Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Notice of Intent

FEBRUARY 2021

SPOFFORD POND SCHOOL

WSE PROJECT NO. ENG20-0865

PREPARED FOR:
TOWN OF BOXFORD

SUBMITTED TO:
BOXFORD CONSERVATION COMMISSION

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

Spofford Pond School - Boxford
WSE Project No. ENG20-0865

February 4, 2021

Boxford Conservation Commission
7A Spofford Road
Boxford, MA 01921

Re: NOI Filing
Spofford Pond School

Dear Members of the Commission:

On behalf of the Town of Boxford, Weston & Sampson Engineers, Inc. is hereby enclosing one (1) copy of the Notice of Intent submittal (including (1) plan set) and one (1) digital copy has been emailed to dircons@town.boxford.ma.us to fulfill the requirements of the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 submittal requirements and the Town of Boxford submittal requirements. This submittal is a formal Notice of Intent for the improvements to the Spofford Pond School.

As part of the filing, we have attached the following:

Appendix A: Project Description
Appendix B: Stormwater Report
Appendix C: Project Maps
Appendix D: Applicable Technical Specifications
Appendix E: Abutters Information
Appendix F: Wetlands Memorandum
Appendix G: Photos
Appendix H: SWPPP
Appendix I: Plans

If you have any questions regarding this submittal, please contact me at 978-532-1900 ext. 2117.

Very truly yours,

WESTON & SAMPSON

Devin Batchelder
Environmental Scientist

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
Boxford Wetlands Protection Bylaw, Town Code Ch. 192 & 375

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boxford
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):

31 Spofford Rd | Boxford | 01921
a. Street Address | b. City/Town | c. Zip Code

Latitude and Longitude: 42°41'49.26"N (d. Latitude) 71° 1'2.53"W (e. Longitude)

15/ 01/ 04
f. Assessors Map/Plat Number

g. Parcel /Lot Number

2. Applicant:

Stephen (a. First Name) Clifford (b. Last Name)

Town of Boxford
c. Organization

28 Middleton Road
d. Street Address

Boxford (e. City/Town) MA (f. State) 01921 (g. Zip Code)

(978)-887-0771 x 225 (h. Phone Number) (978)-887-8042 (i. Fax Number) sclifford@tritownschoolunion.com (j. Email Address)

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

a. First Name | b. Last Name

c. Organization

d. Street Address

e. City/Town | f. State | g. Zip Code

h. Phone Number | i. Fax Number | j. Email address

4. Representative (if any):

Devin (a. First Name) Batchelder (b. Last Name)

Weston & Sampson Engineers
c. Company

55 Walkers Brook Drive, Suite 100
d. Street Address

Reading (e. City/Town) MA (f. State) 01867 (g. Zip Code)

978-573-5802 (h. Phone Number) (i. Fax Number) batchelder.devin@wseinc.com (j. Email address)

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

Exempt (a. Total Fee Paid) Exempt (b. State Fee Paid) Exempt (c. City/Town Fee Paid)

A. General Information (continued)

6. General Project Description:
The Town of Boxford is seeking to replace and redesign the existing bituminous parking areas, sidewalks, and perimeter landscaped areas on the school property as well as will update current storm water drainage.

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

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

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

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

2. Limited Project Type:

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

8. Property recorded at the Registry of Deeds for:

a. County: Essex	b. Certificate # (if registered land):
c. Book: 4869	d. Page Number: 0084

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.

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. ☐	Bank	1. linear feet	2. linear feet
b. ☐	Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐	Land Under Waterbodies and Waterways	1. square feet	2. square feet
		3. cubic yards dredged	

Resource Area		Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐	Bordering Land Subject to Flooding	1. square feet	2. square feet
		3. cubic feet of flood storage lost	4. cubic feet replaced
e. ☐	Isolated Land Subject to Flooding	1. square feet	
		2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☐	Riverfront Area	1. Name of Waterway (if available) - **specify coastal or inland**	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

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

4. Proposed alteration of the Riverfront Area:

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

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

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

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

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

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
Boxford Wetlands Protection Bylaw, Town Code Ch. 192 & 375

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boxford
City/Town

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. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ 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. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

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

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boxford
City/Town

C. Other Applicable Standards and Requirements

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

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

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

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

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

Dec 2020
b. Date of map

*Project is exempt from MESA review per 321 CMR 10.14(12)

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.

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

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

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

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☒ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; 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

North Shore - Hull to New Hampshire border:

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

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

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

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

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No — If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☒ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

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

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

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

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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.

Boxford Public Schools Site Renovation Project Spofford Pond School
a. Plan Title

Weston & Sampson
b. Prepared By

James Pearson
c. Signed and Stamped by

2/3/2021
d. Final Revision Date

As Noted On Plan Sheets
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:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

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
Boxford Wetlands Protection Bylaw, Town Code Ch. 192 & 375

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boxford
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: 2-4-21

3. Signature of Property Owner (if different) — 4. Date

5. Signature of Representative (if any) — 6. Date: 2/4/2021

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.

tab

return

A. Applicant Information

1. Location of Project:

31 Spofford Rd	Boxford
a. Street Address	b. City/Town
Exempt	Exempt
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Stephen	Clifford	
a. First Name	b. Last Name	
Town of Boxford		
c. Organization		
28 Middleton Road		
d. Mailing Address		
Boxford	MA	01921
e. City/Town	f. State	g. Zip Code
(978)-887-0771 x 225	(978)-887-8042	sclifford@tritownschoolunion.com
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

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

B. Fees

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

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

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

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

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

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

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

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

B. Fees (continued)

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

Step 5/Total Project Fee: ______________

Step 6/Fee Payments:

Total Project Fee: Exempt
a. Total Fee from Step 5

State share of filing Fee: Exempt
b. 1/2 Total Fee **less $**12.50

City/Town share of filling Fee: Exempt
c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

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

Department of Environmental Protection
Box 4062
Boston, MA 02211

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

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

Enter your transmittal number → X287348
Transmittal Number

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application.
Copy 2 must accompany your fee payment.
Copy 3 should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA 02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

WPA Form 3
1. Permit Code: 4 to 7 character code from permit instructions

Notice of Intent
2. Name of Permit Category

School site improvements
3. Type of Project or Activity

B. Applicant Information – Firm or Individual

Town of Boxford
1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. **Last Name** of Individual
3. **First Name** of Individual
4. MI

28 Middleton Road
5. Street Address

Boxford	MA	01921	(978) 887 0771	225
6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #

Stephen Clifford
11. Contact Person

sclifford@tritownschoolunion.com
12. e-mail address

C. Facility, Site or Individual Requiring Approval

Spofford Pond School
1. Name of Facility, Site Or Individual

31 Spofford Road
2. Street Address

Boxford	MA	01921		
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

8. DEP Facility Number (if Known)
9. Federal I.D. Number (if Known)
10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

Weston & Sampson Engineers
1. Name of Firm Or Individual

55 Walkers Brook Dr, Suite 100
2. Address

Reading	MA	01867	978-532-1900	2117
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

Devin Batchelder
8. Contact Person

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less). *There are no fee exemptions for BWSC permits, regardless of applicant status.*
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number
Dollar Amount
Date

TO: FAX NUMBER 781.433.7951

Carol
Community Newspaper Company
254 Second Ave., Telecenter
Needham, MA 02494
Tel: 781-433-6700

FROM: Ross Povenmire, Boxford Conservation Commission
FAX NUMBER: (978) 887-0758

RE: **<u>Hearing/Meeting Legal Notice</u>**

I hereby authorize Community Newspaper Company to bill me directly for the legal notice published in the Tri Town Transcript Newspaper for a Conservation Notice.

(Print Legibly) Name: Weston & Sampson Engineers
Attn: Devin Batchelder ENG20-0865

Address: 55 Walkers Brook Drive, Suite 100
Reading MA 01867

Phone: 978-573-5802

Signed:

If questions please call (978) 887-6000, ext. 182

Spofford Pond School No1 to Natural Heritage
MESA

7016 1370 0001 7156 2379

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com*®.

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees

Postmark
Here

2/4/2021

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

for Instructions

APPENDIX A

PROJECT DESCRIPTION

PROJECT DESCRIPTION

Background

The Spofford Pond School serves 423 students in grades 3 through 6. The school was constructed in 1973 with the latest renovations occurring in 1995. In recent years Spofford Pond School has received violations from the Massachusetts Architectural Access Board (MAAB) relating to deficiencies in accessibility. These deficiencies include steep grading in the parking areas and school sidewalks that do not allow for easy access to the school building. As a result, the School Department is working on plans to bring the structure into compliance with the standards of the MAAB and the Americans with Disabilities Act (ADA). Additionally, the Town is seeking to update current storm water drainage to bring it into closer conformance with federal, state, and local laws and regulatory requirements.

Site Description

The Spofford Pond School is located at 31 Spofford Road in Boxford MA. The property is 12.38 acres in size and is composed of the school building, driveway/parking areas, recreational fields, and undeveloped forest. Nearby land uses include residential properties, playing fields, undeveloped forest and a solar field. Directly across the street from the Spofford Pond School is Spofford Pond.

Scope of Work

The Town of Boxford is seeking to replace and redesign the existing bituminous parking areas, sidewalks, and perimeter landscaped areas on the school property as well as will update current storm water drainage. These proposed improvements will allow for the correction of deficiencies identified by the MAAB.

Before work begins, sedimentation and erosion control devices will be placed at the site to minimize sediment migration off-site into any neighboring resource areas. This will include security fencing with dust screen, straw wattles and catch basin protection.

