Primary=0.44 cfs 0.069 af Outflow=0.83 cfs 0.514 af

**Pond DB-2: Detention Basin** Peak Elev=76.81' Storage=18,809 cf Inflow=7.07 cfs 0.623 af  
Discarded=0.34 cfs 0.417 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.417 af

**Pond DB-3: Detention Basin** Peak Elev=77.90' Storage=7,724 cf Inflow=4.27 cfs 0.425 af  
Discarded=0.65 cfs 0.357 af Primary=1.52 cfs 0.055 af Outflow=2.18 cfs 0.412 af

**Pond DB-4: Detention Basin** Peak Elev=78.41' Storage=18,858 cf Inflow=9.63 cfs 0.749 af  
Discarded=0.84 cfs 0.518 af Primary=0.97 cfs 0.069 af Outflow=1.81 cfs 0.587 af

**Pond EDB: Existing Detention Basin** Peak Elev=72.80' Storage=70,915 cf Inflow=27.62 cfs 2.282 af  
Outflow=1.41 cfs 1.301 af

**Pond SRS: Recharge System** Peak Elev=75.92' Storage=2,507 cf Inflow=2.61 cfs 0.191 af  
Discarded=0.37 cfs 0.191 af Primary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.191 af

**Total Runoff Area = 18.706 ac Runoff Volume = 4.937 af Average Runoff Depth = 3.17"**  
**30.96% Pervious = 5.791 ac 69.04% Impervious = 12.915 ac**

**Summary for Subcatchment S-1: Tributary to DB-1**

Runoff = 8.69 cfs @ 12.08 hrs, Volume= 0.663 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
5,650	39	>75% Grass cover, Good, HSG A
65,796	98	Paved parking & roofs
* 12,854	98	Basin
84,300	94	Weighted Average
5,650		Pervious Area
78,650		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-10: Tributary to DB-3**

Runoff = 4.27 cfs @ 12.21 hrs, Volume= 0.425 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
* 8,197	98	Detention Basin
6,877	39	>75% Grass cover, Good, HSG A
* 43,521	98	Proposed Pavement
58,595	91	Weighted Average
6,877		Pervious Area
51,718		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0050	0.06		<b>Sheet Flow, AB</b> Grass: Dense n= 0.240 P2= 3.40"
0.2	15	0.0050	1.06		<b>Shallow Concentrated Flow, BC</b> Grassed Waterway Kv= 15.0 fps
2.0	215	0.0080	1.82		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
16.0	280	Total			

**Summary for Subcatchment S-11: Tributary to Detention Basin**

Runoff = 6.15 cfs @ 12.08 hrs, Volume= 0.498 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

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Type III 24-hr 10-yr Rainfall=4.80"

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	Area (sf)	CN	Description
*	57,081	98	Rooftop
	57,081		Impervious Area

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

**Summary for Subcatchment S-12: Tributary to Detention Basin**

Runoff = 7.92 cfs @ 12.08 hrs, Volume= 0.641 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	73,476	98	Rooftop
	73,476		Impervious Area

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

**Summary for Subcatchment S-13: Tributary to Detention Basin**

Runoff = 6.48 cfs @ 12.08 hrs, Volume= 0.525 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	60,155	98	Detention Basin
	60,155		Impervious Area

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

**Summary for Subcatchment S-14: Tributary toward BVW**

Runoff = 0.56 cfs @ 12.54 hrs, Volume= 0.143 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

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Type III 24-hr 10-yr Rainfall=4.80"

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Area (sf)	CN	Description
122,975	30	Woods, Good, HSG A
49,988	55	Woods, Good, HSG B
47,718	68	<50% Grass cover, Poor, HSG A
220,681	44	Weighted Average
220,681		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b>
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b>
					Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-2: Tributary to DB-2**

Runoff = 7.07 cfs @ 12.08 hrs, Volume= 0.554 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
2,522	39	>75% Grass cover, Good, HSG A
35,232	98	Paved parking & roofs
* 29,046	98	Pond
66,800	96	Weighted Average
2,522		Pervious Area
64,278		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-3: Tributary to Existing Detention Basin**

Runoff = 6.03 cfs @ 12.08 hrs, Volume= 0.488 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
55,950	98	Paved parking
55,950		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-4: Tributary to Existing Detention Basin**

Runoff = 0.58 cfs @ 12.08 hrs, Volume= 0.047 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
5,350	98	Paved parking
5,350		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-5: Tributary to Existing Detention Basin**

Runoff = 2.61 cfs @ 12.09 hrs, Volume= 0.191 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
23,724	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
27,864	89	Weighted Average
4,140		Pervious Area
23,724		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-6: Tributary to Existing Detention Basin**

Runoff = 3.54 cfs @ 12.08 hrs, Volume= 0.262 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
32,070	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
36,210	91	Weighted Average
4,140		Pervious Area
32,070		Impervious Area



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Type III 24-hr 10-yr Rainfall=4.80"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-7: Tributary to Existing Detention Basin**

Runoff = 1.64 cfs @ 12.08 hrs, Volume= 0.133 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
* 15,207	98	Pavement
15,207		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-8: Tributary to DB-4**

Runoff = 3.48 cfs @ 12.09 hrs, Volume= 0.250 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
8,240	39	>75% Grass cover, Good, HSG A
* 18,385	98	Pavement
* 13,240	98	Detention Basin
39,865	86	Weighted Average
8,240		Pervious Area
31,625		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-9: Tributary to Existing Detention Basin**

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.116 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
* 13,301	98	Pavement
13,301		Impervious Area

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Type III 24-hr 10-yr Rainfall=4.80"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

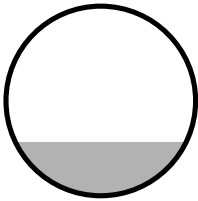
**Summary for Reach P-1: 12" HDPE**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 0.43" for 10-yr event  
 Inflow = 0.44 cfs @ 12.90 hrs, Volume= 0.069 af  
 Outflow = 0.44 cfs @ 12.91 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Max. Velocity= 2.41 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity = 1.67 fps, Avg. Travel Time= 0.7 min

Peak Storage= 13 cf @ 12.91 hrs, Average Depth at Peak Storage= 0.28'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013  
 Length= 70.0' Slope= 0.0050 '/  
 Inlet Invert= 76.35', Outlet Invert= 76.00'

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.706 ac, 69.04% Impervious, Inflow Depth > 0.96" for 10-yr event  
 Inflow = 3.15 cfs @ 12.52 hrs, Volume= 1.500 af  
 Outflow = 3.15 cfs @ 12.52 hrs, Volume= 1.500 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond DB-1: Detention Basin**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 4.11" for 10-yr event  
 Inflow = 8.69 cfs @ 12.08 hrs, Volume= 0.663 af  
 Outflow = 0.83 cfs @ 12.90 hrs, Volume= 0.514 af, Atten= 90%, Lag= 49.0 min  
 Discarded = 0.39 cfs @ 12.90 hrs, Volume= 0.444 af  
 Primary = 0.44 cfs @ 12.90 hrs, Volume= 0.069 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 77.66' @ 12.90 hrs Surf.Area= 11,338 sf Storage= 17,152 cf

Plug-Flow detention time= 410.7 min calculated for 0.514 af (77% of inflow)  
 Center-of-Mass det. time= 330.4 min ( 1,105.0 - 774.6 )

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Type III 24-hr 10-yr Rainfall=4.80"

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Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	28,419 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	9,310	108.0	0	0	9,310
78.00	11,772	416.0	21,034	21,034	22,164
78.60	12,854	454.0	7,385	28,419	24,808

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 9,310 sf
#2	Primary	77.50'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.7' Crest Height

**Discarded OutFlow** Max=0.39 cfs @ 12.90 hrs HW=77.66' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.39 cfs)**Primary OutFlow** Max=0.44 cfs @ 12.90 hrs HW=77.66' TW=76.63' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.44 cfs @ 1.36 fps)**Summary for Pond DB-2: Detention Basin**

Inflow Area = 3.469 ac, 94.59% Impervious, Inflow Depth = 2.16" for 10-yr event  
 Inflow = 7.07 cfs @ 12.08 hrs, Volume= 0.623 af  
 Outflow = 0.34 cfs @ 15.32 hrs, Volume= 0.417 af, Atten= 95%, Lag= 194.1 min  
 Discarded = 0.34 cfs @ 15.32 hrs, Volume= 0.417 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 76.81' @ 15.32 hrs Surf.Area= 24,228 sf Storage= 18,809 cf

Plug-Flow detention time= 499.0 min calculated for 0.417 af (67% of inflow)

Center-of-Mass det. time= 406.6 min ( 1,176.3 - 769.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	63,404 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	22,409	753.0	0	0	22,409
78.00	27,047	792.0	49,383	49,383	27,447
78.50	29,046	807.0	14,020	63,404	29,397

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 22,431 sf

**Discarded OutFlow** Max=0.34 cfs @ 15.32 hrs HW=76.81' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.34 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond DB-3: Detention Basin

Inflow Area = 1.345 ac, 88.26% Impervious, Inflow Depth = 3.79" for 10-yr event  
 Inflow = 4.27 cfs @ 12.21 hrs, Volume= 0.425 af  
 Outflow = 2.18 cfs @ 12.50 hrs, Volume= 0.412 af, Atten= 49%, Lag= 17.1 min  
 Discarded = 0.65 cfs @ 12.50 hrs, Volume= 0.357 af  
 Primary = 1.52 cfs @ 12.50 hrs, Volume= 0.055 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 77.90' @ 12.50 hrs Surf.Area= 6,196 sf Storage= 7,724 cf

Plug-Flow detention time= 192.4 min calculated for 0.412 af (97% of inflow)  
 Center-of-Mass det. time= 175.2 min ( 972.7 - 797.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	11,999 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	2,771	327.0	0	0	2,771
77.00	3,779	346.0	3,262	3,262	3,843
78.00	6,489	429.0	5,073	8,335	8,976
78.50	8,197	477.0	3,663	11,999	12,444
Device	Routing	Invert	Outlet Devices		
#1	Primary	77.75'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64		
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 2,780 sf		

**Discarded OutFlow** Max=0.65 cfs @ 12.50 hrs HW=77.90' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.65 cfs)

**Primary OutFlow** Max=1.52 cfs @ 12.50 hrs HW=77.90' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.52 cfs @ 0.99 fps)

### Summary for Pond DB-4: Detention Basin

Inflow Area = 2.226 ac, 91.50% Impervious, Inflow Depth = 4.04" for 10-yr event  
 Inflow = 9.63 cfs @ 12.08 hrs, Volume= 0.749 af  
 Outflow = 1.81 cfs @ 12.53 hrs, Volume= 0.587 af, Atten= 81%, Lag= 26.5 min  
 Discarded = 0.84 cfs @ 12.53 hrs, Volume= 0.518 af  
 Primary = 0.97 cfs @ 12.53 hrs, Volume= 0.069 af

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Type III 24-hr 10-yr Rainfall=4.80"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 78.41' @ 12.53 hrs Surf.Area= 11,767 sf Storage= 18,858 cf

Plug-Flow detention time= 345.2 min calculated for 0.587 af (78% of inflow)

Center-of-Mass det. time= 265.0 min ( 1,032.8 - 767.9 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	26,719 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	4,552	514.0	0	0	4,552
77.00	7,354	726.0	5,897	5,897	25,481
78.00	9,807	745.0	8,551	14,448	27,823
79.00	14,911	1,028.0	12,270	26,719	67,762

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 7,377 sf
#2	Primary	78.20'	<b>3.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.5' Crest Height

**Discarded OutFlow** Max=0.84 cfs @ 12.53 hrs HW=78.41' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.84 cfs)**Primary OutFlow** Max=0.97 cfs @ 12.53 hrs HW=78.41' TW=72.69' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.97 cfs @ 1.57 fps)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 8.826 ac, 95.70% Impervious, Inflow Depth = 3.10" for 10-yr event  
 Inflow = 27.62 cfs @ 12.08 hrs, Volume= 2.282 af  
 Outflow = 1.41 cfs @ 14.20 hrs, Volume= 1.301 af, Atten= 95%, Lag= 126.9 min  
 Primary = 1.41 cfs @ 14.20 hrs, Volume= 1.301 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 72.80' @ 14.20 hrs Surf.Area= 67,570 sf Storage= 70,915 cf

Plug-Flow detention time= 504.1 min calculated for 1.301 af (57% of inflow)

Center-of-Mass det. time= 392.2 min ( 1,146.1 - 754.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

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Type III 24-hr 10-yr Rainfall=4.80"

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Device	Routing	Invert	Outlet Devices
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=1.41 cfs @ 14.20 hrs HW=72.80' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 1.41 cfs @ 2.90 fps)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond SRS: Recharge System**

Inflow Area = 0.640 ac, 85.14% Impervious, Inflow Depth = 3.58" for 10-yr event  
 Inflow = 2.61 cfs @ 12.09 hrs, Volume= 0.191 af  
 Outflow = 0.37 cfs @ 11.73 hrs, Volume= 0.191 af, Atten= 86%, Lag= 0.0 min  
 Discarded = 0.37 cfs @ 11.73 hrs, Volume= 0.191 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 75.92' @ 12.60 hrs Surf.Area= 1,944 sf Storage= 2,507 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 42.8 min ( 838.6 - 795.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	1,650 cf	<b>27.00'W x 72.00'L x 3.50'H Prismatic</b> 6,804 cf Overall - 2,679 cf Embedded = 4,125 cf x 40.0% Voids
#2	74.50'	2,679 cf	<b>52.6"W x 34.0"H x 7.50'L Cultec R-V8</b> x 40 Inside #1
		4,329 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	76.50'	<b>8.0" x 42.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 73.00' S= 0.0833 '/' Cc= 0.900 n= 0.013

**Discarded OutFlow** Max=0.37 cfs @ 11.73 hrs HW=74.04' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.37 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=74.00' TW=71.70' (Dynamic Tailwater)↑ **2=Culvert** ( Controls 0.00 cfs)

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment S-1: Tributary to DB-1</b>	Runoff Area=84,300 sf 93.30% Impervious Runoff Depth=6.29" Tc=6.0 min CN=94 Runoff=12.99 cfs 1.014 af
<b>Subcatchment S-10: Tributary to DB-3</b>	Runoff Area=58,595 sf 88.26% Impervious Runoff Depth=5.94" Flow Length=280' Tc=16.0 min CN=91 Runoff=6.53 cfs 0.666 af
<b>Subcatchment S-11: Tributary to</b>	Runoff Area=57,081 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=9.00 cfs 0.738 af
<b>Subcatchment S-12: Tributary to</b>	Runoff Area=73,476 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=11.58 cfs 0.950 af
<b>Subcatchment S-13: Tributary to</b>	Runoff Area=60,155 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=9.48 cfs 0.778 af
<b>Subcatchment S-14: Tributary toward BVW</b>	Runoff Area=220,681 sf 0.00% Impervious Runoff Depth=1.15" Flow Length=170' Tc=18.7 min CN=44 Runoff=3.44 cfs 0.488 af
<b>Subcatchment S-2: Tributary to DB-2</b>	Runoff Area=66,800 sf 96.22% Impervious Runoff Depth=6.52" Tc=6.0 min CN=96 Runoff=10.44 cfs 0.834 af
<b>Subcatchment S-3: Tributary to Existing</b>	Runoff Area=55,950 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=8.82 cfs 0.724 af
<b>Subcatchment S-4: Tributary to Existing</b>	Runoff Area=5,350 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=0.84 cfs 0.069 af
<b>Subcatchment S-5: Tributary to Existing</b>	Runoff Area=27,864 sf 85.14% Impervious Runoff Depth=5.71" Tc=6.0 min CN=89 Runoff=4.07 cfs 0.304 af
<b>Subcatchment S-6: Tributary to Existing</b>	Runoff Area=36,210 sf 88.57% Impervious Runoff Depth=5.94" Tc=6.0 min CN=91 Runoff=5.42 cfs 0.411 af
<b>Subcatchment S-7: Tributary to Existing</b>	Runoff Area=15,207 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=2.40 cfs 0.197 af
<b>Subcatchment S-8: Tributary to DB-4</b>	Runoff Area=39,865 sf 79.33% Impervious Runoff Depth=5.37" Tc=6.0 min CN=86 Runoff=5.57 cfs 0.409 af
<b>Subcatchment S-9: Tributary to Existing</b>	Runoff Area=13,301 sf 100.00% Impervious Runoff Depth=6.76" Tc=6.0 min CN=98 Runoff=2.10 cfs 0.172 af
<b>Reach P-1: 12" HDPE</b>	Avg. Depth=1.00' Max Vel=3.66 fps Inflow=3.19 cfs 0.338 af D=12.0" n=0.013 L=70.0' S=0.0050 ' /' Capacity=2.52 cfs Outflow=2.72 cfs 0.338 af
<b>Reach SR: Site Runoff to BVW</b>	Inflow=10.42 cfs 3.238 af Outflow=10.42 cfs 3.238 af

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**Pond DB-1: Detention Basin** Peak Elev=78.10' Storage=22,272 cf Inflow=12.99 cfs 1.014 af  
Discarded=0.51 cfs 0.507 af Primary=3.19 cfs 0.338 af Outflow=3.70 cfs 0.845 af

**Pond DB-2: Detention Basin** Peak Elev=77.51' Storage=36,379 cf Inflow=10.97 cfs 1.172 af  
Discarded=0.66 cfs 0.784 af Primary=0.00 cfs 0.000 af Outflow=0.66 cfs 0.784 af

**Pond DB-3: Detention Basin** Peak Elev=78.07' Storage=8,817 cf Inflow=6.53 cfs 0.666 af  
Discarded=0.76 cfs 0.451 af Primary=4.71 cfs 0.199 af Outflow=5.46 cfs 0.650 af

**Pond DB-4: Detention Basin** Peak Elev=78.78' Storage=23,559 cf Inflow=14.57 cfs 1.148 af  
Discarded=1.21 cfs 0.652 af Primary=4.74 cfs 0.327 af Outflow=5.95 cfs 0.978 af

**Pond EDB: Existing Detention Basin** Peak Elev=73.35' Storage=108,616 cf Inflow=42.62 cfs 3.659 af  
Outflow=3.42 cfs 2.552 af

**Pond SRS: Recharge System** Peak Elev=76.99' Storage=3,897 cf Inflow=4.07 cfs 0.304 af  
Discarded=0.37 cfs 0.273 af Primary=0.91 cfs 0.031 af Outflow=1.28 cfs 0.304 af

**Total Runoff Area = 18.706 ac Runoff Volume = 7.754 af Average Runoff Depth = 4.97"**  
**30.96% Pervious = 5.791 ac 69.04% Impervious = 12.915 ac**



**Summary for Subcatchment S-1: Tributary to DB-1**

Runoff = 12.99 cfs @ 12.08 hrs, Volume= 1.014 af, Depth= 6.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
5,650	39	>75% Grass cover, Good, HSG A
65,796	98	Paved parking & roofs
* 12,854	98	Basin
84,300	94	Weighted Average
5,650		Pervious Area
78,650		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-10: Tributary to DB-3**

Runoff = 6.53 cfs @ 12.21 hrs, Volume= 0.666 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
* 8,197	98	Detention Basin
6,877	39	>75% Grass cover, Good, HSG A
* 43,521	98	Proposed Pavement
58,595	91	Weighted Average
6,877		Pervious Area
51,718		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0050	0.06		<b>Sheet Flow, AB</b> Grass: Dense n= 0.240 P2= 3.40"
0.2	15	0.0050	1.06		<b>Shallow Concentrated Flow, BC</b> Grassed Waterway Kv= 15.0 fps
2.0	215	0.0080	1.82		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
16.0	280	Total			

**Summary for Subcatchment S-11: Tributary to Detention Basin**

Runoff = 9.00 cfs @ 12.08 hrs, Volume= 0.738 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

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Type III 24-hr 100-yr Rainfall=7.00"

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	Area (sf)	CN	Description
*	57,081	98	Rooftop
	57,081		Impervious Area

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

**Summary for Subcatchment S-12: Tributary to Detention Basin**

Runoff = 11.58 cfs @ 12.08 hrs, Volume= 0.950 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	73,476	98	Rooftop
	73,476		Impervious Area

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

**Summary for Subcatchment S-13: Tributary to Detention Basin**

Runoff = 9.48 cfs @ 12.08 hrs, Volume= 0.778 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	60,155	98	Detention Basin
	60,155		Impervious Area

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

**Summary for Subcatchment S-14: Tributary toward BVW**

Runoff = 3.44 cfs @ 12.34 hrs, Volume= 0.488 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

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Type III 24-hr 100-yr Rainfall=7.00"

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Area (sf)	CN	Description
122,975	30	Woods, Good, HSG A
49,988	55	Woods, Good, HSG B
47,718	68	<50% Grass cover, Poor, HSG A
220,681	44	Weighted Average
220,681		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0120	0.06		<b>Sheet Flow, AB</b>
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	120	0.0100	0.50		<b>Shallow Concentrated Flow, bc</b>
					Woodland Kv= 5.0 fps
18.7	170	Total			

**Summary for Subcatchment S-2: Tributary to DB-2**

Runoff = 10.44 cfs @ 12.08 hrs, Volume= 0.834 af, Depth= 6.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
2,522	39	>75% Grass cover, Good, HSG A
35,232	98	Paved parking & roofs
* 29,046	98	Pond
66,800	96	Weighted Average
2,522		Pervious Area
64,278		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-3: Tributary to Existing Detention Basin**

Runoff = 8.82 cfs @ 12.08 hrs, Volume= 0.724 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
55,950	98	Paved parking
55,950		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-4: Tributary to Existing Detention Basin**

Runoff = 0.84 cfs @ 12.08 hrs, Volume= 0.069 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
5,350	98	Paved parking
5,350		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-5: Tributary to Existing Detention Basin**

Runoff = 4.07 cfs @ 12.08 hrs, Volume= 0.304 af, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
23,724	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
27,864	89	Weighted Average
4,140		Pervious Area
23,724		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Minimum

**Summary for Subcatchment S-6: Tributary to Existing Detention Basin**

Runoff = 5.42 cfs @ 12.08 hrs, Volume= 0.411 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
32,070	98	Paved parking
4,140	39	>75% Grass cover, Good, HSG A
36,210	91	Weighted Average
4,140		Pervious Area
32,070		Impervious Area

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Type III 24-hr 100-yr Rainfall=7.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-7: Tributary to Existing Detention Basin**

Runoff = 2.40 cfs @ 12.08 hrs, Volume= 0.197 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
* 15,207	98	Pavement
15,207		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-8: Tributary to DB-4**

Runoff = 5.57 cfs @ 12.09 hrs, Volume= 0.409 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
8,240	39	>75% Grass cover, Good, HSG A
* 18,385	98	Pavement
* 13,240	98	Detention Basin
39,865	86	Weighted Average
8,240		Pervious Area
31,625		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

**Summary for Subcatchment S-9: Tributary to Existing Detention Basin**

Runoff = 2.10 cfs @ 12.08 hrs, Volume= 0.172 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
* 13,301	98	Pavement
13,301		Impervious Area

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Type III 24-hr 100-yr Rainfall=7.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, TR-55 Minimum</b>

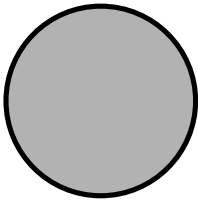
**Summary for Reach P-1: 12" HDPE**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 2.09" for 100-yr event  
 Inflow = 3.19 cfs @ 12.42 hrs, Volume= 0.338 af  
 Outflow = 2.72 cfs @ 12.26 hrs, Volume= 0.338 af, Atten= 15%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Max. Velocity= 3.66 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity = 2.10 fps, Avg. Travel Time= 0.6 min

Peak Storage= 55 cf @ 12.27 hrs, Average Depth at Peak Storage= 1.00'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013  
 Length= 70.0' Slope= 0.0050 '/  
 Inlet Invert= 76.35', Outlet Invert= 76.00'

**Summary for Reach SR: Site Runoff to BVW**

Inflow Area = 18.706 ac, 69.04% Impervious, Inflow Depth > 2.08" for 100-yr event  
 Inflow = 10.42 cfs @ 12.33 hrs, Volume= 3.238 af  
 Outflow = 10.42 cfs @ 12.33 hrs, Volume= 3.238 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond DB-1: Detention Basin**

Inflow Area = 1.935 ac, 93.30% Impervious, Inflow Depth = 6.29" for 100-yr event  
 Inflow = 12.99 cfs @ 12.08 hrs, Volume= 1.014 af  
 Outflow = 3.70 cfs @ 12.42 hrs, Volume= 0.845 af, Atten= 72%, Lag= 19.9 min  
 Discarded = 0.51 cfs @ 12.42 hrs, Volume= 0.507 af  
 Primary = 3.19 cfs @ 12.42 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 78.10' @ 12.42 hrs Surf.Area= 11,957 sf Storage= 22,272 cf

Plug-Flow detention time= 299.0 min calculated for 0.845 af (83% of inflow)  
 Center-of-Mass det. time= 230.6 min ( 995.2 - 764.6 )

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Type III 24-hr 100-yr Rainfall=7.00"

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Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	28,419 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	9,310	108.0	0	0	9,310
78.00	11,772	416.0	21,034	21,034	22,164
78.60	12,854	454.0	7,385	28,419	24,808

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 9,310 sf
#2	Primary	77.50'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.7' Crest Height

**Discarded OutFlow** Max=0.51 cfs @ 12.42 hrs HW=78.10' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.51 cfs)**Primary OutFlow** Max=3.19 cfs @ 12.42 hrs HW=78.10' TW=77.35' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.19 cfs @ 2.81 fps)**Summary for Pond DB-2: Detention Basin**

Inflow Area = 3.469 ac, 94.59% Impervious, Inflow Depth = 4.05" for 100-yr event  
 Inflow = 10.97 cfs @ 12.09 hrs, Volume= 1.172 af  
 Outflow = 0.66 cfs @ 15.25 hrs, Volume= 0.784 af, Atten= 94%, Lag= 189.2 min  
 Discarded = 0.66 cfs @ 15.25 hrs, Volume= 0.784 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 77.51' @ 15.25 hrs Surf.Area= 25,867 sf Storage= 36,379 cf

Plug-Flow detention time= 491.6 min calculated for 0.784 af (67% of inflow)

Center-of-Mass det. time= 409.8 min ( 1,176.8 - 767.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	63,404 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	22,409	753.0	0	0	22,409
78.00	27,047	792.0	49,383	49,383	27,447
78.50	29,046	807.0	14,020	63,404	29,397

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 22,431 sf

**Discarded OutFlow** Max=0.66 cfs @ 15.25 hrs HW=77.51' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.66 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond DB-3: Detention Basin

Inflow Area = 1.345 ac, 88.26% Impervious, Inflow Depth = 5.94" for 100-yr event  
 Inflow = 6.53 cfs @ 12.21 hrs, Volume= 0.666 af  
 Outflow = 5.46 cfs @ 12.31 hrs, Volume= 0.650 af, Atten= 16%, Lag= 6.2 min  
 Discarded = 0.76 cfs @ 12.31 hrs, Volume= 0.451 af  
 Primary = 4.71 cfs @ 12.31 hrs, Volume= 0.199 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 78.07' @ 12.31 hrs Surf.Area= 6,725 sf Storage= 8,817 cf

Plug-Flow detention time= 150.6 min calculated for 0.650 af (98% of inflow)  
 Center-of-Mass det. time= 135.9 min ( 921.6 - 785.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	11,999 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	2,771	327.0	0	0	2,771
77.00	3,779	346.0	3,262	3,262	3,843
78.00	6,489	429.0	5,073	8,335	8,976
78.50	8,197	477.0	3,663	11,999	12,444

Device	Routing	Invert	Outlet Devices
#1	Primary	77.75'	<b>10.0' long x 11.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64
#2	Discarded	76.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 2,780 sf

**Discarded OutFlow** Max=0.76 cfs @ 12.31 hrs HW=78.07' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.76 cfs)

**Primary OutFlow** Max=4.71 cfs @ 12.31 hrs HW=78.07' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 4.71 cfs @ 1.46 fps)

### Summary for Pond DB-4: Detention Basin

Inflow Area = 2.226 ac, 91.50% Impervious, Inflow Depth = 6.19" for 100-yr event  
 Inflow = 14.57 cfs @ 12.08 hrs, Volume= 1.148 af  
 Outflow = 5.95 cfs @ 12.29 hrs, Volume= 0.978 af, Atten= 59%, Lag= 12.4 min  
 Discarded = 1.21 cfs @ 12.29 hrs, Volume= 0.652 af  
 Primary = 4.74 cfs @ 12.29 hrs, Volume= 0.327 af



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Type III 24-hr 100-yr Rainfall=7.00"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 78.78' @ 12.29 hrs Surf.Area= 13,691 sf Storage= 23,559 cf

Plug-Flow detention time= 261.8 min calculated for 0.978 af (85% of inflow)

Center-of-Mass det. time= 197.4 min ( 957.9 - 760.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	76.00'	26,719 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	4,552	514.0	0	0	4,552
77.00	7,354	726.0	5,897	5,897	25,481
78.00	9,807	745.0	8,551	14,448	27,823
79.00	14,911	1,028.0	12,270	26,719	67,762

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.01'	<b>8.270 in/hr Exfiltration over Surface area above invert</b> Excluded Surface area = 7,377 sf
#2	Primary	78.20'	<b>3.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 0.5' Crest Height

**Discarded OutFlow** Max=1.21 cfs @ 12.29 hrs HW=78.78' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.21 cfs)**Primary OutFlow** Max=4.74 cfs @ 12.29 hrs HW=78.78' TW=73.05' (Dynamic Tailwater)↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 4.74 cfs @ 2.84 fps)**Summary for Pond EDB: Existing Detention Basin**

Inflow Area = 8.826 ac, 95.70% Impervious, Inflow Depth = 4.98" for 100-yr event

Inflow = 42.62 cfs @ 12.09 hrs, Volume= 3.659 af

Outflow = 3.42 cfs @ 13.43 hrs, Volume= 2.552 af, Atten= 92%, Lag= 80.5 min

Primary = 3.42 cfs @ 13.43 hrs, Volume= 2.552 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 73.35' @ 13.43 hrs Surf.Area= 70,392 sf Storage= 108,616 cf

Plug-Flow detention time= 445.4 min calculated for 2.552 af (70% of inflow)

Center-of-Mass det. time= 356.8 min ( 1,105.4 - 748.6 )

Volume	Invert	Avail.Storage	Storage Description		
#1	71.70'	155,808 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
71.70	60,155	952.0	0	0	60,155
72.00	63,529	1,023.0	18,550	18,550	71,318
73.00	68,606	1,069.0	66,051	84,602	79,047
74.00	73,838	1,080.0	71,206	155,808	81,213

**15500POST**

Type III 24-hr 100-yr Rainfall=7.00"

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Device	Routing	Invert	Outlet Devices
#1	Primary	72.01'	<b>12.0" x 3.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 72.00' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Primary	73.30'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=3.42 cfs @ 13.43 hrs HW=73.35' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 2.93 cfs @ 3.74 fps)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.48 cfs @ 0.53 fps)**Summary for Pond SRS: Recharge System**

Inflow Area = 0.640 ac, 85.14% Impervious, Inflow Depth = 5.71" for 100-yr event  
 Inflow = 4.07 cfs @ 12.08 hrs, Volume= 0.304 af  
 Outflow = 1.28 cfs @ 12.39 hrs, Volume= 0.304 af, Atten= 69%, Lag= 18.3 min  
 Discarded = 0.37 cfs @ 11.58 hrs, Volume= 0.273 af  
 Primary = 0.91 cfs @ 12.39 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 76.99' @ 12.39 hrs Surf.Area= 1,944 sf Storage= 3,897 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

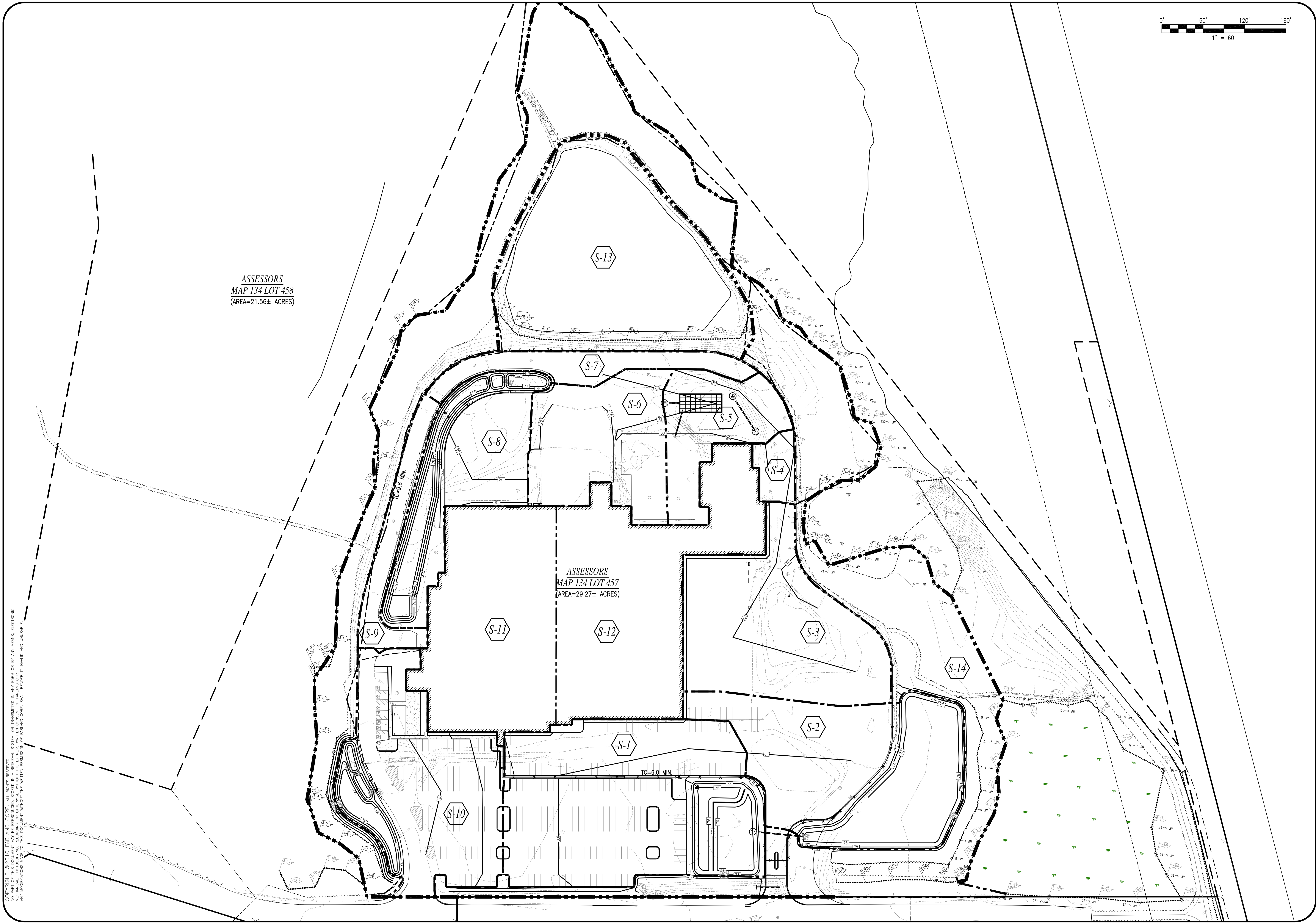
Center-of-Mass det. time= 59.3 min ( 842.5 - 783.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	1,650 cf	<b>27.00'W x 72.00'L x 3.50'H Prismatic</b> 6,804 cf Overall - 2,679 cf Embedded = 4,125 cf x 40.0% Voids
#2	74.50'	2,679 cf	<b>52.6"W x 34.0"H x 7.50'L Cultec R-V8</b> x 40 Inside #1
		4,329 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	76.50'	<b>8.0" x 42.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 73.00' S= 0.0833 '/' Cc= 0.900 n= 0.013

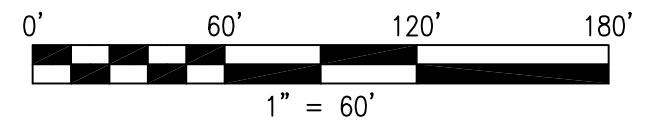
**Discarded OutFlow** Max=0.37 cfs @ 11.58 hrs HW=74.04' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.37 cfs)**Primary OutFlow** Max=0.91 cfs @ 12.39 hrs HW=76.99' TW=73.14' (Dynamic Tailwater)↑ **2=Culvert** (Inlet Controls 0.91 cfs @ 3.27 fps)





ASSESSORS  
MAP 134 LOT 458  
(AREA=21.56± ACRES)

ASSESSORS  
MAP 134 LOT 457  
(AREA=29.27± ACRES)



REVISIONS


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OFFICES IN:  
● TAUNTON  
● MARLBOROUGH  
● WARWICK, RI

DRAWN BY: JKM/MJW  
DESIGNED BY: CAF  
CHECKED BY: CAF

SITE PLAN

50 DUCHAINE BLVD

ASSESSORS MAP 134 LOTS 456, 457, 458 & 459

NEW BEDFORD, MASSACHUSETTS

PREPARED FOR:  
EVERSOURCE ENERGY  
PO BOX 100085 - N2  
DULUTH, GA 30096

NOVEMBER 18, 2016

SCALE: 1"=60'

JOB NO. 15-500

LATEST REVISION:

POST-DEVELOPMENT  
DRAINAGE MAP

SHEET 5A OF 9



# TSS REMOVAL CALCULATIONS

## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Infiltration Basin (Same for all infiltration basins)

TSS Removal Calculation Worksheet	B	C	D	E	F
	BMP <sup>1</sup>	TSS Removal Rate <sup>1</sup>	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
	Sediment Forebay	0.25	1.00	0.25	0.75
	Infiltration Basin	0.80	0.75	0.60	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15

Total TSS Removal =

85%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Nstar Energy Company

Prepared By: Christian A. Farland, P.E.