Work will begin prior to the 2021-2022 calendar school year.

Environmental Considerations - NOI

As part of this proposed project there will be no direct impacts to any resource area identified by the Massachusetts Wetlands Protection Act (WPA). However, the Town of Boxford Wetland Protection Regulations bylaw recognize the 100-foot Wetland Buffer Zone as a Resource Area. As a result, a NOI is being submitted for this project based on the local bylaw requirements.

100ft Wetland Buffer Zone

A small portion of the proposed project area occur within 100ft of adjacent delineated wetlands, which is an Area Subject to Protection and recognized by the WPA as the 100ft Wetland Buffer Zone (Buffer Zone) per 310 CMR 10.02(2)(b). The Buffer Zone is defined as any area within 100ft of any of the areas subject to the protection of M.G.L chapter 131, section 40 and identified per 310 CMR 10.02(1)(a), including bordering vegetated wetlands. Per Town of Boxford Chapter 375 Wetland Regulations Statement of Jurisdiction (375-2) the Buffer Zone is considered a protected resource area.

Proposed work within the Buffer Zone includes replacing an existing driveway (northernmost existing driveway at the school), removing a section of existing parking area, and a small portion of the proposed drainage improvements in the form of a basin located immediately adjacent to Spofford Road. Approximately 1,826 square feet (SF) of existing driveway is currently located within the Buffer Zone. This proposed project is seeking to replace the existing driveway within the Buffer Zone in-kind and in the same configuration. This proposed driveway replacement will result in a total of 1,826 SF of impact within the Buffer Zone for repaving. The existing driveway material is impervious and the proposed driveway material is also impervious. Pervious pavement in these areas were discussed with the Boxford Department of Public Works (DPW) and concerns were raised about the DPW's ability to provide the maintenance given limitations of budget and equipment. Additionally, the school's potable water source is from an onsite MDEP registered public water supply via bedrock well. When the DPW provides roadway treatment during inclement weather they apply larger amounts of sand and less salt to the area surrounding the school due to the presence of the drinking water well. The excess sand utilized during road treatments would mean that any installation of pervious pavement would have a greater tendency to clog, greater likelihood of failure, and increased maintenance needs.

Within the Buffer Zone, this project is also proposing to remove a section of existing parking area, which will result in 1,483 SF of impact to the Buffer Zone. Due to this parking lot removal this project will result in a decrease of impervious area within the Buffer Zone. The existing driveway and parking area total 3,109 SF of impervious area within the Buffer Zone. Upon completion only the driveway will remain so the total amount of impervious area within the Buffer Zone will be 1,826 SF. This represents a decrease of 1,283 SF of impervious area within the Buffer Zone.

Finally, the proposed installation of the proposed drainage basin will have 2,365 SF of impact withing the Buffer Zone. These improvements are necessary to handle the runoff produced from the adjacent impervious parking/driveway areas. The cumulative proposed impact including the driveway replacement, parking lot removal and drainage improvements will result in 5,674 SF of impact within the Buffer Zone

Outside of the Buffer Zone, the parking area located on the southeast side of the school will also be resurfaced with impervious pavement and a new driveway will be added to better facilitate traffic flow. The existing southeastern parking area is composed of both impervious pavement and crushed gravel which is heavily compacted and currently functions as impervious area. During storm events sheet flow from this parking area flows towards the isolated wetland (also a vernal pool) located to the southeast, with no treatment provided. The proposed parking design will allow for all stormwater runoff to be directed to deep sump hooded catch basins for treatment before entering the existing stormwater drainage channel that leads to the isolated wetland. This will prevent untreated sheet flow from entering any resource areas and will represent an environmental improvement over existing conditions.

Prior to construction erosion control measures will be installed to prevent any unwanted sediment migration into the adjacent resource areas. This will include security fencing with dust screen, straw wattles and catch basin protection.

The 100ft Wetland Buffer Zone is shown on the attached plan set where the scale allows.

Local Fees

As this project is a municipal project with the Town of Boxford as the applicant, this project is exempt from the fees associated with the WPA. We would request that the Conservation Commission also waive the Town of Boxford Wetland Regulations local fee associated with this project due to the municipal status.

Environmental Considerations – MESA

The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats as part of the Massachusetts Division of Fisheries and Wildlife. The Natural Heritage & Endangered Species Program produces regulatory maps for both Priority and Estimated Habitat of rare wildlife. These habitat maps are available on MassGIS and are used for determining whether or not a proposed project must be reviewed for MESA and WPA compliance. Per the regulations (321 CMR 10.00), MESA Project Review is required when the proposed project area is located within Priority Habitat because there is the potential that a Take of any Endangered, Threatened, or Special Concern species may occur as a result of the proposed project or activity.

A very small portion of the northernmost existing driveway is located within MassWildlife's Natural Heritage & Endangered Species Program (NHESP) Priority Habitats of Rare Species, which falls under MESA jurisdiction. This driveway will be replaced in-kind and in the same configuration as part of this proposed project. Per 321 CMR 10.14(12) "*the maintenance, repair or replacement, but not widening, of existing paved roads, shoulder repair that does not exceed four feet from an existing travel lane, paved and unpaved driveways and paved and unpaved parking areas, provided such unpaved driveways and unpaved parking areas are for year-round use*" are exempt from review. As a result, no submission to MESA is required as part of this project.

APPENDIX B

STORMWATER REPORT

Stormwater Report

Boxford, Massachusetts

Spofford Pond School

February 3, 2021

JOB NO: ENG20-0865

Weston & Sampson
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
www.westonandsampson.com
Tel: 978-532-1900 Fax: 978-977-0100

Table of Contents

Checklist for Stormwater Report

A. Introduction

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

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

The Stormwater Report must include:

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
JAMES I. PEARSON
CIVIL
No. 50675
REGISTERED PROFESSIONAL ENGINEER
02/03/2021

2/3/2021
Signature and Date

Checklist

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

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (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:

- [x] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [x] 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
- [x] 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

- [x] 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 (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[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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

Checklist (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 (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 (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 (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 Report

February 3, 2021

Applicant/Project Name: Town of Boxford
Spofford Pond School

Project Address: 31 Spofford Road, Boxford, MA

Application Prepared by:
Firm: Weston & Sampson, Inc.
Registered PE: James Pearson

Below is an explanation concerning Standards 1-10 as they apply to the Spofford Pond School project:

<u>General</u>:

The project applicant, the Town of Boxford, proposes a redevelopment project at the Spofford Pond School located at 31 Spofford Road in Boxford to improve site access and traffic circulation. Site work will include, but is not limited to grading, drainage, paving and landscaping. The site is actively used as an elementary school for the town of Boxford and will remain in use over the duration of the project. The site is predominantly developed, and the middle courtyard of the school contains a drinking water well, placing part of the site under Zone I well head protection with an approximate 250-FT protective radius. Existing topography is relatively moderate across the site, with elevations ranging from 140-FT at the northwestern portion of the site to a low of approximately 127-FT to the southeast, along the Spofford Pond existing drainage channel and headwall. NRCS soil mapping describes the site as being a mixture of Hinckley Loamy Sand (HSG-A) and Merrimac Fine Sandy Loam (HSG-A). Test pits conducted across the site generally support the soil mapping and can be found in Attachment C of this report.

<u>Standard 1: No New Untreated Discharges</u>

The proposed project will create no new untreated discharges. Total impervious area will be increased in comparison with existing conditions by approximately 9,945-SF. All discharges from new impervious area as well as a large portion of existing impervious, will undergo treatment via street sweeping, deep sump hooded catch basins, and subsurface infiltration chambers or bio-retention areas. Additionally, subsurface detention chambers have been proposed to remove TSS from existing stormwater flows using proprietary treatment devices. As such, existing stormwater discharges will meet Standard 1 to the maximum extent practicable. HydroCAD modeling of the site is provided in Attachment D.

Standard 2: Peak Rate Attenuation

Existing and proposed conditions were modeled using HydroCAD computer software and Town of Boxford rainfall data. A table, summarizing peak discharges for the 2-Yr, 10-Yr, 25-Yr, 50-Yr and 100-Yr storm events can be found in Attachment D. The proposed design is such that peak runoff rates do not exceed pre-development rates, even in the 100-year storm scenario. Peak discharges will be managed by subsurface infiltration systems.

To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction, as depicted on the site plans.

Standard 3: Recharge

As a redevelopment, Standard 3 shall be met to the maximum extent practicable. Several infiltration BMP's are being proposed for recharge on site. The BMP's are designed to capture and infiltrate the required recharge volume for the contributing subcatchments. The infiltration BMP's have also been oversized to provide additional recharge volume to account for existing areas of the site which are not being captured. Supporting calculations can be found in Attachment E of this report.

Standard 4: Water Quality

Standard 4 shall be met to the maximum extent practicable. Treatment practices have been designed to capture the required water quality volume and provide treatment to remove greater than 80% of total suspended solids where able. The proposed stormwater management system will present an improvement over existing condition.

During the project, appropriate BMPs will be used to minimize sedimentation and soil erosion.

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

This site is not considered a LUHPPL, as such, Standard 5 does not apply.

Standard 6: Critical Areas

There will be no new discharge to critical areas.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

This is a redevelopment project. Stormwater standards 1, 2, 3 and 4 have been met to the maximum extent practicable.

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

A detailed Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Attachment G. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction.

Standard 9: Operation and Maintenance Plan

An operations and maintenance plan is included in Attachment H.