Date: 12/8/2016

\*Equals remaining load from previous BMP (E)  
which enters the BMP

# LONG TERM OPERATION & MAINTENANCE PLAN



**ENGINEERING A BETTER TOMORROW**  
ENGINEERING | SITE WORK | LAND SURVEYING

# **Long Term Operation and Maintenance Plan**

## **Site Plan 50 Duchaine Boulevard New Bedford, MA**

**December 8, 2016**

### **Owner:**

NStar Energy Company  
274 Station Drive  
Westwood, MA 02090

### **Prepared For:**

NStar Energy Company  
274 Station Drive  
Westwood, MA 02090

### **Prepared By:**

Christian A. Farland, P.E.  
Farland Corp.  
Project No. 15-500

## **Street Sweeping**

The parking lot will be inspected and maintained by the owner.

It shall be the responsibility of the owner to:

Inspections:

Inspect sediment deposit accumulations on the parking lots quarterly.

Maintenance:

Sweep parking lots at least annually.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

## **Stone/ Rip Rap Areas**

The owner of the rip rap areas shall be the owner.

The rip rap areas are to be inspected and maintained by the owner.

It shall be the responsibility of the owner to:

Inspections:

Inspect the rip rapped areas quarterly.

Maintenance:

Remove accumulated sediment, trash, leaves and debris at least annually. Check for signs of erosion and repair as need. Replace any damaged areas with new rip rap of the same size.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.



## **Infiltration Basin**

The owner of the basins shall be the owner.

The basins are to be inspected and maintained by the owner.

It shall be the responsibility of the owner to:

### **Inspections:**

Inspect to basins quarterly and after major storms (>3.2" of rain in 24 hours)

Inspect fore-bay quarterly.

Inspect basins for settlement, subsidence, erosion, cracking or tree growth on the embankment, condition of stone; sediment accumulation around the outlet or within the basin; and erosion within the basin and banks.

Inspect outlet structures and/ or outlet pipes for evidence of clogging, sediment deposits or signs of erosion around the structure/ pipe.

Ensure that the basins are operating as designed. If inspection shows that a basin fails to fully drain within 72 hours following a storm event, then the responsible party shall retain a Registered Professional Civil Engineer licensed in the state of Massachusetts to assess the reason for infiltration/ detention failure and recommend corrective action for restoring the intended functions. For a wet pond, fully drained means that the ponding level in the basin is at or below the lowest elevation of the outlet structure. For an infiltration basin, fully drained means that there is no ponding occurring in the infiltration basin.

Inspect emergency spillways for signs of erosion.

### **Maintenance:**

When mowing the basin and forebay, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated debris. Mow three times per year in May, July and September.

Remove accumulated trash, leaves, debris in basin and forebay every month between April and November of each year. Inspect areas in February of each year, if possible, to determine whether the aforementioned services are required.

If the infiltration basin is ponding in areas or not infiltrating as designed, use deep tilling to break up clogged surfaces, and re-vegetate immediately.

Replace stone in forebay and at all pipe ends once every five (5) years or when sediment depth is excessive.

Do not store snow in basin area.

Remove sediment from the basin and forebay as necessary and at least once every 5 years but wait until the floor of the basin is thoroughly dry. After removing sediment, replace any vegetation damaged during clean-out by either re-seeding or re-sodding.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

### **Drain Lines**

After construction, the drain lines shall be inspected after every major storm for the first few months to ensure proper functions. Presence of accumulated sand and silt would indicate more frequent maintenance of the pre-treatment devices is required. Thereafter, the drain lines shall be inspected at least once per year. Accumulated silt shall be removed by a vacuum truck or other method preferred.

# LONG TERM POLLUTION PREVENTION PLAN



**ENGINEERING A BETTER TOMORROW**  
ENGINEERING | SITE WORK | LAND SURVEYING

# Long Term Pollution Prevention Plan

## **Site Plan 50 Duchaine Boulevard New Bedford, MA**

**December 8, 2016**

**Owner:**

NStar Energy Company  
274 Station Drive  
Westwood, MA 02090

**Prepared For:**

NStar Energy Company  
274 Station Drive  
Westwood, MA 02090

**Prepared By:**

Christian A. Farland, P.E.  
Farland Corp.  
Project No. 15-500

### **Long Term Pollution Prevention Plan**

This Long Term Pollution Prevention Plan serves to outline good housekeeping practices in order to prevent pollution of the wetland resource areas and surrounding environment. The Long Term Operation & Maintenance Plan shall be taken as part of this document as it is a critical part of this plan and shall be adhered to. Proper operation and maintenance records shall be kept on file at all times.

Snow disposal shall be carried out by the owner. The owner should follow DEP guideline #BRPG 01-01 for all snow removal requirements.

The following areas shall be avoided for snow disposal:

- Avoid dumping the snow in the bordering vegetated wetlands.
- Avoid dumping of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

In order to prevent or minimize the potential for a spill of hazardous substances or oils to contaminate stormwater, a spill control and containment kit, including spill berm, absorbent materials, rags, gloves, and trash containers, shall be readily available. All product manufacturers recommended spill cleanup methods shall be known by maintenance personnel, who shall be trained regarding these procedures and the location of the cleanup procedure information and supplies. In the event of oil, gasoline or other hazardous waste spill on-site, the City of New Bedford Fire Department, DEP and the Conservation Agent shall be notified immediately. For spills of less than ¼ gallon, clean-up with absorbent materials or other appropriate means, unless circumstances dictate that the spill should be treated by a professional emergency response contractor. Spills which exceed the reportable quantities of substances mentioned in 40 CFR 110, 40 CFR 117, or 40 CFR 302 must be immediately reported to the EPA National Response Center (800) 242-8802. Any catch basin that may be affected by the spill shall be covered immediately with a spill protector drain cover or similar product, or a spill berm placed around the perimeter of the opening to prevent any contamination into the drainage system. Proper cleanup and disposal of hazardous wastes must follow all applicable local and state regulations and must be carried out by a qualified contractor.

The maintenance of all individual lawns, gardens and landscaped areas shall be performed by the owner. The site is not located within or near an Area of Critical Environmental Concern. However, good housekeeping practices should include proper storage and minimal use of cleaning products and fertilizers.

# ILLICIT DISCHARGE STATEMENT



December 8, 2016

New Bedford Conservation Commission  
John Radcliffe, Chairman  
City Hall, Room 304  
133 William Street  
New Bedford, MA 02740

**RE: Site Plan – 50 Duchaine Boulevard  
Illicit Discharge Compliance Statement (IDCS)**

Dear Mr. Radcliffe,

As required, we are submitting this Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site or are proposed. We have included in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

The site plan identifies the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system.

Please feel free to contact us if you should need any further information.

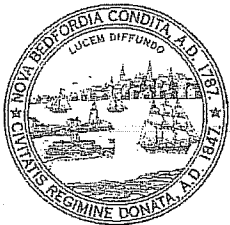
Very truly yours,

FARLAND CORP., INC.

*Christian A. Farland*

Christian A. Farland, P.E., LEED AP  
Principal Engineer and President

cc. client, file



*City of New Bedford*  
**REQUEST for a CERTIFIED ABUTTERS LIST**

This information is needed so that an official abutters list as required by MA General Law may be created and used in notifying abutters. You, as applicant, are responsible for picking up and paying for the certified abutters list from the assessor's office (city hall, room #109).

SUBJECT PROPERTY			
MAP #	134	LOT(S)#	457
ADDRESS: 50 Duchaine Boulevard			
OWNER INFORMATION			
NAME: SM Real Estate, LLC			
MAILING ADDRESS: 401 Industry Road, Suite 100 - Louisville, KY 40208			
APPLICANT/CONTACT PERSON INFORMATION			
NAME (IF DIFFERENT): Matthew J. White, Farland Corp.			
MAILING ADDRESS (IF DIFFERENT): 401 County Street - New Bedford, MA 02740			
TELEPHONE #	(508) 717-3479		
EMAIL ADDRESS:	mwhite@farlandcorp.com		
REASON FOR THIS REQUEST: <i>Check appropriate</i>			
<input type="checkbox"/>	ZONING BOARD OF APPEALS APPLICATION		
<input type="checkbox"/>	PLANNING BOARD APPLICATION		
<input checked="" type="checkbox"/>	CONSERVATION COMMISSION APPLICATION		
<input type="checkbox"/>	LICENSING BOARD APPLICATION		
<input type="checkbox"/>	OTHER (Please explain):		

PLANNING

SEP 09 2016

DEPARTMENT

Once obtained, the Certified List of Abutters must be attached to this Certification Letter.

Submit this form to the Planning Division Room 303 in City Hall, 133 William Street. You, as applicant, are responsible for picking up and paying for the certified abutters list from the assessor's office (city hall, room #109).

**Official Use Only:**

As Administrative Assistant to the City of New Bedford's Board of Assessors, I do hereby certify that the names and addresses as identified on the attached "abutters list" are duly recorded and appear on the most recent tax.

Carlos Amado

Printed Name

*Jade M. Serdahl*

Signature

9/15/2016

Date



September 13, 2016

Dear Applicant,

Please find below the List of Abutters within 100 feet of the property known as 50 Duchaine Boulevard (134-457) The current ownership listed herein must be checked and verified by the City of New Bedford Assessor's Office. Following said verification, the list shall be considered a Certified List of Abutters.

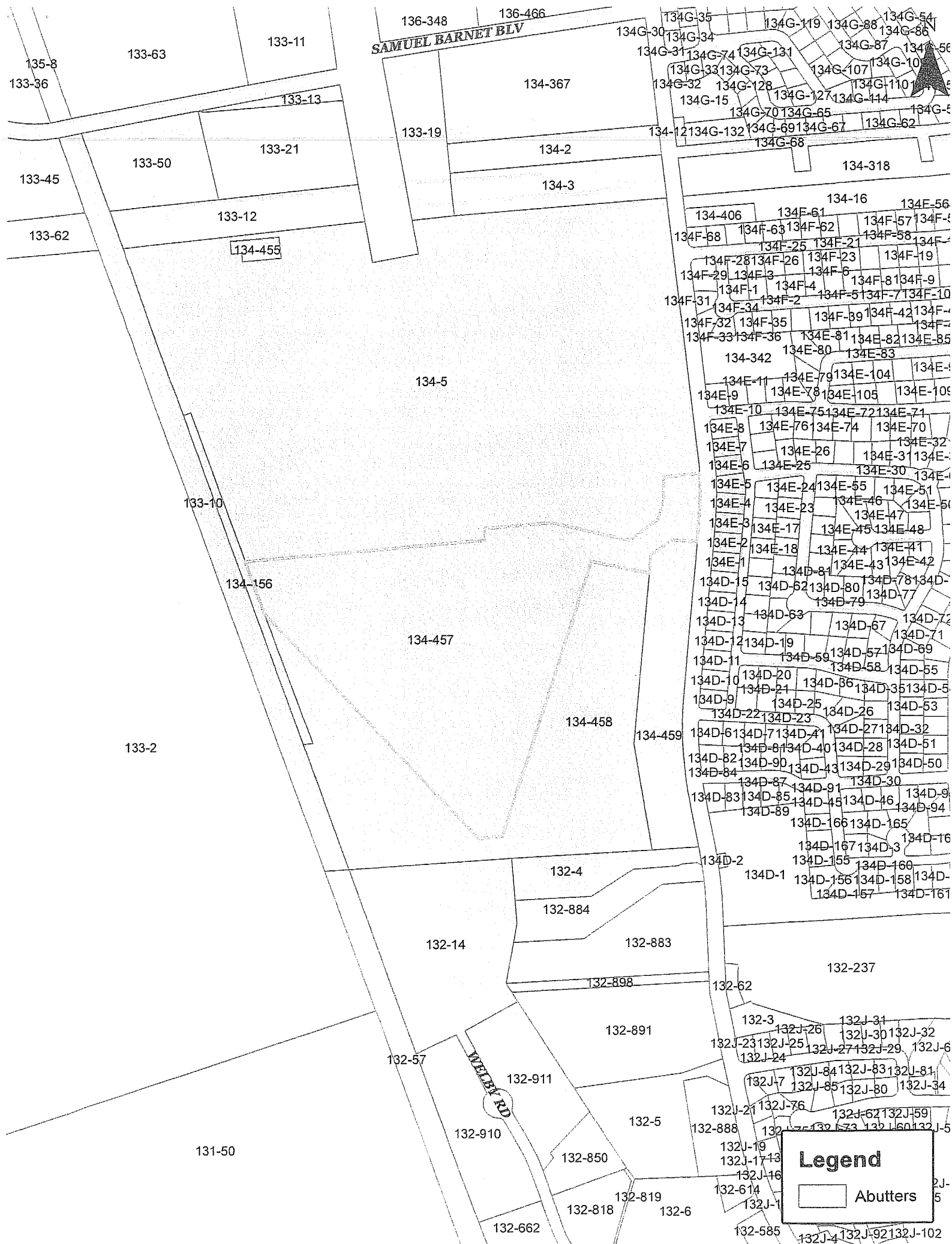
Please note that multiple listed properties with identical owner name and mailing address shall be considered duplicates, and shall require only 1 mailing. Additionally, City of New Bedford-Owned properties shall not require mailed notice.

Parcel	Location	Owner and Mailing Address
134E-6	107 RIDGEWOOD RD	DUBOIS RAYMOND, DUBOIS DIANE C 107 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
134E-7	115 RIDGEWOOD RD	CATOJO LENNY, 115 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
134E-2	69 RIDGEWOOD RD	ST ONGE LAWRENCE A, ST ONGE JACQUELINE A 69 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
134E-3	81 RIDGEWOOD RD	GONSALVES JOAO M, GONSALVES JUDITH 81 RIDGEWOOD RD NEW BEDFORD, MA 02745
132-14	200 WELBY RD	WELBY ROAD LLC, 71 MAPLE STREET MANSFIELD, MA 02048
132-4	1569 PHILLIPS RD	PIRES WALTER C, PIRES LENA 1569 PHILLIPS ROAD NEW BEDFORD, MA 02745
134E-1	63 RIDGEWOOD RD	TRAVERS LORRAINE, 63 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
134E-4	89 RIDGEWOOD RD	STUPALSKI VITALIA M, 89 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
134E-5	99 RIDGEWOOD RD	SEIFERT JEFFREY A, SEIFERT LORIE A 99 RIDGEWOOD ROAD NEW BEDFORD, MA 02745
133-10	RIGHT OF WAY	PENN CENTRAL CO, CONSOLIDATED RAIL CORP <del>P.O. BOX 8097</del> 500 Water St. Dept. J910 PHILADELPHIA, PA 19101 Jacksonville, FL 32202
134-5	100 DUCHAINE BLVD	LOGAL LLC, C/O ERIC DECOSTA <del>89 BLACKMER STREET</del> 100 Duchaine Blvd. NEW BEDFORD, MA 02744 02745
134-456 p-ws	DUCHAINE BLVD	MULTILAYER COATING TECHNOLOGIES LLC, SM Real Estate LLC <del>1 CRANBERRY HILL SUITE 401</del> 401 Industry Road Suite 100 LEXINGTON, MA 02421-7397 Louisville, KY 40208
134-457	50 DUCHAINE BLVD	MULTILAYER COATING TECHNOLOGIES LLC, SM Real Estate LLC <del>1 CRANBERRY HILL</del> 401 Industry Road-Suite 100 LEXINGTON, MA 02421 Louisville, KY 40208

Dear Applicant,

Please note that multiple listed properties with identical owner name and mailing address shall be considered duplicates, and shall require only 1 mailing. Additionally, City of New Bedford-Owned properties shall not require mailed notice.

[illegible]



**Under the Massachusetts Wetlands Protection Act**

(to be submitted to the Massachusetts Department of  
Environmental Protection and the Conservation Commission  
when filing a Notice of Intent)

I, Christian Farland hereby certify under the pains and penalties of perjury  
that on December 12, 2016, 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 with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands  
Protection Act by NStar Energy Company with the New  
Bedford Conservation Commission on December 8, 2016 for  
property located at 50 Duchaine Boulevard.