Standard 10: Prohibition of Illicit Discharges

An illicit discharge compliance statement has been included in Attachment I.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including any relevant soil evaluations, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan, the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement 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

02/03/2021

2/3/2021

Signature and Date

Attachment A - Locus Map

<BOL>Path:</BOL> C:\Users\batchelder.devin\OneDrive - WESTON & SAMPSON ENGINEERS, Inc\Desktop\Boxford\GIS\Maps\Locus.mxd   <BOL>User:</BOL> Batchelder.Devin   <BOL>Saved:</BOL> 12/2/2020 1:35:20 PM   <BOL>Opened:</BOL> 12/2/2020 1:35:59 PM

N
W E
S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Site Location

Attachment A

Locus Map
Spofford Pond School

USGS Topographic Map

Weston & Sampson

Attachment B - NRCS Soils Map, Soils Report, and HSG Classifications

Map Scale: 1:2,150 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 16, Jun 9, 2020

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

Date(s) aerial images were photographed: Sep 13, 2019—Oct 5, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
253C	Hinckley loamy sand, 8 to 15 percent slopes	A	9.4	74.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	3.2	25.3%
Totals for Area of Interest			**12.6**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment C - Test Pit Logs

85 Devonshire Street, 3rd Floor, Boston, MA 02109
Tel: 617.412.4480

MEMORANDUM

TO: James Pearson

FROM: Kyle Elmy

DATE: January 21, 2021

SUBJECT: Spofford Pond School, Boxford, MA – Test pit results

Test pits were conducted on January 19th, 2021, at the Spofford Pond School in Boxford, MA. The test pits were performed to better understand the subsurface soil and drainage conditions, so that proper precautions could be accounted for during the reconstruction of the school parking lots and landscaping. The following is a summary of the test pit explorations. Detailed test pit logs and photos are attached to this memorandum. The soil was evaluated by Kyle Elmy, of Weston & Sampson, a licensed soil evaluator in MA, SE14274.

Eight (8) test pits were performed on site. Please refer to the attached site plan for exact locations of the test pits. The test pits were excavated to a depth of 6-ft to 8-ft below ground surface (b.g.s.). Test pits were stopped when the required depths were reached or pit stability could not be maintained and further exploration could not be achieved. Test pits throughout the site were consistent and contained mostly sandy loam and sand with a notable amount of gravel and cobbles.

Screening for contaminated soils was conducted in conjunction with the test pits. A Photoionization Detector (PID) was used to analyze the soils within the pit. Samples were taken at 2-ft intervals and tested using the jar headspace method. No contaminates were encountered within any of the test pits.

With respect to the site, test pit 1 was located behind the school at the Northwest end of the pavement where, the pavement met the grass. Test pit 1 ranged from fill to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 93-in b.g.s., due to pit stability. No sample was taken and no redox was encountered. Irrigation piping was discovered, at 3-in b.g.s.

Test pit 2 was to the Southeast of test pit 1, in a reclaimed asphalt overflow parking lot, to the Southeast of the school. Test pit 2 ranged from pavement to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 72-in b.g.s., due to pit stability. No sample was taken and no redox was encountered.

Test pit 3 was located along the entrance to the parking lot, to the South of test pit 2, and to the Southeast of the school and parking lot. Test pit 3 ranged from pavement to fill to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 90-in b.g.s., due to pit stability. No sample was taken and no redox was encountered. A PVC pipe was encountered at 54-in b.g.s. The pipe size was not able to be determined, but it is believed to be for storm drainage.

Test pit 4 was located at the Southwest of test pit 3 in a median within the parking lot. Test pit 4 ranged from fill to sand, with a massive structure. The test pit was stopped at a depth of 92-in b.g.s., due to pit stability. No sample was taken and no redox was encountered. As digging began two (2) small concrete blocks were encountered at 12-in b.g.s., no other debris was encountered in the fill.

Test pit 5 was to the Southwest of test pit 4, and to the west of the parking lot entryway. Test pit 5 ranged from fill to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 84-in b.g.s., due to pit stability. Redox features were not encountered at this location and no sample was taken.

Test pit 6 was to the Southwest of test pit 5, and centered in the grassy area in front of the front parking lot. Test pit 6 ranged from sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 92-in, b.g.s., due to pit stability. Redox features were not encountered at this location and no sample was taken.

Test pit 7 was located to the Northwest of test pit 6, along the wooded area to the south west of the school. Test pit 7 ranged from fill to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 96-in, b.g.s., due to pit stability. Redox features were not encountered at this location and no sample was taken.

Test pit 8 was located to the Northeast of test pit 7 along the western side of the school within a parking lot median. Test pit 8 ranged from fill to sandy loam to sand, with a massive structure. The test pit was stopped at a depth of 96-in, b.g.s., due to pit stability. Redox features were not encountered at this location and no sample was taken.

The USDA web soil survey indicates that at this site the following soils are present; map unit 253C Hinckley loamy sand and 254B Merrimac fine sandy loam. The USGS surficial geologic map indicates that in this particular location coarse deposits consisting of gravel and sand are present. The test pit data gathered at the Spofford Pond School is consistent with the data recorded on both the USDA and USGS websites. Please refer to the attached maps and test pit results for more information and soil layer ranges.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**	
LOCATION	Spofford Pond School, Boxford, MA			TP 1	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
19"	Fill 10% Gravel & 10% Cobbles
24"	Ap - Dark Brown Sandy Loam (10YR 3/3) 10% Gravel & 10% Cobbles
29"	Bw - Brown Sandy Loam (10YR 4/3) 10% Gravel & 10% Cobbles
93"	C1 - Yellowish Brown Coarse Sand (10YR 5/4) 5% Gravel
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM
3. Irrigation line encountered at 3-in

TEST PIT NUMBER
TP 1

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**	
LOCATION	Spofford Pond School, Boxford, MA			TP 1	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION

NOTES:

1. No Redox encountered
2. PID = 0.0PPM
3. Irrigation line encountered at 3-in

TEST PIT NUMBER

TP 1

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 2
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
4"	Pavement
8"	Bw - Yellowish Brown Sandy Loam (10YR 5/6) 10% Gravel & 10% Cobbles
24"	C1 - Brown Sand (10YR 5/3) 10% Gravel & 5% Cobbles
72"	C2 - Pale Brown Coarse Sand (10YR 6/3) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 2

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 2
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
	

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 2

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 3
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
4"	Pavement
21"	Fill
24"	Ab - Dark Brown Sandy Loam (10YR 3/3) 10% Gravel & 10% Cobbles
32"	Bw - Brown Sandy Loam (10YR 5/3) 10% Gravel & 10% Cobbles
90"	C1 - Dark Yellowish Brown Coarse Sand (10YR 4/4) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM
3. PVC pipe encountered at 54-in

TEST PIT NUMBER
TP 3

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**	
LOCATION	Spofford Pond School, Boxford, MA			TP 3	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION

NOTES:

1. No Redox encountered
2. PID = 0.0PPM
3. PVC pipe encountered at 54-in

TEST PIT NUMBER

TP 3

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 4
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
28"	Fill
92"	C1 - Yellowish Brown Coarse Sand (10YR 5/4) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 4

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 4
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
	

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 4

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 5
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
12"	Fill 10% Gravel & 10% Cobbles
16"	Ab - Dark Grayish Brown Sandy Loam (10YR 4/2) 10% Gravel & 10% Cobbles
20"	Bw - Yellowish Brown Sandy Loam (10YR 5/8) 10% Gravel & 10% Cobbles
84"	C1 - Yellowish Brown Coarse Sand (10YR 5/4) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 5

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			TEST PIT NUMBER	
LOCATION	Spofford Pond School, Boxford, MA			TP 5	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
	

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 5

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 6
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
12"	Ap - Dark Brown Sandy Loam (10YR 3/3) 10% Gravel & 10% Cobbles
24"	Bw - Yellowish Brown Sandy Loam (10YR 5/6) 10% Gravel & 10% Cobbles
92"	C1 - Brown Coarse Sand (10YR 5/3) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 6

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			TEST PIT NUMBER	
LOCATION	Spofford Pond School, Boxford, MA			TP 6	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 6

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 7
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
12"	Fill
24"	Ap - Dark Brown Sandy Loam (10YR 3/3) 10% Gravel & 10% Cobbles
36"	Bw - Yellowish Brown Sandy Loam (10YR 5/6) 10% Gravel & 10% Cobbles
96"	C1 - Brown Coarse Sand (10YR 5/4) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 7

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 7
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
	

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 7

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			**TEST PIT NUMBER**
LOCATION	Spofford Pond School, Boxford, MA			TP 8
CLIENT	Boxford, MA			GROUND SURFACE
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW
CHECKED BY		DATE		SURFACE Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
23"	Fill
26"	Ap - Dark Brown Sandy Loam (10YR 3/3) 10% Gravel & 10% Cobbles
28"	Bw - Brown Sandy Loam (10YR 4/3) 10% Gravel & 10% Cobbles
96"	C1 - Brown Coarse Sand (10YR 5/4) 5% Gravel & 5% Cobbles
	- End of Exploration -

NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER

TP 8

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	Spofford Pond School - ENG20-0865			TEST PIT NUMBER	
LOCATION	Spofford Pond School, Boxford, MA			TP 8	
CLIENT	Boxford, MA			GROUND SURFACE	
CONTRACTOR	RE Thompson	FOREMAN:		ELEVATION	see plan
OBSERVED BY	K. Elmy	DATE	1/19/21	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	Not Observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
	