The form of the notification, and a list of the abutters to whom it was given  
and their addresses, are attached to this Affidavit of Service.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

## **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 NStar Energy Company.
- B. The applicant has filed a Notice of Intent with the Conservation Commission for the municipality of New Bedford seeking permission to remove, fill, dredge or alter an Area Subject to Protection Under the Wetlands Protection Act (General Laws Chapter 131, Section 40).
- C. The address of the lot where the activity is proposed is 50 Duchaine Boulevard.
- D. Copies of the Notice of Intent may be examined at the New Bedford Conservation Commission office at New Bedford City Hall, 131 William Street - New Bedford, MA 02740 between the hours of Monday - Friday: 8 am - 4 pm.
- E. Copies of the Notice of Intent may also be obtained from the applicant's representative FOR A REASONABLE FEE by calling: Farland Corp. at (508) 717-3479 between the hours of 8:00 am and 4:00 pm on Monday – Friday.
- F. Information regarding the date, time and place of the public hearing may be obtained from the New Bedford CONSERVATION COMMISSION by calling: (508) 979-1400.

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in a publication with general circulation in the Community.

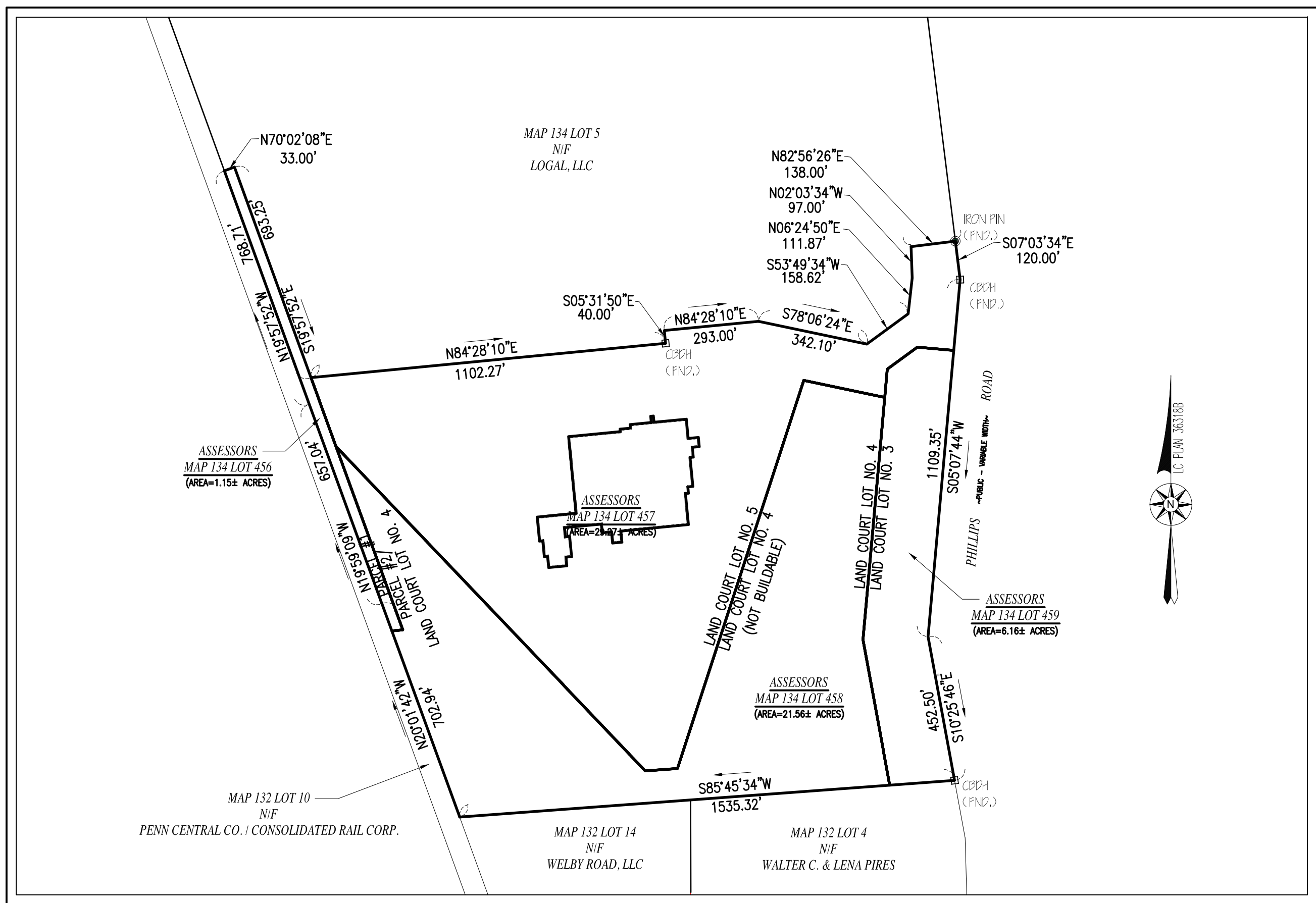
NOTE: Notice of the public hearing, including its date, time, and place, will be posted in the City or Town Hall not less than forty-eight (48) hours in advance.

NOTE: You also 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: (508) 946-2700

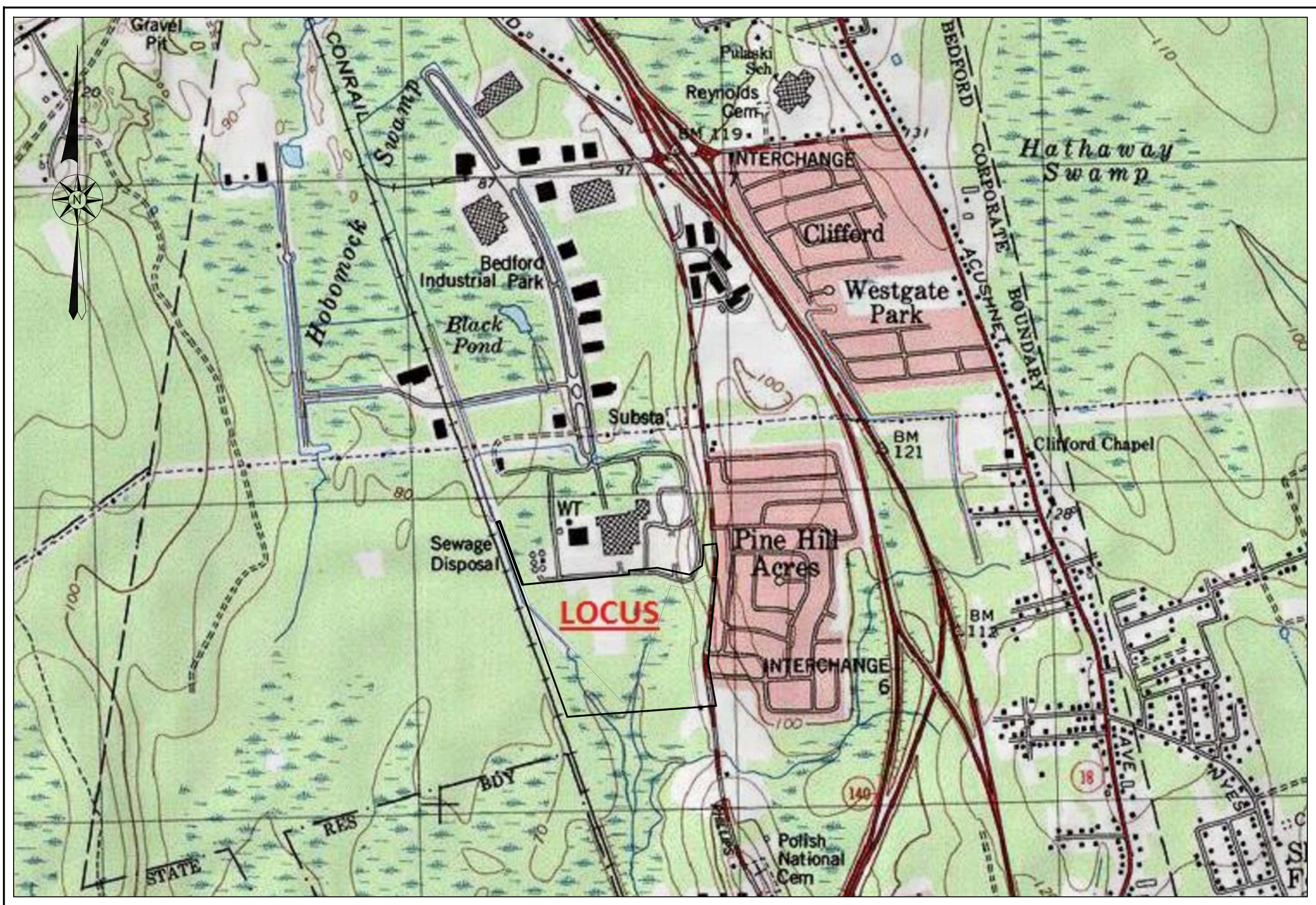
# SITE PLAN



S I T E P L A N M O D I F I C A T I O N  
50 DUCHAINE BOULEVARD  
ASSESSORS MAP #134 LOTS #456, 457, 458, & 459  
NEW BEDFORD, MASSACHUSETTS



— OVERALL SITE MAP —  
SCALE: 1"=300'



— AREA MAP —  
SCALE: 1"=1,000'±

— ZONING DATA —			
DISTRICT: INDUSTRIAL C			
DESCRIPTION	REQUIRED	EXISTING	PROVIDED
LOT AREA	0 S.F.	58.14 AC	58.14 AC
LOT FRONTAGE	0 FT	1681.85 FT	1681.85 FT
FRONT SETBACK	25 FT	756 FT	756 FT
SIDE SETBACK	25 FT	219 FT	219 FT
REAR SETBACK	25 FT	922 FT	522 FT
BUILDING HEIGHT (MAXIMUM)	100 FT	<100 FT	<100 FT
BUILDING COVERAGE (MAXIMUM)	50 %	6.0 %	6.0 %
LOT COVERAGE (MAXIMUM)	80 %	10.5 %	16.9 %
— PARKING REQUIREMENT —			
PRINCIPAL USE: ENERGY SUPPLIER CORPORATE OFFICES			
(FOR PARKING REGULATION PURPOSES: BUSINESS ENGAGED IN WAREHOUSING & DISTRIBUTION)			
REQUIREMENT	REQUIRED	PROVIDED	
1 SPACE PER 1,500 S.F. OF G.F.A. UP TO 15,000 S.F. THEREAFTER, ON ADDITIONAL SPACE FOR EACH 5,000 S.F. OR PORTION THEREOF IN EXCESS OF 15,000 S.F., PLUS ONE SPACE FOR EACH VEHICLE UTILIZED IN THE BUSINESS.	41 SPACES	208 SPACES	
WHEN 51-75 TOTAL PARKING SPACES ARE PROVIDED, 3 MUST BE ACCESSIBLE SPACES. ONE IN EVERY EIGHT ACCESSIBLE SPACES, BUT NOT LESS THAN ONE, SHALL BE VAN ACCESSIBLE.	3 ACCESSIBLE, 1 VAN ACCESSIBLE	5 ACCESSIBLE, 2 VAN ACCESSIBLE	

— INDEX —			
SHEET	DESCRIPTION	SHEET	DESCRIPTION
1	COVER	5	UTILITIES & GRADING
2	NOTES & LEGEND	6	LANDSCAPE
3	EXISTING CONDITIONS	7-8	DETAILS
4	LAYOUT	9	MODIFICATION PLAN

RECORD OWNER:  
ASSESSORS MAP 134  
LOTS 456, 457, 458, & 459  
NSTAR ELECTRIC CO.  
A.K.A. EVERSOURCE ENERGY  
247 STATION DRIVE  
WESTWOOD, MA 02090  
LC CERT(S)#: 23855 & 24085

REVISIONS

[www.FarlandCorp.com](http://www.FarlandCorp.com)  
401 COUNTY STREET  
NEW BEDFORD, MA 02740  
P. 508.717.3479  
OFFICES IN:  
• TAUNTON  
• MARLBOROUGH  
• WARWICK, RI

DRAWN BY: JKM/MJW  
DESIGNED BY: CAF  
CHECKED BY: CAF

S I T E P L A N  
50 DUCHAINE BLVD  
ASSESSORS MAP 134 LOTS 456, 457, 458 & 459  
NEW BEDFORD, MASSACHUSETTS  
PREPARED FOR:  
EVERSOURCE ENERGY  
PO BOX 10085  
DULUTH, GA 30096

NOVEMBER 18, 2016  
SCALE: AS NOTED  
JOB NO. 15-500  
LATEST REVISION:  
COVER SHEET  
SHEET 1 OF 9



GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIG SAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
2. PROPERTY LINE INFORMATION TAKEN FROM:
  - PLAN ENTITLED: "PLAN OF LAND IN NEW BEDFORD, MASS., SURVEYED FOR POLAROID CORPORATION", DATED JUNE 10, 1969 BY TIBBETS ENGINEERING CORP. (PLAN BOOK 81, PAGE 78), AND
  - LAND COURT PLAN 36318C, ENTITLED "SUBDIVISION PLAN OF LAND IN NEW BEDFORD", BY CULLINAN ENGINEERING CO., INC., SURVEYORS, DATED JANUARY 6, 2009 (LAND COURT CERTIFICATE OF TITLE NO. 22029).
3. TOPOGRAPHIC SURVEY PERFORMED BY THOMPSON FARLAND, INC. IN SEPTEMBER 2015.
4. WETLAND DELINEATION BY FARLAND CORP. IN JANUARY 2016.
5. VERTICAL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 AND HORIZONTAL LOCATIONS REFER TO THE NORTH AMERICAN DATUM (NAD) OF 1983.
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL STANDARDS AND REGULATIONS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY FOR THE WORK.
8. WHERE PROPOSED PAVEMENT AND WALKS ARE TO MEET EXISTING, THE CONTRACTOR SHALL SAWCUT A NEAT LINE AND MATCH GRADE. SEAL ALL JOINTS WITH HOT BITUMINOUS ASPHALT JOINT SEALER.
9. CURBING TO BE AS INDICATED ON THE PLANS.
10. ALL EXISTING TREES, SHRUBS AND GROUND COVER WHERE NATURAL GRADE IS TO BE RETAINED SHALL BE KEPT IN THEIR EXISTING STATE UNLESS REMOVAL IS REQUIRED FOR CONSTRUCTION PURPOSES.
11. ALL AREAS DISTURBED BY CONSTRUCTION AND NOT TO BE PAVED OR OTHERWISE TREATED AS NOTED ON PLAN SHALL BE TREATED WITH 4" OF LOAM, SEEDED AND HAY MULCHED FOR EROSION CONTROL.
12. SITE IMPROVEMENTS SHALL CONFORM TO A.D.A. SPECIFICATIONS.
13. LIGHTING SHALL BE DIRECTED ON SITE AND AWAY FROM TRAFFIC INTERFERENCE.
14. TEST PITS AND/OR BORINGS WERE TAKEN FOR THE PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY. THEY DO NOT NECESSARILY SHOW THE NATURE OF ALL MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
15. THE CONTRACTOR SHALL PROTECT AND/OR CAP OFF ALL EXISTING ON-SITE UTILITY SERVICES ACCORDING TO THE LOCAL AUTHORITY'S SPECIFICATIONS. SERVICES SHALL BE CAPPED OFF WHERE SAME ENTER THE PERIMETER OF THE PROPERTY LINE.
16. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL CONSTRUCTION DOCUMENTS, SPECIFICATIONS AND SITE CONDITIONS PRIOR TO BIDDING AND PRIOR TO CONSTRUCTION.
17. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE OWNER'S REPRESENTATIVE FOR CLARIFICATION AND RESOLUTION PRIOR TO BIDDING OR CONSTRUCTION.
18. THESE PLANS ARE PERMITTING PLANS AND SHALL NOT TO BE USED FOR CONSTRUCTION. A FINAL SET OF STAMPED PLANS FOR CONSTRUCTION WILL BE ISSUED AFTER RECEIVING FINAL APPROVAL FROM THE LOCAL AND/OR STATE DEPARTMENTS.
19. ANY MINOR MODIFICATIONS (AS DETERMINED BY THE CITY ENGINEER) TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO WORK BEING PERFORMED.
20. ANY WORK AND MATERIAL WITHIN THE CITY RIGHT-OF-WAY SHALL CONFORM TO THE CITY OF NEW BEDFORD REQUIREMENTS.
21. ALL HANDICAP PARKING, RAMPS, AND ACCESS SHALL CONFORM TO AAB & MAAB REQUIREMENTS.
22. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO CITY OF NEW BEDFORD CONSERVATION COMMISSION REQUIREMENTS AS STATED IN THE ORDER OF CONDITIONS.
23. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO MUTCD REQUIREMENTS.
24. THE CONTRACTOR SHALL OBTAIN A STREET DISTURBANCE & OBSTRUCTION PERMIT PRIOR TO ANY CONSTRUCTION WITHIN THE RIGHT OF WAY.
25. ALL WATER AND SEWER MATERIAL AND CONSTRUCTION SHALL CONFORM TO THE CITY OF NEW BEDFORD REQUIREMENTS.
26. ALL WATER AND SEWER CONSTRUCTION SHALL BE INSPECTED BY THE CITY OF NEW BEDFORD BEFORE BEING BACKFILLED.
27. THE CITY SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO THE REQUIRED INSPECTIONS.

CONSTRUCTION SEQUENCING NOTES

1. CONSTRUCT TEMPORARY AND PERMANENT EROSION CONTROL FACILITIES. EROSION CONTROL FACILITIES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING.
2. TREE PROTECTION FENCE SHALL BE INSTALLED AND APPROVED BY THE OWNER REPRESENTATIVE PRIOR TO ANY EARTH MOVING.
3. ALL PERMANENT DITCHES AND SWALES ARE TO BE STABILIZED WITH VEGETATION OR RIP RAP PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR CUT, DEMOLISH AND DISPOSE OF EXISTING SITE ELEMENTS NOT TO REMAIN.
5. STORMWATER SHALL NOT BE DIRECTED TOWARDS THE INFILTRATION BASINS UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.
6. GRADE AND GRAVEL ALL PAVED AREAS. ALL PROPOSED PAVED AREAS SHALL BE STABILIZED IMMEDIATELY AFTER GRADING.
7. BEGIN ALL PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED IMMEDIATELY AFTER THEIR CONSTRUCTION.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT FENCES AND MULCH AND SEED AS REQUIRED.
9. FINISH PAVING ALL HARD SURFACE AREAS.
10. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
11. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
12. REMOVE TEMPORARY EROSION CONTROL MEASURES.
13. THE CONSTRUCTION SEQUENCE SHALL BE CONFINED TO THE LIMIT OF WORK AS SHOWN ON THE DRAWINGS.
14. UPON COMPLETION OF CONSTRUCTION THE OWNER SHALL AGREE TO MAINTAIN AND CLEAN ALL DRAINAGE STRUCTURES AS REQUIRED.