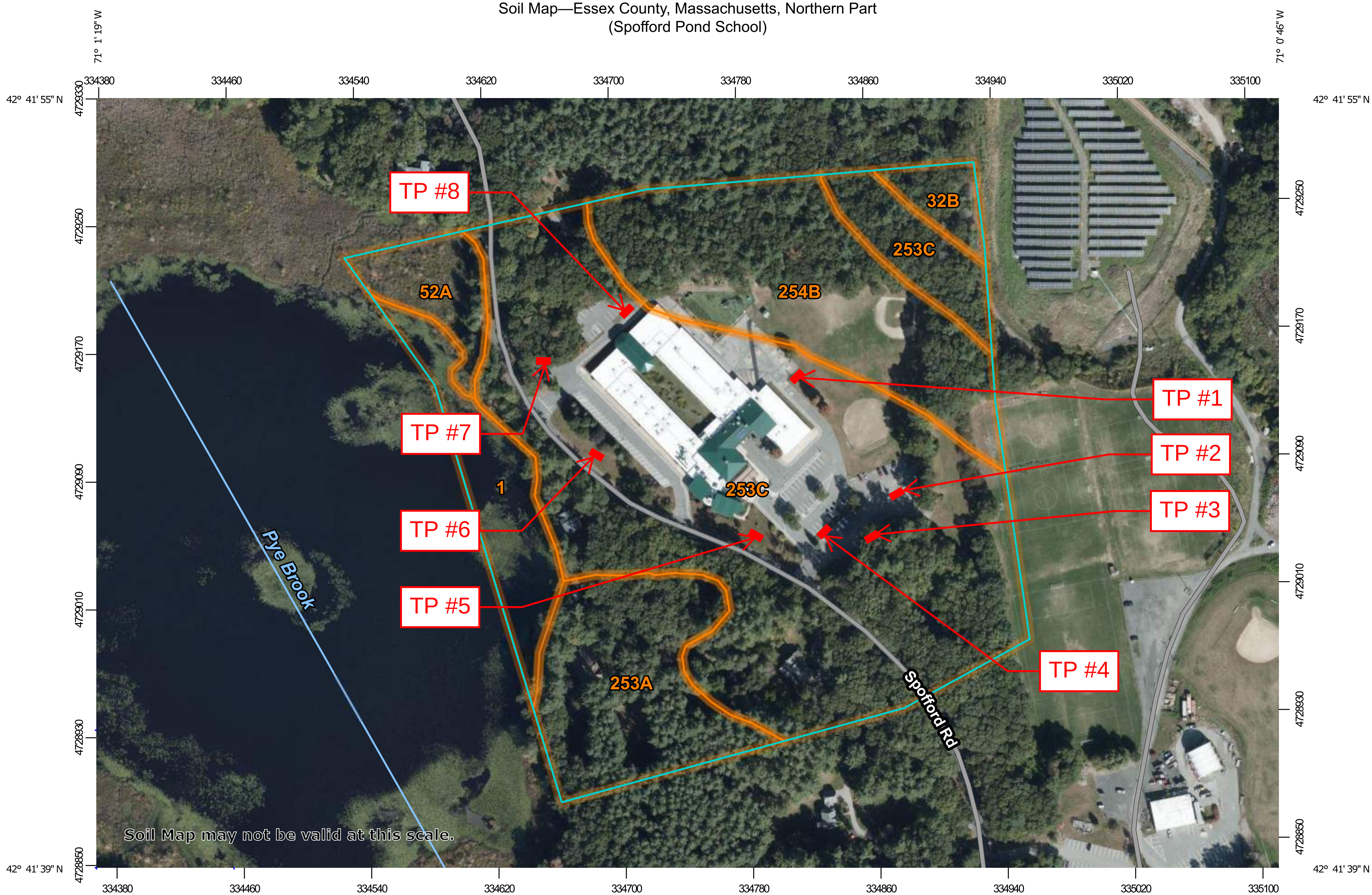
NOTES:

1. No Redox encountered
2. PID = 0.0PPM

TEST PIT NUMBER
TP 8

WESTON & SAMPSON ENGINEERS, INC.

Soil Map—Essex County, Massachusetts, Northern Part
(Spofford Pond School)



Map Scale: 1:3,400 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 150, 300, 600, 900

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 16, Jun 9, 2020

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

Date(s) aerial images were photographed: Sep 13, 2019—Oct 5, 2019

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

Map Unit Legend

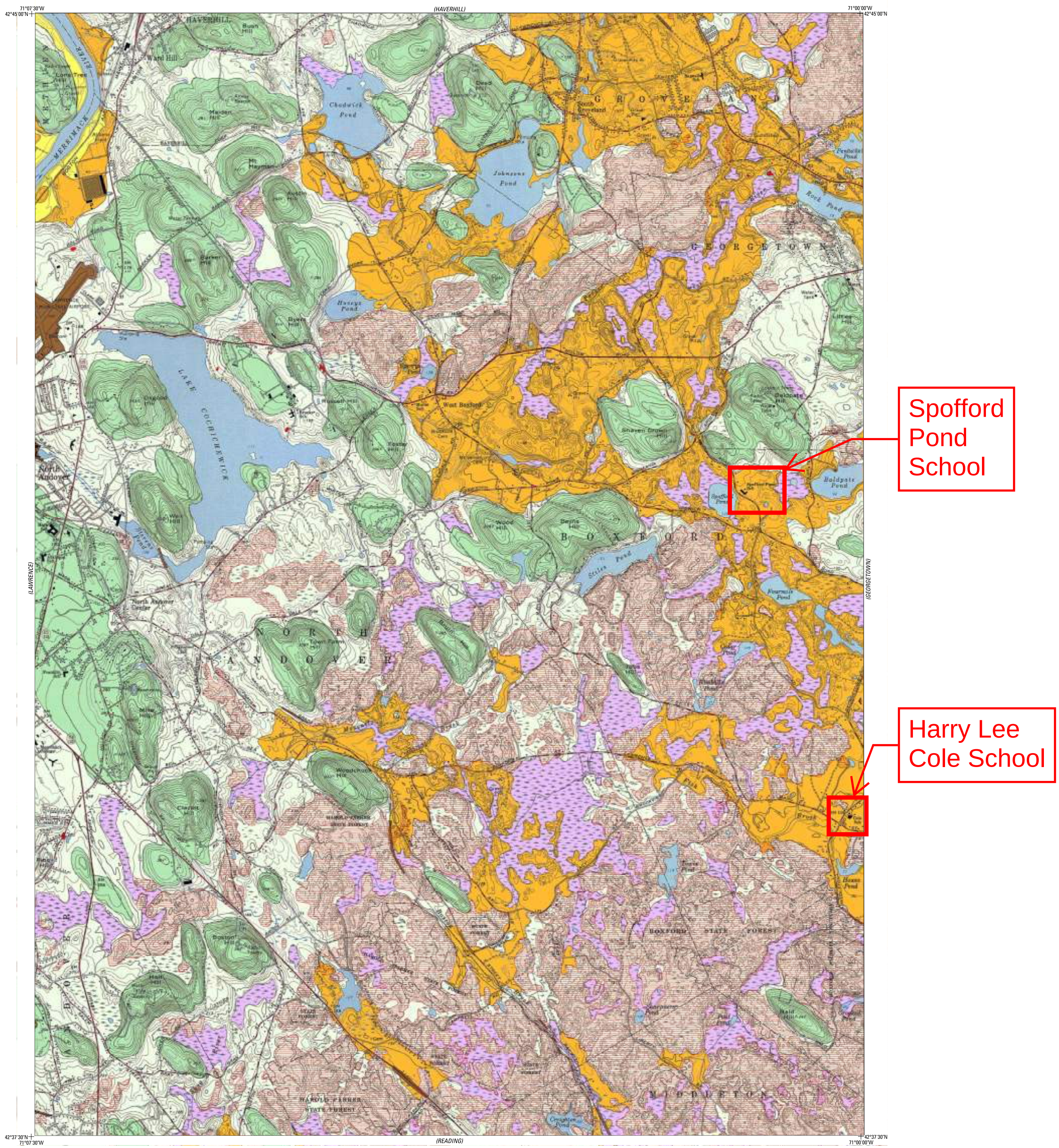
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	1.9	6.6%
32B	Wareham loamy sand, 3 to 8 percent slopes	0.5	1.9%
52A	Freetown muck, 0 to 1 percent slopes	1.1	3.6%
253A	Hinckley loamy sand, 0 to 3 percent slopes	3.5	11.9%
253C	Hinckley loamy sand, 8 to 15 percent slopes	17.0	58.1%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	5.2	17.9%
Totals for Area of Interest		**29.2**	**100.0%**

U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with the
Commonwealth of Massachusetts
Massachusetts Geological Survey
and Executive Office for Administration and Finance

Scientific Investigations Map 3402
Quadrangle 123—South Groveland

Discussion of surficial materials and description of map units available at https://doi.org/10.3133/sim3402

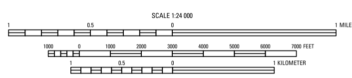


Base from U.S. Geological Survey, 1966

Map was scanned, processed, georeferenced, rectified, and cropped by the Massachusetts Geological Survey

Lambert Conformal Conic projection. North American Datum of 1983

Massachusetts state plane coordinate system, mainland zone



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MAP LOCATION

Map units were reproduced from Stone, B.D., 1982, unpublished field maps. Some bedrock outcrops are from Bell (1976). Some units were mapped or revised from analysis of topographic (lidar) data and 2005 orthophoto images.

Surficial Materials Map of the South Groveland Quadrangle, Massachusetts

Compiled by
Byron D. Stone, Janet R. Stone, and Mary L. DiGiacomo-Cohen

2018

For sale by U.S. Geological Survey, Box 25286, Denver Federal Center, Denver, CO 80225; https://store.usgs.gov; 1–888–ASK–USGS (1–888–275–8747)

Suggested citation: Stone, B.D., Stone, J.R., and DiGiacomo-Cohen, M.L., comps., 2018, Surficial materials map of the South Groveland quadrangle, Massachusetts, quadrangle 123 *in* Stone, J.R., Stone, B.D., DiGiacomo-Cohen, M.L., and Mabee, S.B., comps., Surficial materials of Massachusetts—A 1:24,000-scale geologic map database: U.S. Geological Survey Scientific Investigations Map 3402, 1 sheet, scale 1:24,000, https://doi.org/10.3133/sim3402.

ISSN 2329-132X (online)
https://doi.org/10.3133/sim3402

Description of Map Units

Postglacial Deposits

Artificial fill—Earth materials and manmade materials that have been artificially emplaced, primarily in highway and railroad embankments and in dams; unit may also include landfills, urban-development areas, and filled coastal wetlands

Cranberry bog deposits—Natural freshwater swamps or peat bogs overlain locally by artificially emplaced sand or other fill; these deposits occur primarily in southeastern Massachusetts and on Cape Cod. Commonly, cranberry bogs also are created by excavation into sand and gravel deposits that form the bed; peat and other organic material are then artificially emplaced over the bed, and water drainage pathways are diverted into the area to control seasonal flooding of the bog

Flood-plain alluvium—Sand, gravel, silt, and some organic material, stratified and well sorted to poorly sorted, beneath the flood plains of modern streams. The texture of alluvium commonly varies over short distances both laterally and vertically, and generally is similar to the texture of adjacent glacial deposits. Along smaller streams, alluvium is commonly less than 5 feet (ft) thick. The most extensive deposits of alluvium in Massachusetts are along the Housatonic, Deerfield, Westfield, Connecticut, Nashua, Merrimack, and Blackstone Rivers. Alluvium typically overlies thicker glacial stratified deposits

Swamp deposits—Organic muck and peat that contain minor amounts of sand, silt, and clay, are stratified and poorly sorted, and occur in swamps and freshwater marshes, in kettle depressions, or in poorly drained areas. Unit is shown only where deposits are estimated to be at least 3 ft thick; most deposits are less than 10 ft thick. Swamp deposits overlie glacial deposits or bedrock. They locally overlie glacial till even where they occur within thin glacial meltwater deposits

Salt-marsh and estuarine deposits—Peat and organic muck interbedded with sand and silt, deposited in saltwater or brackish-water environments of low wave energy along the coast and in river estuaries. Salt-marsh deposits are dominantly peat and muck, generally a few feet to 25 ft thick. In the major estuaries, these deposits locally overlie estuarine deposits (not mapped), which are sand and silt with minor organic material and are as much as 30 to 80 ft thick. Salt-marsh and estuarine deposits generally are underlain by adjacent glacial material, consisting of till, coarse stratified deposits, or glaciomarine fine deposits

Beach and dune deposits—Sand and fine gravel deposited along the shoreline by waves and currents, and by wind action. The texture of beach deposits varies over short distances and is generally controlled by the texture of nearby glacial materials exposed to wave action. Sand beach deposits are composed of moderately sorted, very coarse to fine sand, and are commonly laminated. Coarser layers may contain some fine gravel particles; finer layers may contain some very fine sand and silt. Gravel beach deposits are composed of granule- to cobble-size clasts in moderately sorted thin beds; deposits contain minor amounts of sand within gravel beds, and thin beds of sand as alternating layers. Beach deposits are rarely more than a few feet thick. Dune deposits are composed of moderately sorted to well-sorted, fine to medium sand, and are variably massive, laminated, and crossbedded. Dune deposits are as much as 100 ft thick. Unit includes artificial sand deposits in locally replenished beaches

Early Postglacial Deposits

Alluvial-fan deposits—Generally coarse gravel and sand deposits on steep slopes where high-gradient streams entered lower gradient valleys. Alluvial fans in some places were graded to lowering levels of glacial lakes. Fans continue to form today at some locations in Massachusetts

Valley-floor fluvial deposits—Sand, gravel, and minor silt, stratified and moderately to poorly sorted, beneath flat floors of valleys, called furrows (Mather and others, 1942), that are eroded into glacial outwash plains. The texture of the fluvial deposits commonly varies over short distances both laterally and vertically, and generally is similar to the texture of adjacent glacial deposits. The fluvial deposits overlie thick glacial stratified deposits in the upper, dry reaches of the furrow valleys and probably are less than 20 ft thick. Swamp deposits and deformation of bedding related to melting of buried ice in kettles interrupt the fluvial deposits. The deposits probably extend beneath salt-marsh and estuarine deposits in coastal valley reaches. The most extensive valley-floor fluvial deposits are on upper Cape Cod along Quaker Run and the Coonamessett, Childs, and Quashnet Rivers, and on Martha's Vineyard in Quampache Bottom

Stream-terrace deposits—Sand, gravel, and silt deposited by meteoric water (locally distal meltwater) on terraces cut into glacial meltwater sediments along rivers and streams. These deposits are shown where they overlie glaciolacustrine deposits (fine deposits map unit) and glaciomarine fine deposits; elsewhere, stream-terrace deposits are included in the coarse deposits map unit. Most stream-terrace deposits are less than 10 ft thick and overlie thicker glacial deposits; textures are commonly similar to those of underlying glacial meltwater deposits. Many stream terraces in the Connecticut River valley are composed of fine to medium sand and overlie lake-bottom silt and clay

Marine regressive deposits—Sand and minor gravel deposited along former, higher shorelines in northeastern Massachusetts by waves and currents, and by wind action on beaches and spits. These deposits are shown where they overlie glaciomarine fine deposits. Regressive beach and nearshore deposits are composed of moderately sorted, very coarse to fine sand, commonly laminated. Coarser layers may contain some fine gravel particles; finer layers may contain some very fine sand and silt. Regressive beach and nearshore deposits are rarely more than a few feet thick. Regressive spit deposits are 10 to 30 ft thick

Inland-dune deposits—Fine to medium, well-sorted sand in transverse, parabolic, and hummocky dunes as much as 60 ft thick. Deposits occur mostly in the glacial Lake Hitchcock basin (in the Connecticut Valley lowland), where sand derived from extensive glacial-lake deltas that were not yet vegetated was deposited in dune forms by early postglacial winds. Dune sand is now fixed by vegetation except where disturbed by human activities

Talus deposits—Angular, loose blocks of basalt and diabase accumulated by rockfall and creep at the base of bedrock cliffs along linear traprock ridges in the Mesozoic lowland (Connecticut Valley lowland). Talus deposits form steep, unstable slopes. Generally less than 20 ft thick

Glacial Stratified Deposits

Sorted and stratified sediments composed of gravel, sand, silt, and clay (as defined in the particle-size diagram, figure 12, below), deposited in layers by glacial meltwater. These sediments occur as four basic textural units: gravel deposits, sand and gravel deposits, sand deposits, and fine deposits. On this surficial geologic map, gravel deposits, sand and gravel deposits, and sand deposits are not differentiated and are shown as *Coarse Deposits* where they occur at the land surface. *Fine Deposits* also are shown where they occur at the land surface. Textural changes occur both areally and vertically (fig. 9); however, subsurface textural variations are not shown on this map.

PARTICLE DIAMETER											
	10	2.5	.16	.08	.04	.02	.01	.005	.0025	.00015	inches
	256	64	4	2	1	.5	.25	.125	.063	.004	mm
Boulders	Cobbles	Pebbles	Granules	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay	
GRAVEL PARTICLES				SAND PARTICLES				FINE PARTICLES			

Figure 12. Grain-size classification used in this report, modified from Wentworth (1922). Abbreviation: mm, millimeter.

Coarse deposits consist of *gravel deposits*, *sand and gravel deposits*, and *sand deposits*, not differentiated in this report. *Gravel deposits* are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. *Sand and gravel deposits* occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. *Sand deposits* are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay

Fine deposits include very fine sand, silt, and clay that occur as well-sorted, thin layers of alternating silt and clay (varves), or as thicker layers of very fine sand and silt. Very fine to fine sand commonly occurs at the surface of these lake-bottom deposits and grades downward into rhythmically bedded silt and clay varves. In some places on the lake-bottom surface of glacial Lake Hitchcock (in the Connecticut Valley lowland) and glacial Lake Narragansett (in southeastern Massachusetts), fine deposits are overlain by as much as 30 ft of fine to medium sand, deposited as the lake level lowered or the lake shallowed; this sand has not been mapped separately. Locally, this map unit may include areas underlain by fine sand

Glaciomarine fine deposits include clay, silty clay, fine sand, and some fine gravel deposited in a higher-level sea in environments of low wave energy along the coast and in river estuaries. Fine to very fine sand, massive and laminated, commonly is present at the surface and grades downward into interbedded very fine sand, silt, silty clay, and clay. The lower silty clay and clay is massive and thinly laminated. Total thickness is generally a few feet to 75 ft

Stagnant-ice deposits—Surface coarse sediments include scattered large surface boulders, gravel deposits, and sand and gravel deposits, totaling 5 to 30 ft thick, that overlie predominantly sand deposits. Sand deposits contain deltaic foreset bedding and interlayered beds of fine sand, silt, and a little clay. Sand and silty sand deposits extend downward to basal till and bedrock. Flowtill sediments are interlayered under ice-contact slopes. Stratification in surface and underlying sediments is generally distorted and faulted due to postdepositional collapse related to melting of buried ice. Stagnant-ice deposits are confined to irregular hummocky hills, bounded by ice-contact slopes, present on tops of till hills or extending more than 30 ft above the altitudes of adjacent meltwater morphosequences in lowlands. Deposits are aligned in belts parallel to the retreating ice margin