SITE PREPARATION NOTES

1. WITHIN THE LIMIT OF WORK LINE AS NOTED ON THE SITE PLANS, REMOVE AND DISCARD ALL CONCRETE PAVEMENT, BITUMINOUS CONCRETE PAVEMENT, BRICK PAVEMENT, TOP SOIL, MULCH, TRASH, DEAD TREES AND STUMPS, SHRUBBERY, CHAIN LINK FENCE POSTS, RAILS, FABRIC, GATES, FOOTINGS AND ALL APPURTENANCES, BOLLARDS, POSTS, CONCRETE FOOTINGS AND FOUNDATIONS, WALLS AND CURBS UNLESS OTHERWISE NOTED.
2. THE OWNER'S REPRESENTATIVE SHALL BE CONSULTED AND WILL REVIEW THE WORK ON SITE WITH THE CONTRACTOR BEFORE ANY WORK SHALL COMMENCE.
3. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO CONTRACTOR OPERATIONS.
5. ALL ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS EFFORTS OF THE DEMOLITION WITH ALL TRADES.
7. THE CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
8. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADES AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MANHOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER'S REPRESENTATIVE.

UTILITY AND GRADING NOTES

1. ALL ON-SITE STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE PIPE (HDPE) OR RCP, UNLESS NOTED OTHERWISE.
2. HDPE PIPE SHALL CONFORM WITH ASHTO DESIGNATIONS M294 AND M252, SHALL BE MANUFACTURED WITH HIGH DENSITY POLYETHYLENE PLASTIC AND SHALL BE ADS N-12 PIPE AS MANUFACTURED BY ADVANCE DRAINAGE SYSTEM, INC. OR HANCOR HI Q PIPE AS MANUFACTURED BY HANCOR, INC. OR APPROVED EQUAL UNLESS OTHERWISE NOTED OR DETAILED.
3. BEFORE THE DEVELOPMENT SITE IS GRADED, THE AREA OF THE DRAINAGE BASINS SHOULD BE FENCED OFF TO PREVENT HEAVY EQUIPMENT FROM COMPACTING THE UNDERLYING SOIL.
4. WHERE PROPOSED GRADES MEET EXISTING GRADES, CONTRACTOR SHALL BLEND GRADES TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING AND NEW WORK. PONDING AT TRANSITION AREAS WILL NOT BE ALLOWED.
5. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS AND STRUCTURES.
6. MAXIMUM SLOPE IN DISTURBED AREAS SHALL NOT EXCEED 3:1, UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL VERIFY EXISTING GRADES AND NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES.
8. CONTRACTOR SHALL ADJUST UTILITY ELEMENT MEANT TO BE FLUSH WITH GRADE THAT IS AFFECTED BY SITE WORK OR GRADE CHANGES, WHETHER SPECIFICALLY NOTED ON PLANS OR NOT.
9. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE OWNER'S REPRESENTATIVE FOR RESOLUTION OF THE CONFLICT.
10. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF ALL GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
11. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY AND APPROVED BY THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE AND ELECTRICAL). FINAL DESIGN AND LOCATIONS AT THE BUILDING WILL BE PROVIDED BY THE ARCHITECT. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE UTILITY CONNECTIONS WITH THE RESPECTIVE COMPANIES PRIOR TO ANY UTILITY CONSTRUCTION.

LAYOUT AND MATERIAL NOTES

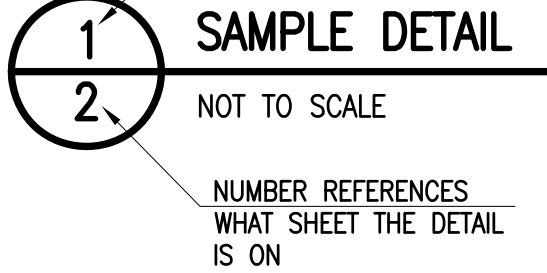
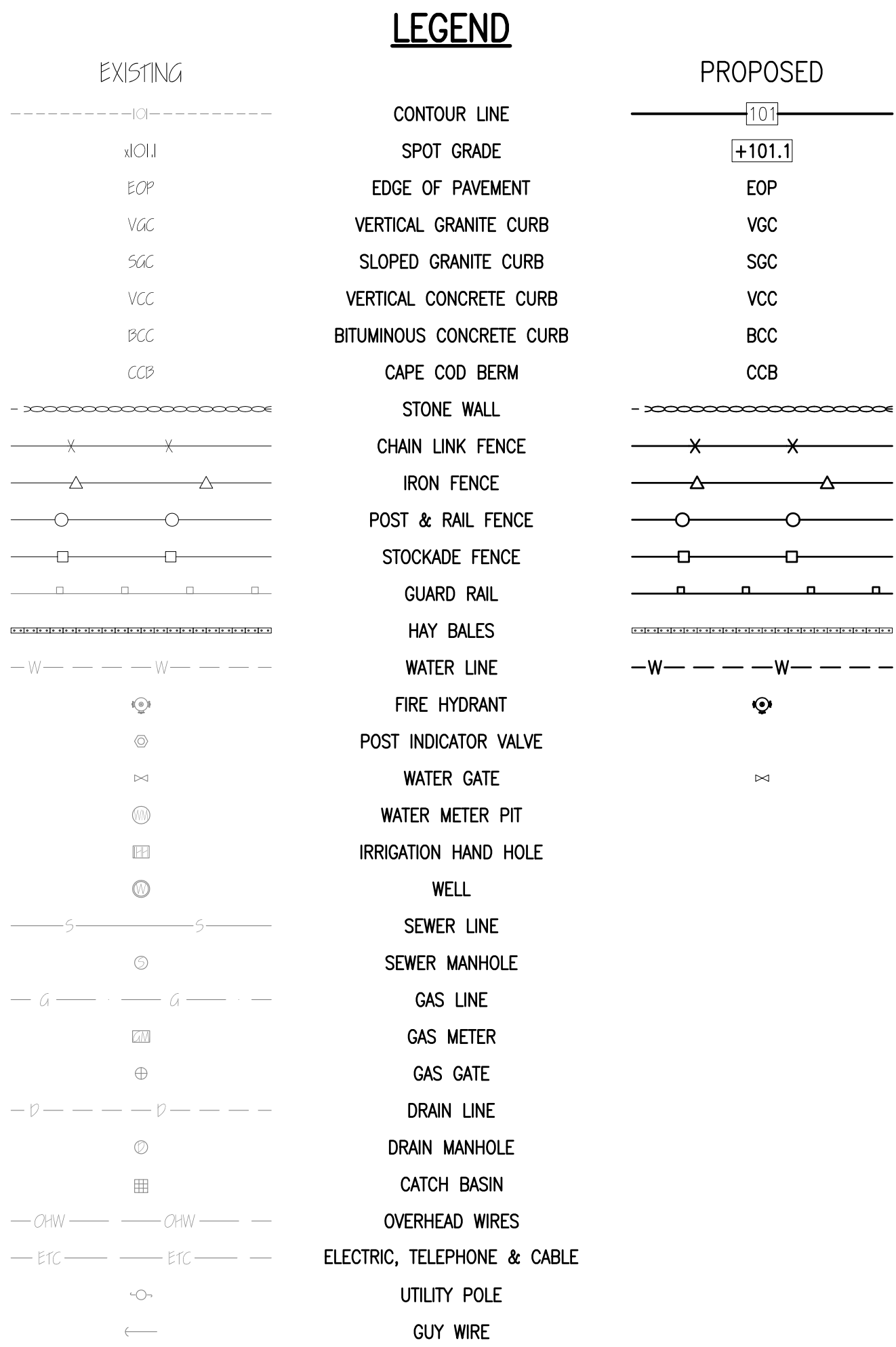
1. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL CONSTRUCTION DOCUMENTS, SPECIFICATIONS AND SITE CONDITIONS PRIOR TO BIDDING AND PRIOR TO CONSTRUCTION.
2. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE OWNER'S REPRESENTATIVE FOR CLARIFICATION AND RESOLUTION PRIOR TO BIDDING OR CONSTRUCTION.
3. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND ALL DETAILS CONTIGUOUS TO THE BUILDING INCLUDING SIDEWALKS, RAMPS, UTILITY ENTRANCE LOCATIONS, WALL PACKS, CONCRETE DOOR PADS, ROOF DRAINS, ETC.
4. ACCESSIBLE CURB RAMPS SHALL BE PER THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD AND THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES, WHICH IS MORE STRINGENT.
5. THE FOLLOWING LAYOUT CRITERIA SHALL CONTROL UNLESS OTHERWISE NOTED ON THE PLAN:
  - ALL DIMENSIONS ARE TO OUTSIDE FACE OF BUILDING.
  - ALL DIMENSIONS ARE TO FACE OF CURB AT GUTTER LINE.
  - ALL DIMENSIONS ARE TO CENTER OF PAVEMENT MARKINGS.
  - ALL TIES TO PROPERTY LINES ARE PERPENDICULAR TO THE PROPERTY LINE UNLESS OTHERWISE NOTED.

GENERAL PLANTING NOTES

1. ALL PLANT MATERIAL SHALL CONFORM TO THE STANDARDS OF THE AMERICAN ASSOCIATION OF NURSERYMEN OR THE PLANT MATERIAL WILL BE UNACCEPTABLE. ALL PLANT MATERIAL SHALL BE TRUE TO SPECIES, VARIETY, SIZE AND BE CERTIFIED DISEASE AND INSECT FREE. THE OWNER AND/OR THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO APPROVE ALL PLANT MATERIAL ON SITE PRIOR TO INSTALLATION.
2. ALL PLANT MATERIAL SHALL BE PROPERLY GUYED, STAKED, WRAPPED, AND PLANTED IN CONFORMANCE WITH THE TYPICAL PLANTING DETAILS. GUY WIRES SHALL BE ATTACHED TO THE TREE AT A HEIGHT OF TWO-THIRDS THE HEIGHT OF THE TREE AND SHOULD BE LOCATED AT POINTS SO AS NOT TO SPLIT THE TRUNK OF MULTI-STEMMED TREES. PROVIDE THREE STAKES PER TREE UNLESS NOTED OTHERWISE. INSTALL ALL PLANT MATERIAL ON UNDISTURBED GRADE. PROVIDE BURLAP WRAPPING WITH A 50% OVERLAP. CUT AND REMOVE BURLAP FROM TOP ONE-THIRD OF THE ROOT BALL.
3. PROVIDE PLANTING PITS AS INDICATED ON PLANTING DETAILS. BACKFILL PLANTING PITS WITH ONE PART EACH OF TOP SOIL, PEAT MOSS, AND PARENT MATERIAL. IF WET SOIL CONDITIONS EXIST THEN PLANTING PITS SHALL BE EXCAVATED AN ADDITIONAL 12" AND FILLED WITH SAND.
4. NEWLY INSTALLED PLANT MATERIAL SHALL BE WATERED AT THE TIME OF INSTALLATION AND SHALL BE SUBSEQUENTLY FLOODED TWICE WITHIN TWENTY-FOUR (24) HOURS OF PLANTING. REGULAR WATERING SHALL BE PROVIDED TO ENSURE THE ESTABLISHMENT, GROWTH AND SURVIVAL OF ALL PLANTS.
5. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR ONE YEAR AFTER THE DATE OF FINAL ACCEPTANCE, ANY PLANT MATERIAL THAT DIES WITHIN THAT TIME PERIOD SHALL BE REMOVED, INCLUDING THE STUMP, AND REPLACED WITH MATERIAL OF SIMILAR SIZE AND SPECIES AT THE EXPENSE OF THE DEVELOPER. THE REPLACED PLANT MATERIAL SHALL BE GUARANTEED FOR ONE YEAR AFTER THE REPLACEMENT DATE.
6. THE LANDSCAPE CONTRACTOR SHALL PROVIDE A MINIMUM 4" LAYER OF TOPSOIL IN ALL LAWN AREAS AND A MINIMUM OF 6" OF TOPSOIL IN ALL PLANTING AREAS. A FULL SOIL ANALYSIS SHALL BE CONDUCTED AFTER CONSTRUCTION AND PRIOR TO PLANTING TO DETERMINE THE EXTENT OF SOIL AMENDMENT REQUIRED.
7. ALL DISTURBED LAWN AREAS SHALL BE STABILIZED WITH EITHER SOD OR SEED AS INDICATED ON THE LANDSCAPE PLANS. SEED SHALL CONSIST OF THE MIXTURE LISTED IN THE GENERAL SEEDING NOTES. ALL DISTURBED LAWN AREAS SHALL BE TOP SOILED, LIMED, FERTILIZED, AND FINE GRADED PRIOR TO LAWN INSTALLATION.
8. ALL PLANTING BEDS SHALL RECEIVE 3" OF SHREDDED PINE, CEDAR OR HEMLOCK BARK.
9. ALL SHRUB MASSES SHALL BE PLANTED IN CONTINUOUS MULCHED BEDS.
10. ALL TREES ARE TO BE GUYED, 3 EACH, UNLESS OTHERWISE NOTED ON PLAN.
11. ALL DECIDUOUS TREES ARE TO BE WRAPPED, WITH TREE WRAP, UP TO THE FIRST BRANCHING AND SECURED.
12. THE LANDSCAPE CONTRACTOR IS TO PERFORM ALL CONTRACTED WORK IN A REASONABLE PERIOD OF CONTINUOUS WORK.
13. THE LANDSCAPE CONTRACTOR IS TO MAINTAIN PLANT MATERIAL WHILE THE PROJECT IS UNDERWAY AND FOR A PERIOD OF TWO WEEKS AFTER THE COMPLETION OF THE PROJECT UNLESS OTHERWISE SPECIFIED.
14. THE CONTRACTOR IS TO CLEAN UP AND REMOVE ANY DEBRIS FROM THE SITE, CAUSED BY THE LANDSCAPE CONTRACTOR.

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. THE CONSERVATION COMMISSION SHALL BE NOTIFIED, AT LEAST 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
2. A COPY OF THE SOIL EROSION AND SEDIMENT CONTROL PLAN MUST BE MAINTAINED ON THE PROJECT SITE DURING CONSTRUCTION.
3. SOIL EROSION AND SEDIMENT CONTROL PRACTICES IN THE PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
4. ALL APPLICABLE SOIL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN PLACE PRIOR TO ANY DEMOLITION GRADING OPERATIONS AND/OR INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES.
5. ALL APPLICABLE SOIL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE LEFT IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND/OR THE AREA IS STABILIZED.
6. ALL SOIL EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED AND MAINTAINED ON A REGULAR BASIS AND AFTER EVERY STORM EVENT.
7. THE MAINTENANCE OF SOIL EROSION AND SEDIMENT CONTROL MEASURES AND FACILITIES DURING AND IMMEDIATELY AFTER CONSTRUCTION RESTS WITH THE GENERAL CONTRACTOR. UPON ACCEPTANCE OF THE PROJECT, THE OWNER SHALL BECOME RESPONSIBLE FOR MAINTENANCE OF ANY REMAINING MEASURES AND FACILITIES.
8. OFF SITE SEDIMENT DISTURBANCE MAY REQUIRE ADDITIONAL CONTROL MEASURES TO BE DETERMINED BY THE ENGINEER.
9. THE CONSERVATION COMMISSION AND/OR ENGINEER MAY REQUIRE ADDITIONAL SOIL EROSION MEASURES TO BE INSTALLED, AS DIRECTED BY THE DISTRICT INSPECTOR.
10. ADJOINING PROPERTIES SHALL BE PROTECTED FROM EXCAVATION AND FILLING OPERATIONS AT ALL TIMES.
11. THE CONTRACTOR SHALL UTILIZE ALL METHODS NECESSARY TO PREVENT BLOWING AND MOVEMENT OF DUST FROM THE EXPOSED SOIL SURFACES.
12. PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.
13. A CRUSHED STONE TIRE CLEANING PAD WILL BE INSTALLED WHEREVER A CONSTRUCTION ENTRANCE EXISTS. SEE LOCATION DETAIL ON PLAN.
14. ALL CATCH BASIN INLETS SHALL BE PROTECTED DURING CONSTRUCTION AS DETAILED ON THE PLAN, IF APPLICABLE.
15. ALL STORM DRAINAGE OUTLETS SHALL BE PROTECTED AS REQUIRED HEREON BEFORE DISCHARGE POINTS BECOME OPERATIONAL.
16. THE SITE SHALL AT ALL TIMES BE GRADED AND MAINTAINED SUCH THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.
17. LAND AREAS EXPOSED AT ANY ONE TIME AND THE LENGTH OF EXPOSURE SHALL BE KEPT TO A PRACTICAL MINIMUM. THEY SHALL BE LEFT IN A NEAT AND FINISHED APPEARANCE AND PROTECTED FROM EROSION.
18. ANY DISTURBED AREA THAT WILL BE LEFT EXPOSED FOR MORE THAN SIXTY (60) DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING AND FERTILIZATION. IF THE SEASON PROHIBITS TEMPORARY SEEDING, THE DISTRIBUTED AREAS SHALL BE MULCHED.
19. ALL CRITICAL AREAS SUBJECT TO EROSION SHALL RECEIVE A TEMPORARY SEEDING AND BE MULCHED IN ACCORDANCE WITH THE SPECIFICATIONS IMMEDIATELY FOLLOWING ROUGH GRADING.
20. IMMEDIATELY AFTER COMPLETION OF STRIPPING AND STOCKPILING OF TOPSOIL, SEED THE STOCKPILE WITH ANNUAL RYE GRASS. STABILIZE TOPSOIL STOCKPILES WITH STRAW MULCH FOR PROTECTION IF THE SEASON DOES NOT PERMIT THE APPLICATION AND ESTABLISHMENT OF TEMPORARY SEEDING.
21. SOIL STOCKPILES ARE NOT TO BE LOCATED WITHIN FIFTY (50) FEET OF WETLANDS, THE FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITIES. THE BASE OF ALL STOCKPILES SHALL BE PROTECTED BY A HAY BALE BARRIER OR SEDIMENT FENCE. LOCATIONS ARE DELINEATED ON THE PLAN.
22. MAXIMUM SIDE SLOPES OF ALL EXPOSED SURFACES SHALL NOT BE CONSTRUCTED STEEPER THAN 3:1 UNLESS OTHERWISE APPROVED BY THE DISTRICT.
23. ALL AREAS NOT STABILIZED BY CONSTRUCTION, SODDING OR LANDSCAPING SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE SEEDING AND MULCHING SPECIFICATIONS.
24. MULCHING IS REQUIRED ON ALL SEEDED AREAS TO INSURE AGAINST EROSION BEFORE GRASS IS ESTABLISHED TO PROMOTE EARLIER VEGETATIVE COVER.
25. ALL DEWATERING OPERATIONS MUST DISCHARGE DIRECTLY INTO A SEDIMENT FILTRATION DEVICE. THE SEDIMENT FILTER MUST BE CAPABLE OF FILTERING THE SEDIMENT AND BE PLACED SO AS NOT TO CAUSE EROSION OF THE DOWNSTREAM AREA.



REVISIONS




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OFFICES IN:  
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•WARWICK, RI

DRAWN BY: JKM/MJW  
DESIGNED BY: CAF  
CHECKED BY: CAF

SITE PLAN

50 DUCHAINE BLVD

ASSESSORS MAP 134 LOTS 456, 457, 458 & 459

NEW BEDFORD, MASSACHUSETTS

PREPARED FOR:  
EVERSOURCE ENERGY  
PO BOX 100085 N2  
DULUTH, GA 30096

NOVEMBER 18, 2016

SCALE: N.T.S.

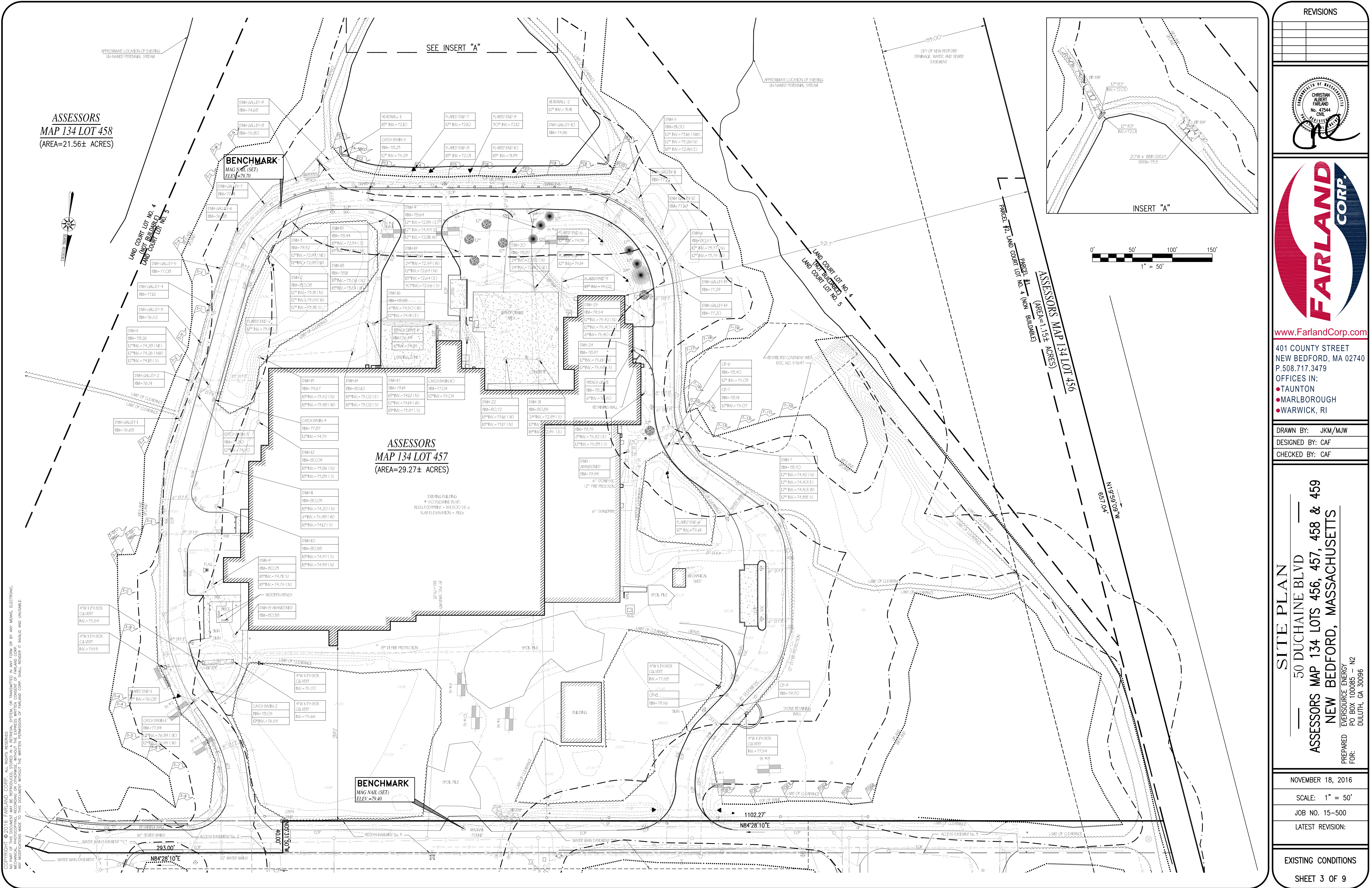
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LATEST REVISION:

NOTES & LEGEND

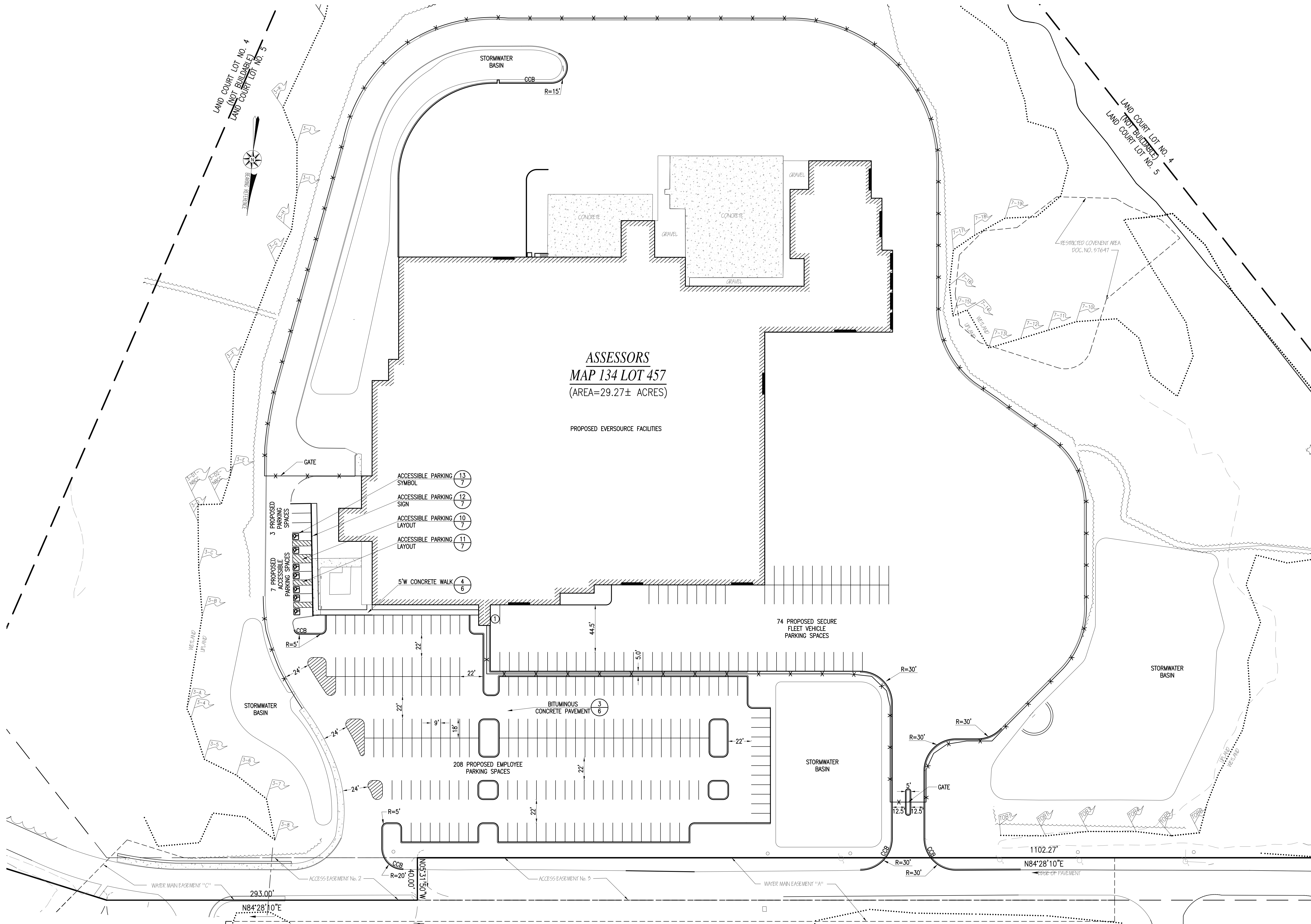
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ASSESSORS  
MAP 134 LOT 457  
(AREA=29.27± ACRES)

PROPOSED EVERSOURCE FACILITIES

- ACCESSIBLE PARKING SYMBOL (13/7)
- ACCESSIBLE PARKING SIGN (12/7)
- ACCESSIBLE PARKING LAYOUT (10/7)
- ACCESSIBLE PARKING LAYOUT (11/7)
- 5'W CONCRETE WALK (4/6)

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SITE PLAN

50 DUCHAINE BLVD

ASSESSORS MAP 134 LOTS 456, 457, 458 & 459

NEW BEDFORD, MASSACHUSETTS

PREPARED FOR:  
EVERSOURCE ENERGY  
PO BOX 10085 N2  
DULUTH, GA 30096

NOVEMBER 18, 2016

SCALE: 1"=40'

JOB NO. 15-500

LATEST REVISION:

LAYOUT

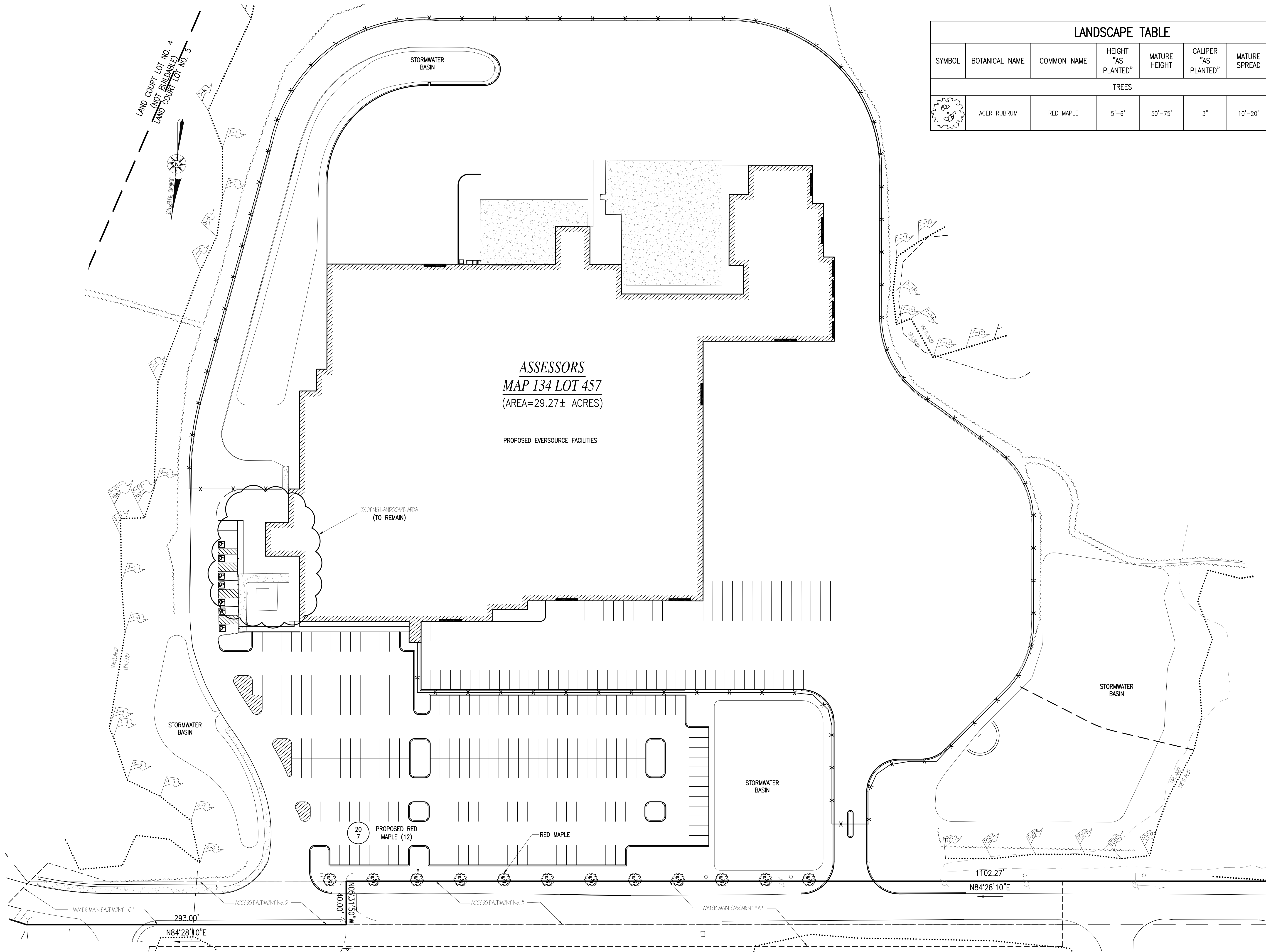
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LANDSCAPE TABLE							
SYMBOL	BOTANICAL NAME	COMMON NAME	HEIGHT "AS PLANTED"	MATURE HEIGHT	CALIPER "AS PLANTED"	MATURE SPREAD	QUANTITY
TREES							
	ACER RUBRUM	RED MAPLE	5'-6'	50'-75'	3"	10'-20'	7