Glacial Till and Moraine Deposits

End moraine deposits—Composed predominantly of boulders and ablation-facies sandy upper till; lenses of stratified sand and gravel occur locally within the till. In the larger deposits on Cape Cod and Martha's Vineyard, the surface ablation till is as much as 30 ft thick and overlies sand, gravel, and silty sand meltwater deposits. Some end moraine deposits include thrusted sheets of glacial meltwater deposits resulting from readvance of the ice margin (Oldale and O'Hara, 1984). Stratification in underlying sediments may also be deformed, the result of postdepositional collapse caused by melting of buried ice. Surface boulders on end moraine deposits are generally more numerous than on adjacent till surfaces; dense concentrations of boulders are present in some places. Deposits occur as freestanding hummocky landforms, commonly in ridges that trend east-northeast to west-southwest, and range in height from 10 to 100 ft

Thrust moraine deposits—In western Martha's Vineyard, thrusted moraine deposits stand as high as 300 ft in altitude and are composed of allochthonous, ice-thrusted Cretaceous, Tertiary, and older Quaternary sediments, locally overlain by thin surface till and boulders. These coastal-plain beds are fossiliferous, semi-consolidated sand, gravel, and silty clay in tilted strata that were thrust up by glacial ice into positions well above the autochthonous coastal-plain surface, which lies below sea level. Numerous northeast-southwest-trending ridges within the thrust moraine unit mark the edges of these tilted and thrusted strata

Thin till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered pebble, cobble, and boulder clasts; large surface boulders are common; unit was mapped where till is generally less than 10 to 15 ft thick including areas of shallow bedrock. Predominantly consists of upper till of the last glaciation; loose to moderately compact, generally sandy, commonly stony. Two facies are present in some places: a looser, coarser grained ablation facies, melted out from supraglacial position; and an underlying more compact, finer grained lodgement facies deposited subglacially. In general, both ablation and lodgement facies of upper till derived from fine-grained bedrock are finer grained, more compact, less stony and have fewer surface boulders than upper till derived from coarse-grained crystalline rocks. Across Massachusetts, fine-grained bedrock sources include the red Mesozoic sedimentary rocks of the Connecticut Valley lowland, marble in the western river valleys, and fine-grained schists in upland areas

Thick till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered pebbles, cobbles, and boulders in the shallow subsurface; at greater depths consists of compact, nonsorted matrix of silt, very fine sand, and some clay containing scattered small gravel clasts. Mapped in areas where till is greater than 10 to 15 ft thick, mostly in drumlin landforms in which till thickness commonly exceeds 100 ft (maximum recorded thickness is 230 ft). Although upper till of late Wisconsinan age is the surface deposit, lower till of probable Illinoian age constitutes the bulk of the material in thick-till areas. Lower till is moderately to very compact and is commonly finer grained and less stony than upper till. An oxidized zone, the lower part of a soil profile formed during a period of interglacial weathering, is generally present in the upper part of the lower till. This zone commonly shows closely spaced joints that are stained with iron and manganese oxides

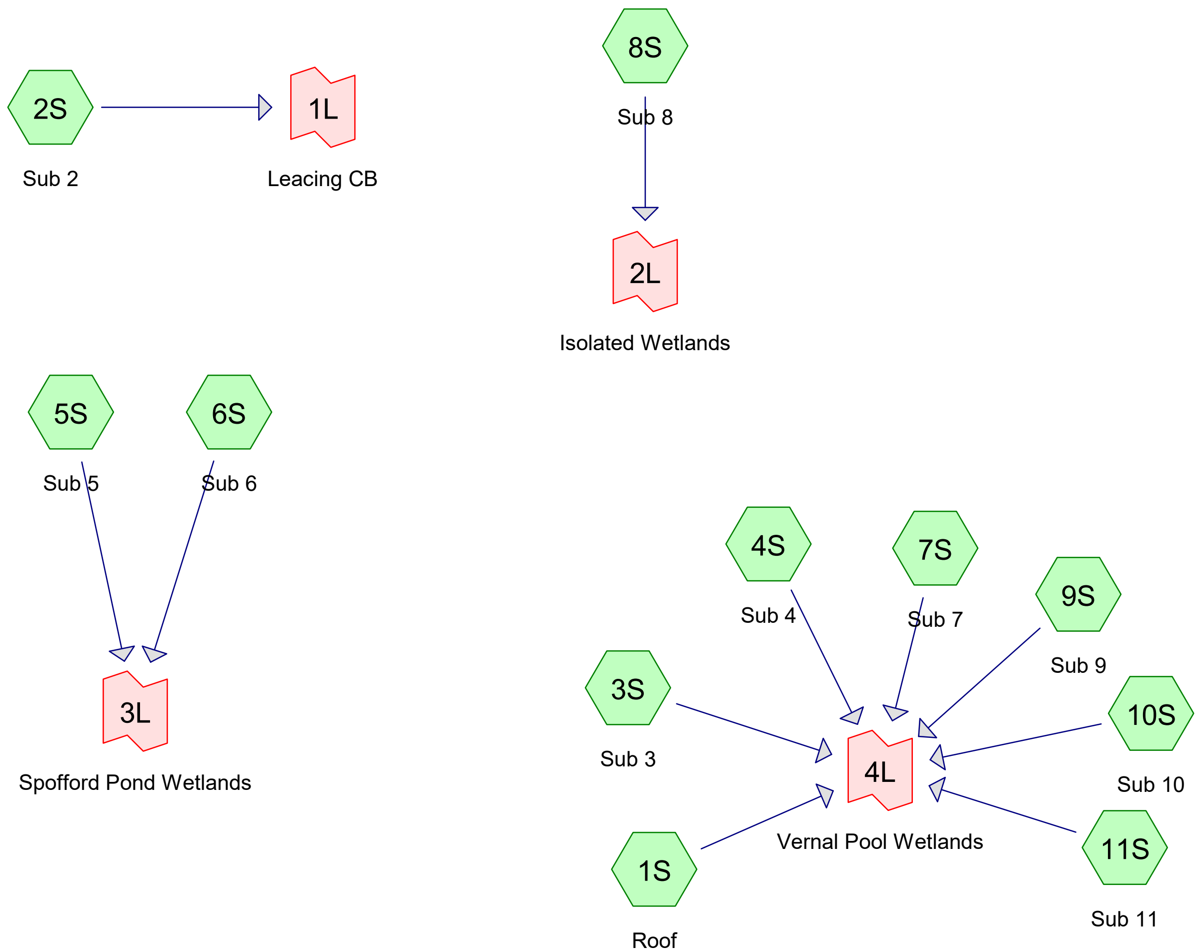
Glacially modified coastal-plain hill deposits—In the Marshfield Hills area (Scituate, Cohasset, Hanover, and Duxbury quadrangles) and in the Pine Hills area (Manomet quadrangle), very compact till and older glacial stratified deposits overlie thrusted blocks of Tertiary coastal-plain strata that are semi-consolidated dark clay layers. Miocene-age green sand deposits have also been reported at depth. These hills in many places were sculpted by the last ice sheet, but they are generally larger (3–4 miles [mi] long and 1–2 mi wide) than typical drumlins

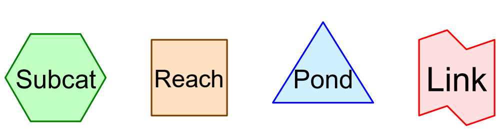
Thick valley till and fine deposits—Composed of sandy surface till with boulders, 3 to 20 ft thick, overlying finer grained till, or fine sand, silt, or clay, local boulders, and local weathered limestone and dolostone bedrock; total thickness of all sediments is 6 to 135 ft, averaging 50 ft. Materials reported in drillers' records include four descriptions usually synonymous with till: hardpan with no boulders; boulders and clay; gravelly hardpan; and clay with few boulders. Unit includes materials probably defining glaciolacustrine fine sediments or various weathered carbonate bedrock materials, listed as follows: gray clay, gray and yellow clay, black soft rock, and weathered bedrock. The subsurface fine sediments are exposed only in fresh, temporary landslide slopes or shallow excavations, where silty-clayey fine sand typically appears to be sheared, deformed, or disaggregated. Original laminations are difficult to discern. Surface morphology of the thick valley till and fine deposits includes (1) a glacially smoothed surface without bedrock outcrops or any relief related to bedrock structure; (2) locally a streamlined shape similar to small drumlins composed of thick till in other parts of Massachusetts; (3) landslide scarps and stream-cut banks commonly having 5 to 10 ft of relief, locally as much as 50 ft; and (4) dry, meltwater-carved channels 3 to 10 ft deep. These deposits extend almost continuously along lower valley slopes in the Housatonic and Hoosic River valleys, and their tributary valleys, that are underlain by marble, dolostone, or limestone and shale bedrock (Zen and others, 1983). The deposits appear to extend beneath the edges of glacial meltwater deposits in the valley bottoms, but their extent beneath thick glacial deposits in the centers of the valleys is not known. Some of these deposits are present in north-draining upland valleys in areas that also contain thick till deposits in drumlins

Bedrock Areas

Bedrock outcrops and areas of abundant outcrop or shallow bedrock—Solid color shows extent of individual bedrock outcrops; horizontal-line pattern indicates areas of shallow bedrock or areas where small outcrops are too numerous to map individually; in areas of shallow bedrock, surficial materials are less than 5 to 10 ft thick. These units were not mapped consistently among all quadrangles; see note at beginning of appendix 1 for information on bedrock outcrop mapping by quadrangle

Attachment D - HydroCAD Reports





Routing Diagram for Spofford Pre-Development
Prepared by Weston & Sampson, Printed 2/4/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.446	98	Compacted Gravel (11S)
1.891	30	Grass (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S)
2.401	98	Paved parking, HSG A (3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S)
1.634	98	Roofs, HSG A (1S)
0.209	98	Turf (impervious) (3S)
0.021	30	Woods (3S)
0.389	30	Woods, Good, HSG A (4S, 5S, 10S, 11S)
6.990	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.424	HSG A	1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.566	Other	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
6.990		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.446	0.446	Compacted Gravel	11S
0.000	0.000	0.000	0.000	1.891	1.891	Grass	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
2.401	0.000	0.000	0.000	0.000	2.401	Paved parking	3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
1.634	0.000	0.000	0.000	0.000	1.634	Roofs	1S
0.000	0.000	0.000	0.000	0.209	0.209	Turf (impervious)	3S
0.000	0.000	0.000	0.000	0.021	0.021	Woods	3S
0.389	0.000	0.000	0.000	0.000	0.389	Woods, Good	4S, 5S, 10S, 11S
4.424	**0.000**	**0.000**	**0.000**	**2.566**	**6.990**	**TOTAL AREA**	

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=4.91 cfs 0.390 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=80 Runoff=0.87 cfs 0.063 af

Subcatchment 4S: Sub 4 Runoff Area=13,434 sf 63.43% Impervious Runoff Depth=0.92"
Tc=6.0 min CN=73 Runoff=0.31 cfs 0.024 af

Subcatchment 5S: Sub 5 Runoff Area=28,818 sf 23.38% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=46 Runoff=0.00 cfs 0.002 af

Subcatchment 6S: Sub 6 Runoff Area=24,010 sf 12.40% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 7S: Sub 7 Runoff Area=18,136 sf 97.29% Impervious Runoff Depth=2.65"
Tc=6.0 min CN=96 Runoff=1.21 cfs 0.092 af

Subcatchment 8S: Sub 8 Runoff Area=16,497 sf 9.02% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 9S: Sub 9 Runoff Area=40,665 sf 98.20% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=2.76 cfs 0.215 af

Subcatchment 10S: Sub 10 Runoff Area=18,533 sf 69.05% Impervious Runoff Depth=1.14"
Tc=6.0 min CN=77 Runoff=0.55 cfs 0.040 af

Subcatchment 11S: Sub 11 Runoff Area=38,742 sf 64.38% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=74 Runoff=0.95 cfs 0.072 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2L: Isolated Wetlands Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 3L: Spofford Pond Wetlands Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Link 4L: Vernal Pool Wetlands Inflow=11.55 cfs 0.896 af
Primary=11.55 cfs 0.896 af

Total Runoff Area = 6.990 ac Runoff Volume = 0.898 af Average Runoff Depth = 1.54"
32.91% Pervious = 2.301 ac 67.09% Impervious = 4.690 ac

Summary for Subcatchment 1S: Roof

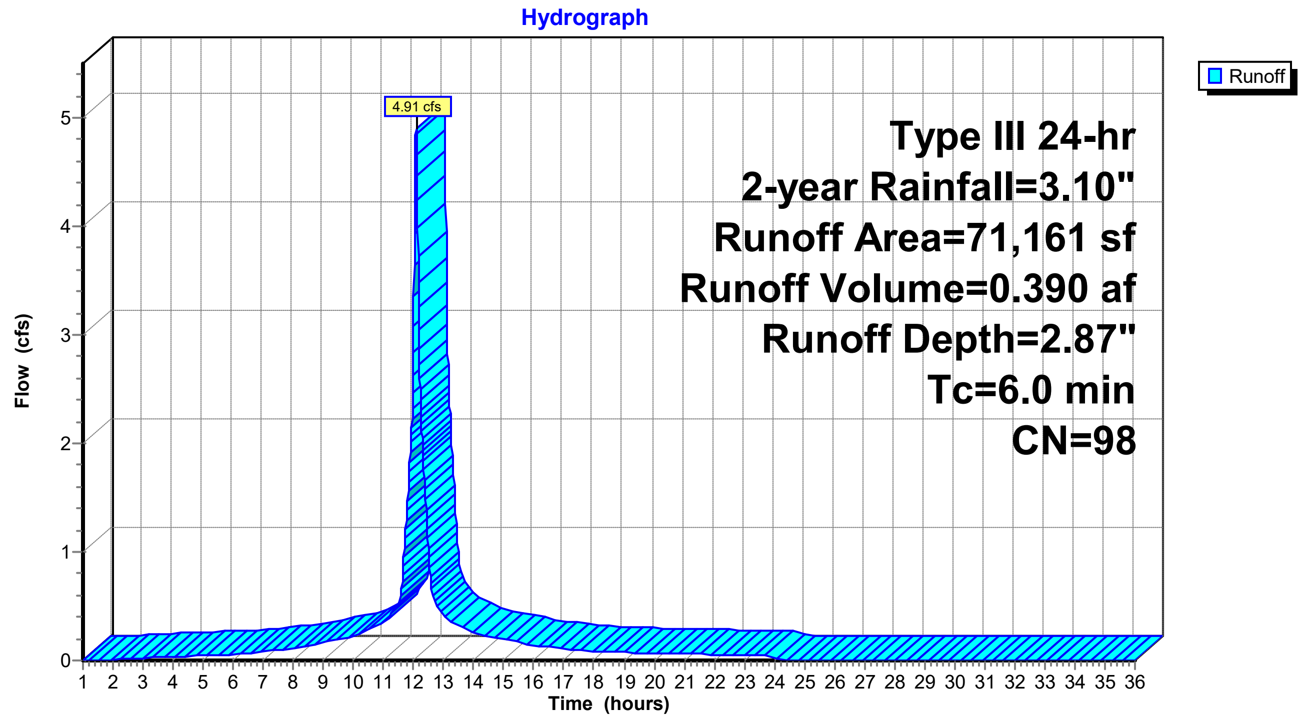
Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.390 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

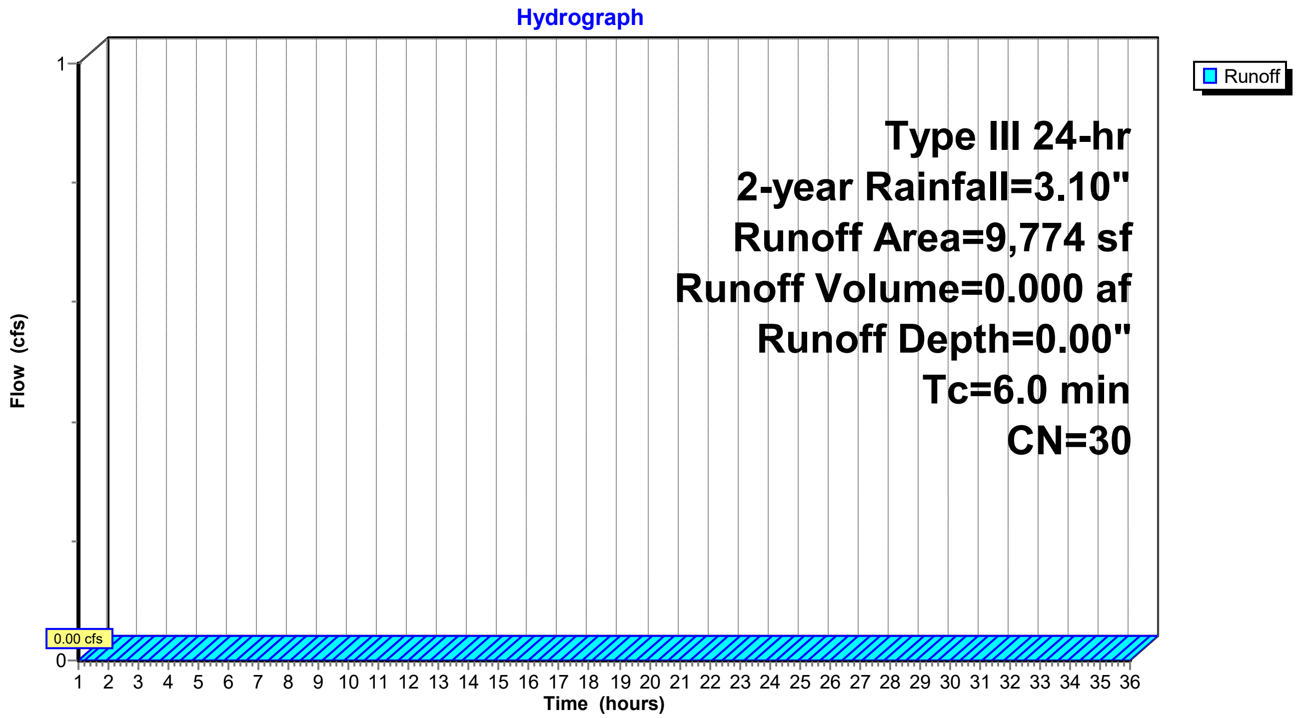
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