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50 DUCHAINE BLVD

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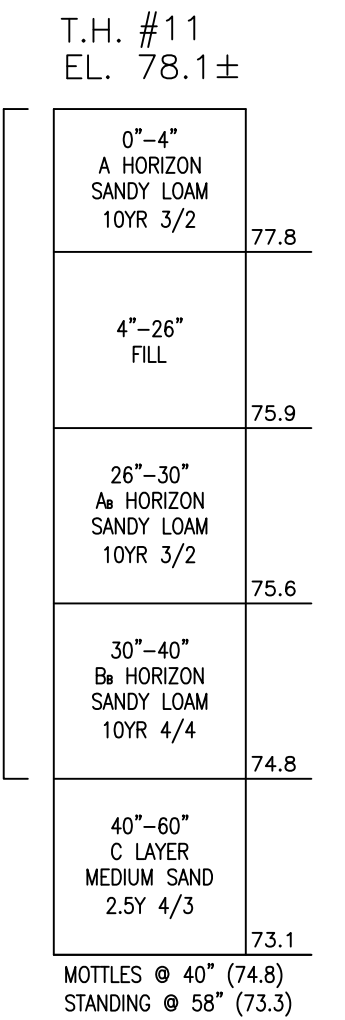
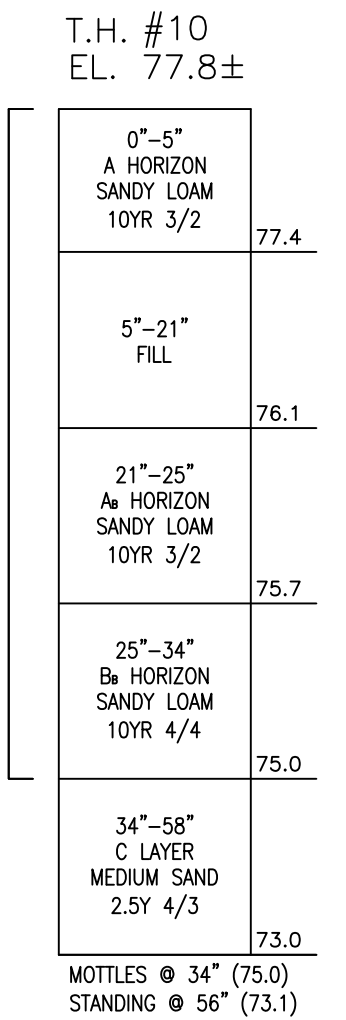
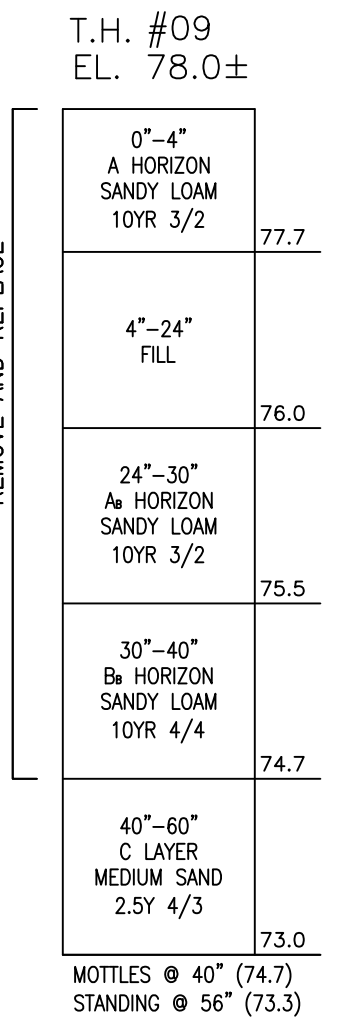
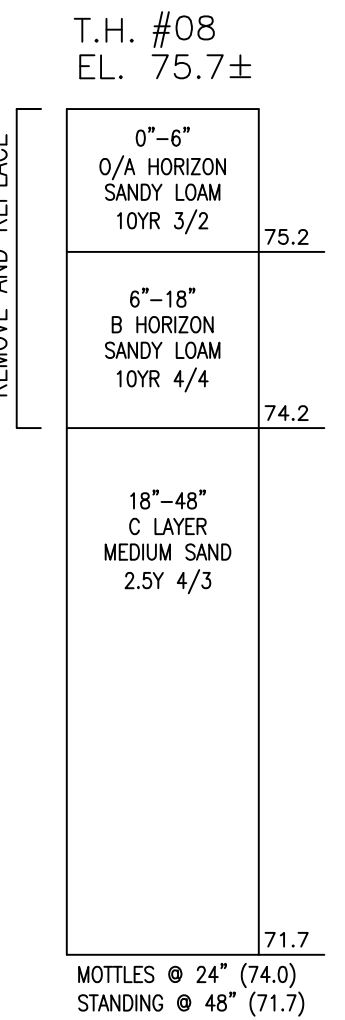
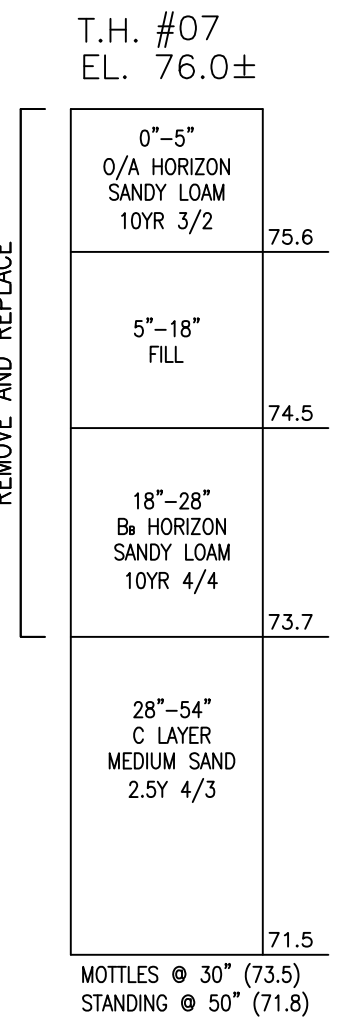
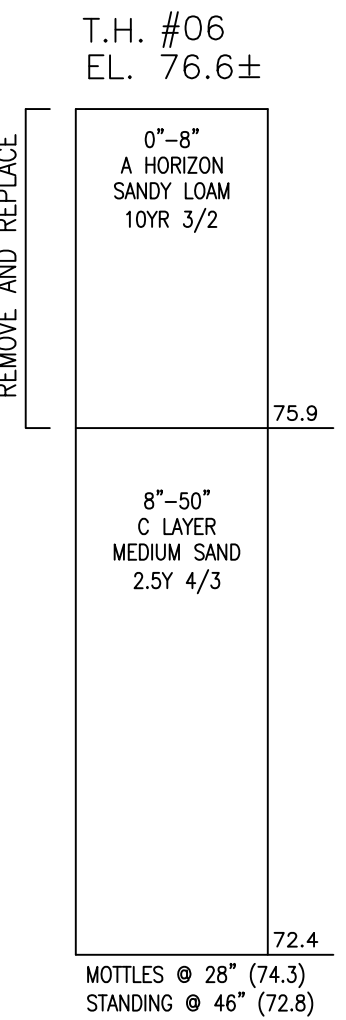
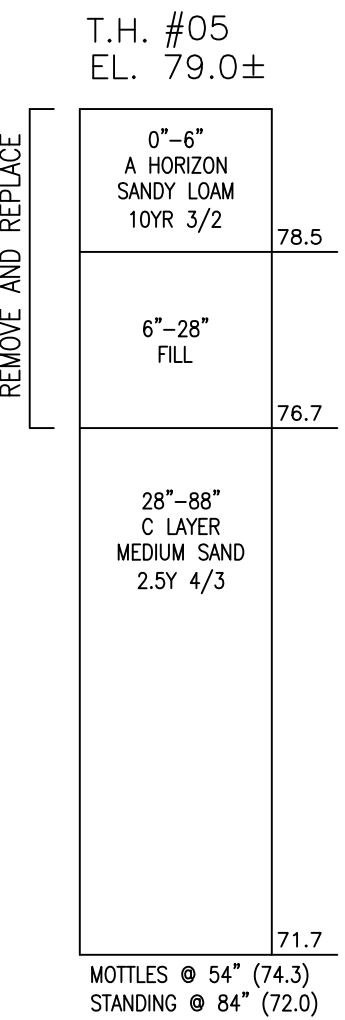
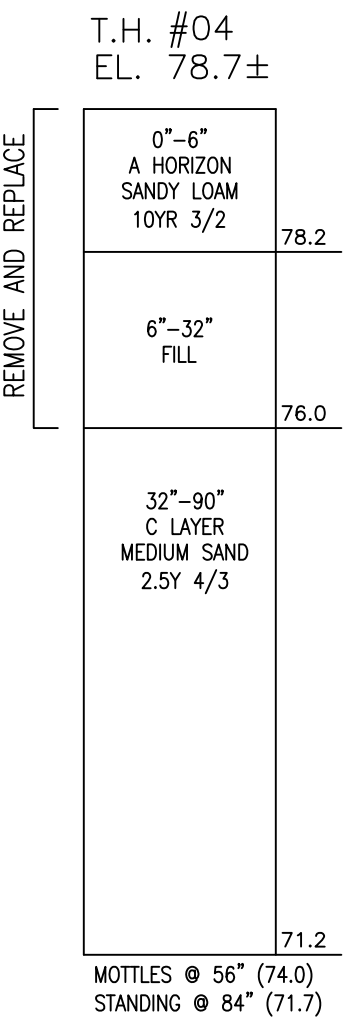
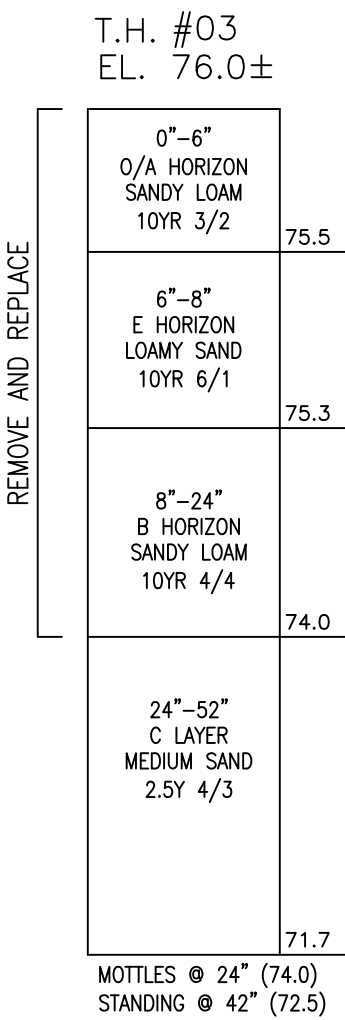
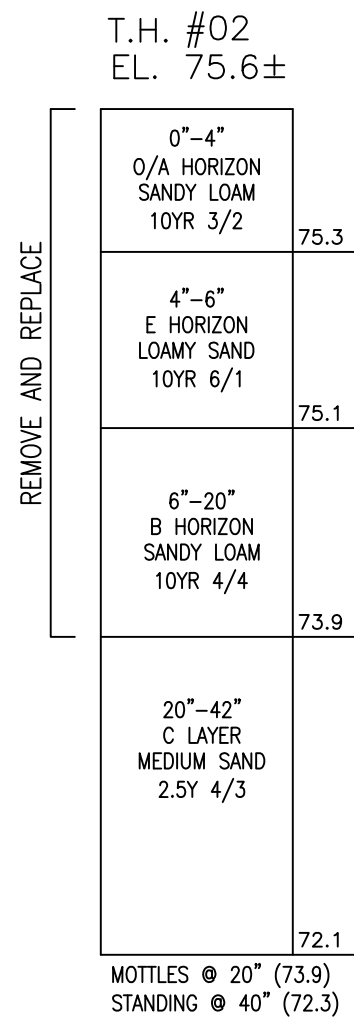
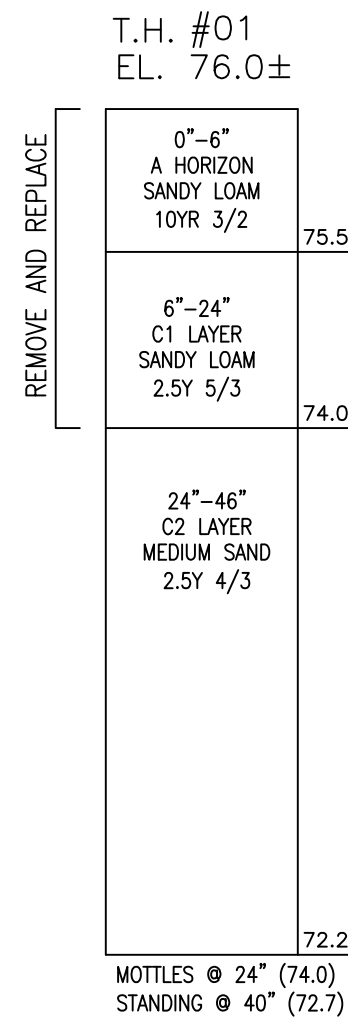
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LANDSCAPE

SHEET 6 OF 9

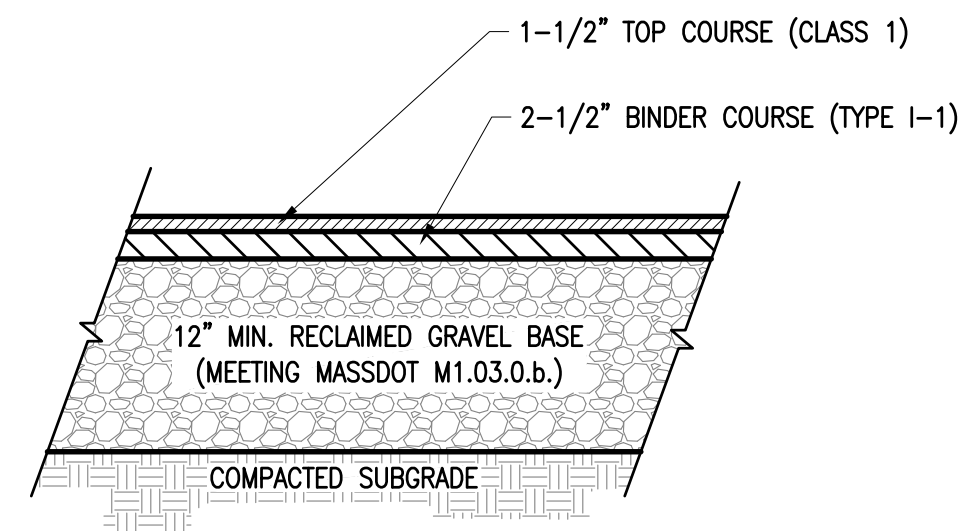
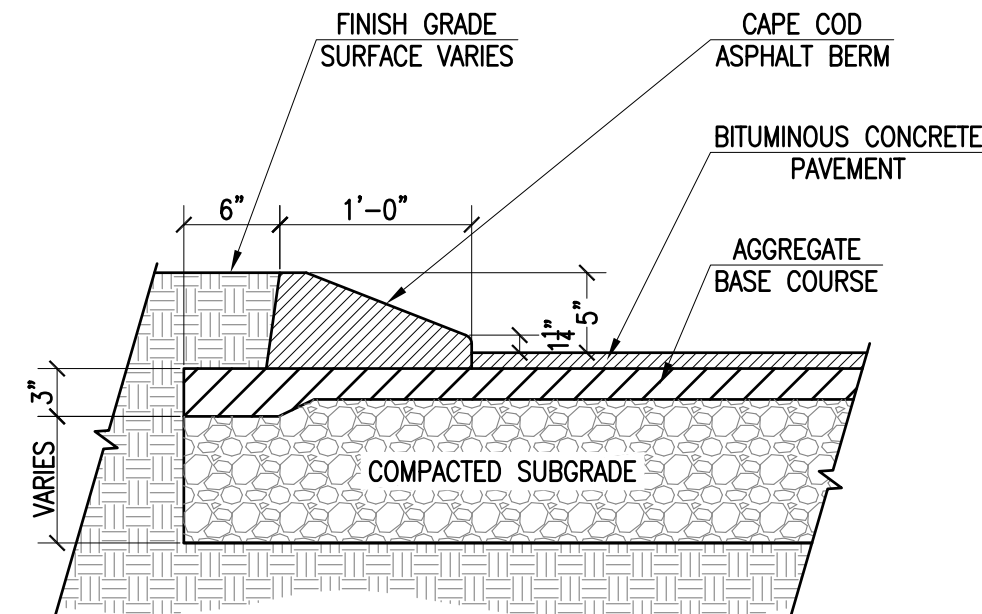


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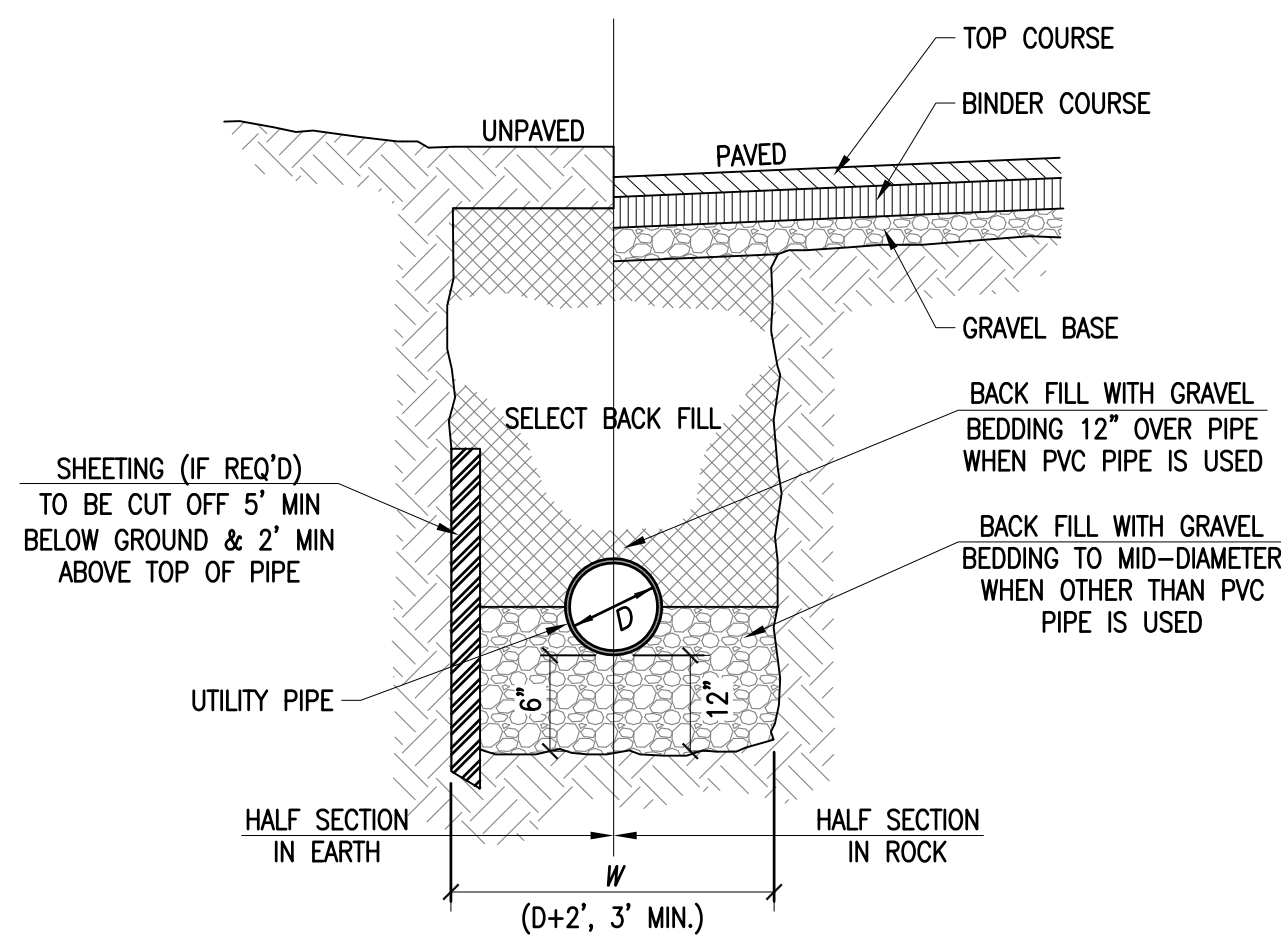
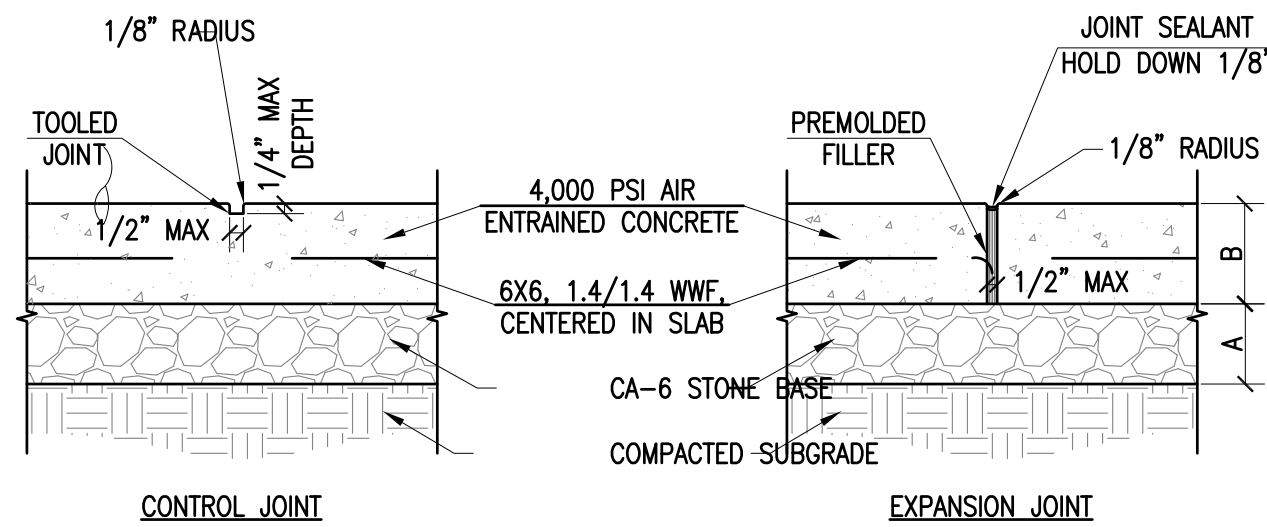


## 1 SOIL PROFILES

NOT TO SCALE



NOTE:  
UNLESS OTHERWISE NOTED ON PLANS, CONTRACTION JOINTS TO BE 5'-0" O.C. AND EXPANSION JOINTS TO BE 40'-0" O.C. MAX., OR AT BACK OF CURB, CHANGE OF DIRECTION, OTHER WALK, UTILITY APPURTENANCE, OR FACE OF STRUCTURE.



## 2 BITUMINOUS CONCRETE CAPE COD BERM

NOT TO SCALE

## 3 BITUMINOUS CONCRETE PAVEMENT - RECLAIMED

NOT TO SCALE

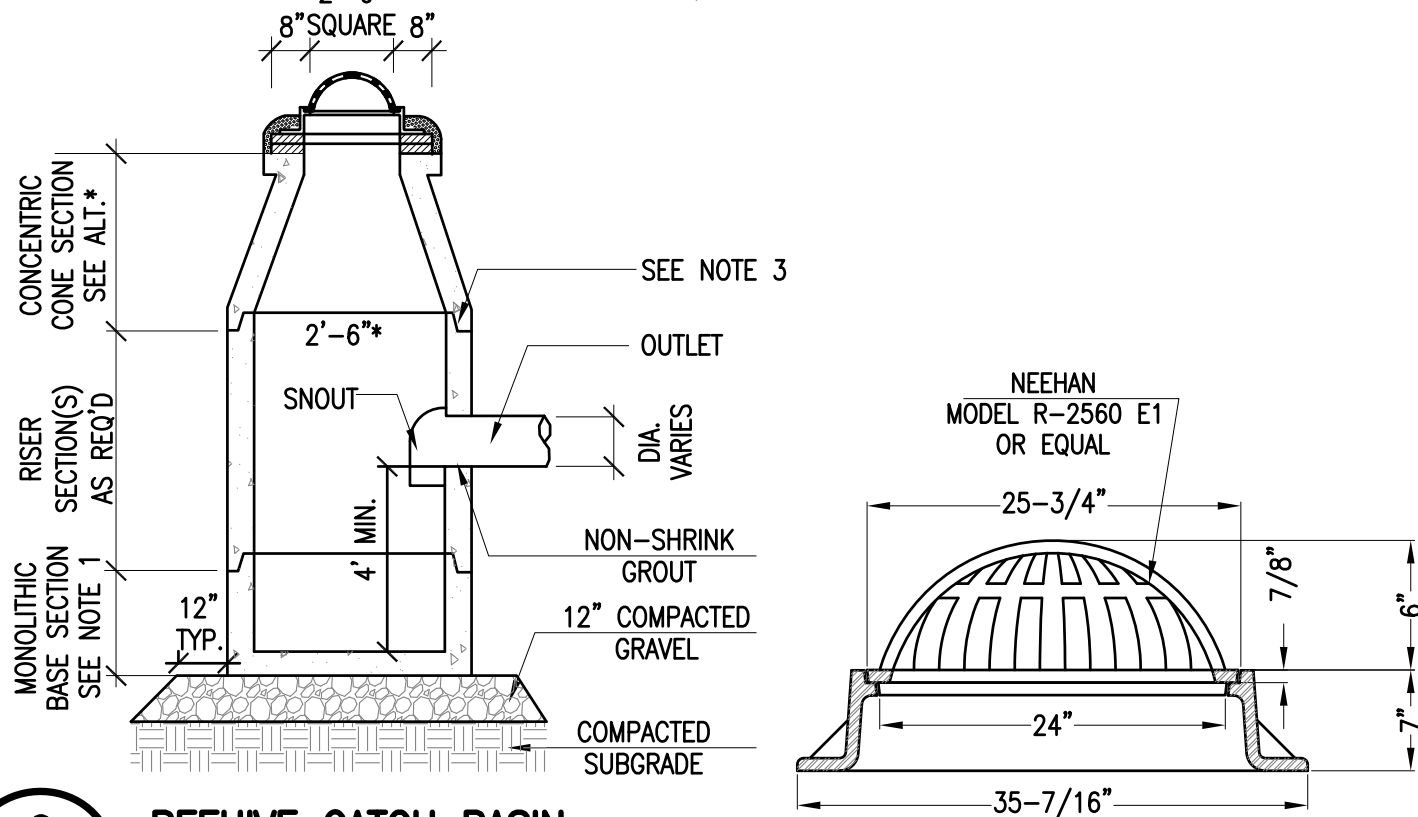
## 4 CONCRETE PAVEMENT SIDEWALK

NOT TO SCALE

## 5 UTILITY TRENCH

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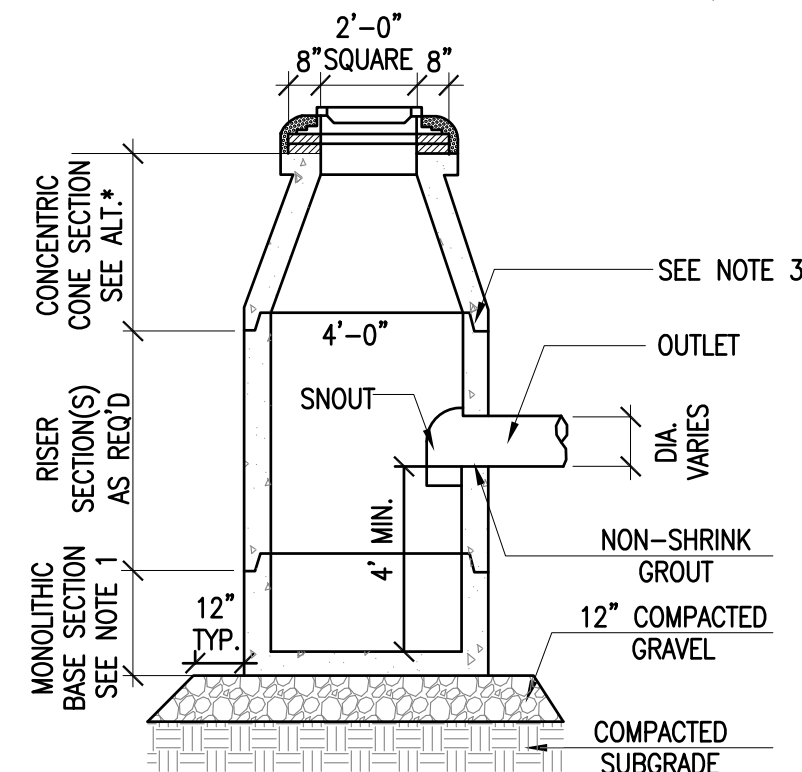
- NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
  2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 1" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
  3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
  4. CATCH BASIN FRAME SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR. (2 BRICK COURSES MIN. 5 BRICK COURSES MAX.)
  5. FRAME AND GRATE TO BE EQUAL TO NEENAH R-2560 E-1 BEEHIVE STYLE.



## 6 BEEHIVE CATCH BASIN

NOT TO SCALE

- NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
  2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 1" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
  3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
  4. MANHOLE FRAME SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR. (2 BRICK COURSES MIN. 5 BRICK COURSES MAX.)

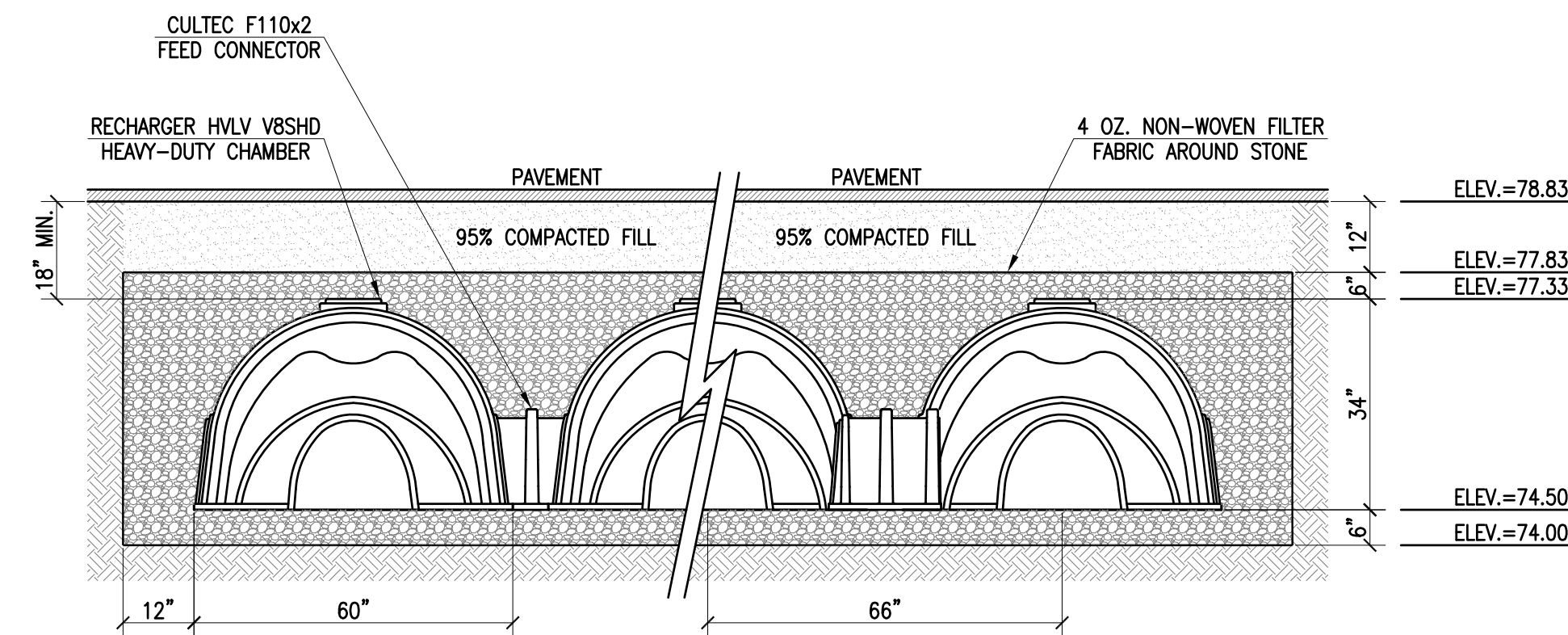


## 7 DEEP SUMP MANHOLE

NOT TO SCALE

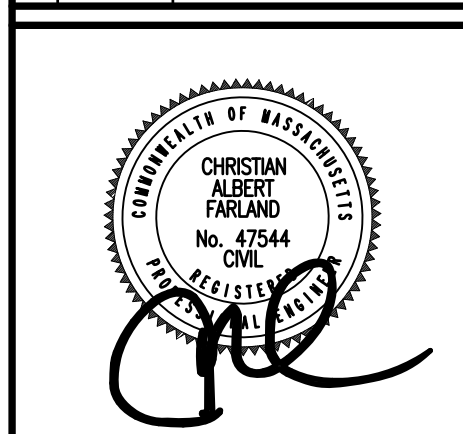
## 8 CULTEC RECHARGER V8HD HEAVY DUTY CROSS SECTION

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## REVISIONS

NO.	DESCRIPTION	DATE



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SITE PLAN  
50 DUCHAINE BLVD  
ASSESSORS MAP 134 LOTS 456, 457, 458 & 459  
NEW BEDFORD, MASSACHUSETTS  
PREPARED FOR:  
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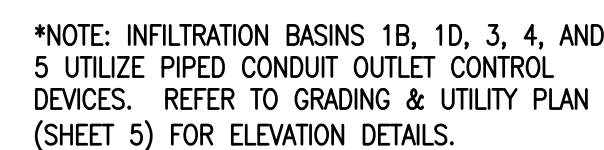
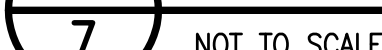
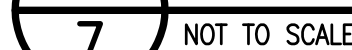
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SHEET 7 OF 9

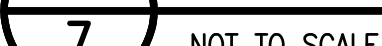




1. COLOR OF TACTILE DETECTABLE WARNINGS SHALL BE YELLOW.
2. CONTRACTOR SHALL INSTALL TILE PER MANUFACTURER'S SPECIFICATIONS
3. PREFERRED PRODUCT SHALL BE REPLACEABLE (WET-SET) COMPOSITE TACTILE BY ADA SOLUTIONS, INC. FOR PRICING QUOTATIONS, PLACING ORDERS, AND FURTHER INFORMATION, CALL JON MEHLMAN, EAST REGIONAL ACCOUNT DIRECTOR FOR ADA SOLUTIONS, INC. AT (800) 372-0519 or (978) 262-9900. DETAILED INFORMATION IS AVAILABLE AT [www.adaotile.com](http://www.adaotile.com).



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DESIGNED BY: CAF

CHECKED BY: CAF

**SITE PLAN**

---

— 50 DUCHAINE BLVD —  
ASSESSORS MAP 134 LOTS 456, 457, 458 & 459  
NEW BEDFORD, MASSACHUSETTS

PREPARED  
FOR: EVERSOURCE ENERGY  
PO BOX 100085 - N2  
DULUTH GA 30096

NOVEMBER 18, 2016

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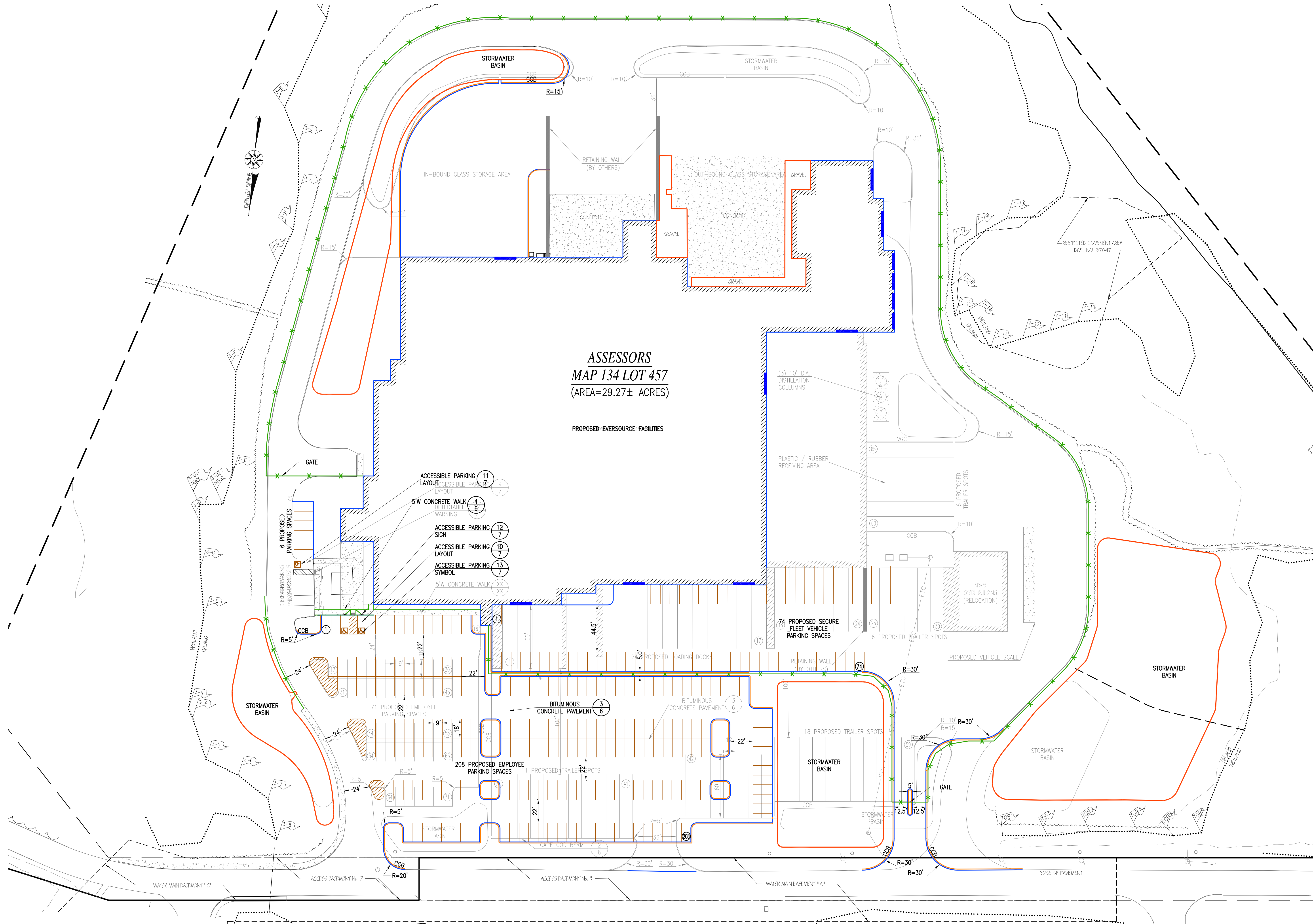
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ASSESSORS  
MAP 134 LOT 457  
(AREA=29.27± ACRES)

PROPOSED EVERSOURCE FACILITIES

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50 DUCHAINE BLVD

ASSESSORS MAP 134 LOTS 456, 457, 458 & 459

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NOVEMBER 18, 2016

SCALE: 1"=40'

JOB NO. 15-500

LATEST REVISION:

MODIFIED LAYOUT PLAN

SHEET 9 OF 9