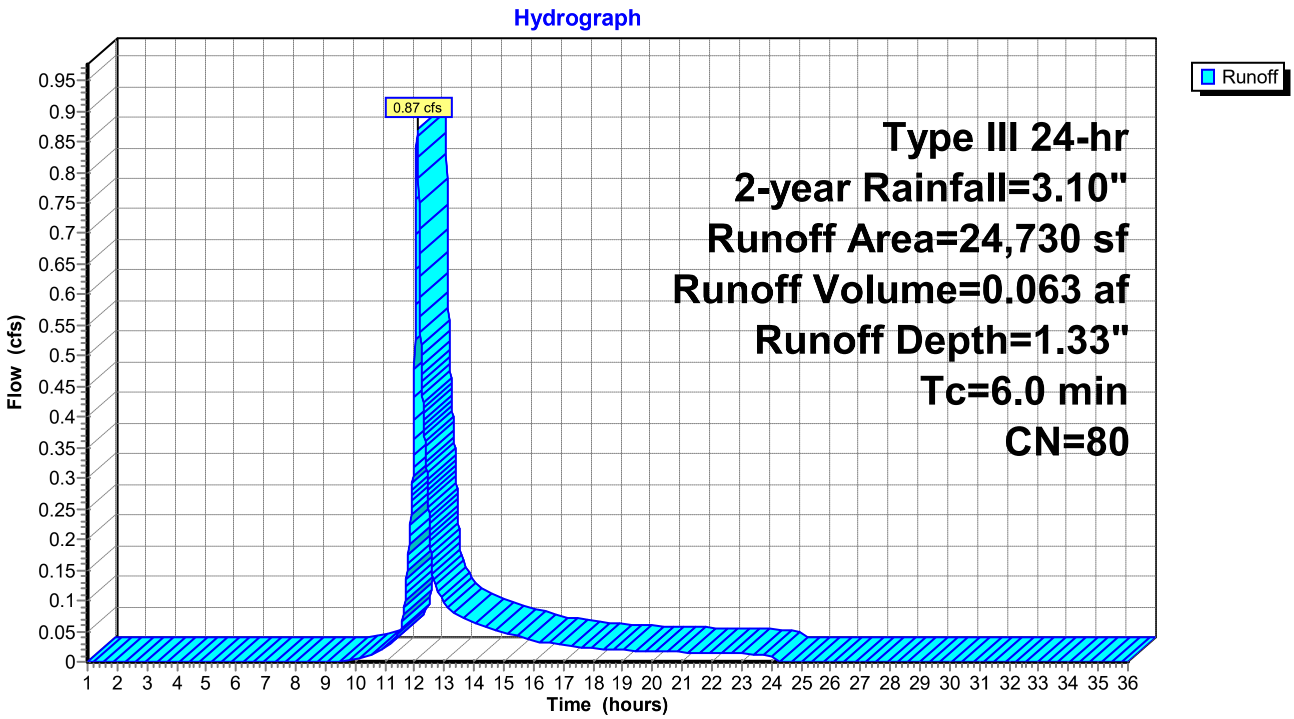
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

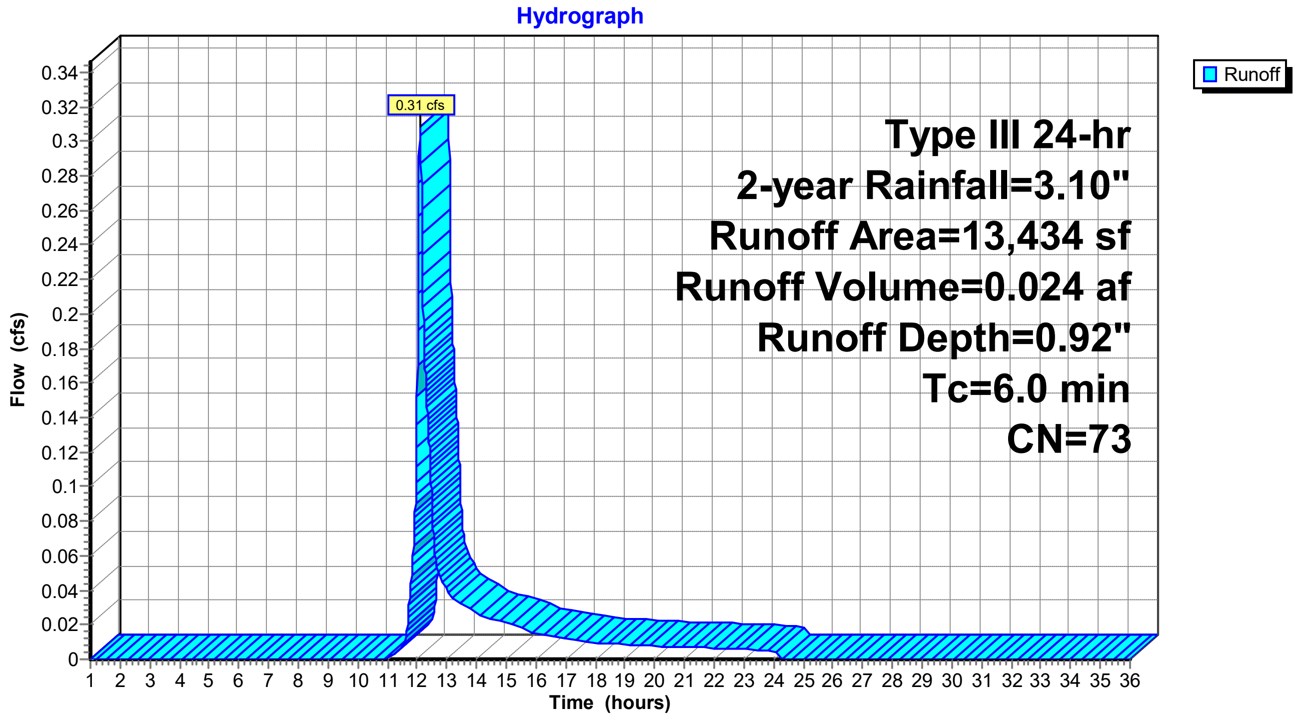
Runoff = 0.31 cfs @ 12.10 hrs, Volume= 0.024 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	8,521	98	Paved parking, HSG A
	2,064	30	Woods, Good, HSG A
*	2,849	30	Grass
	13,434	73	Weighted Average
	4,913		36.57% Pervious Area
	8,521		63.43% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

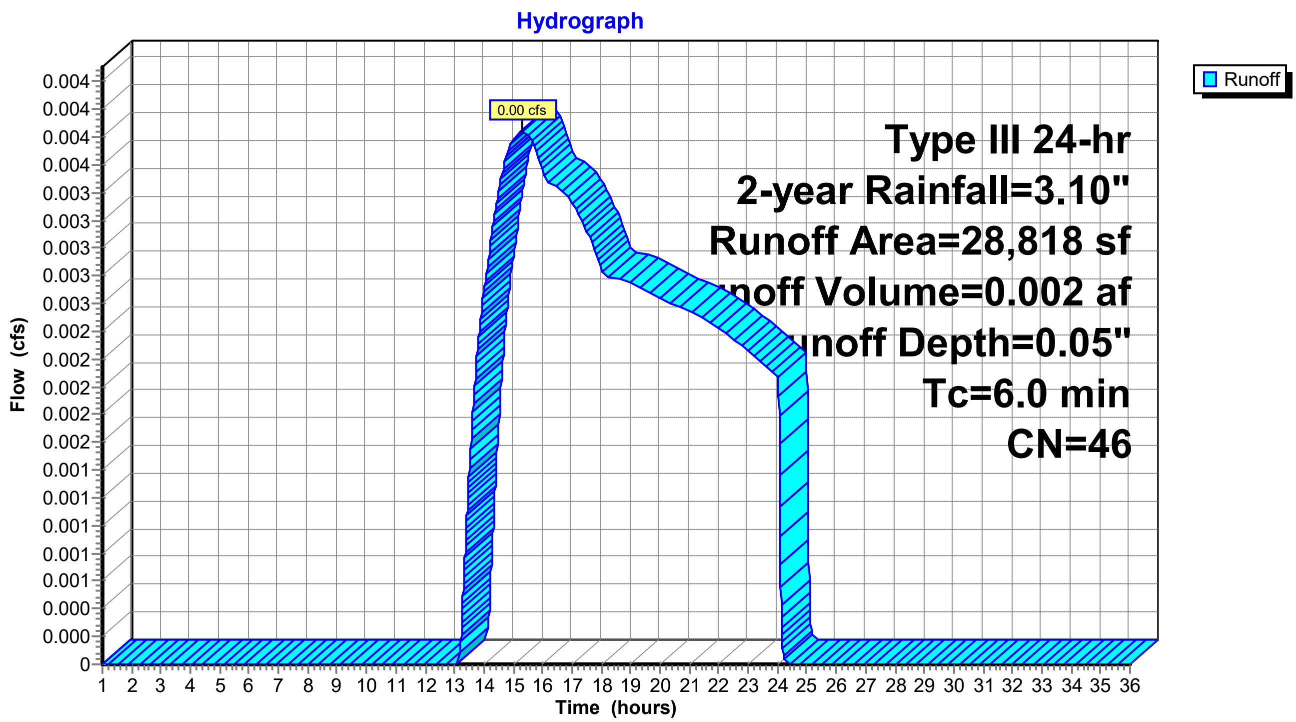
Runoff = 0.00 cfs @ 15.30 hrs, Volume= 0.002 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	6,737	98	Paved parking, HSG A
	9,957	30	Woods, Good, HSG A
*	12,124	30	Grass
	28,818	46	Weighted Average
	22,081		76.62% Pervious Area
	6,737		23.38% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

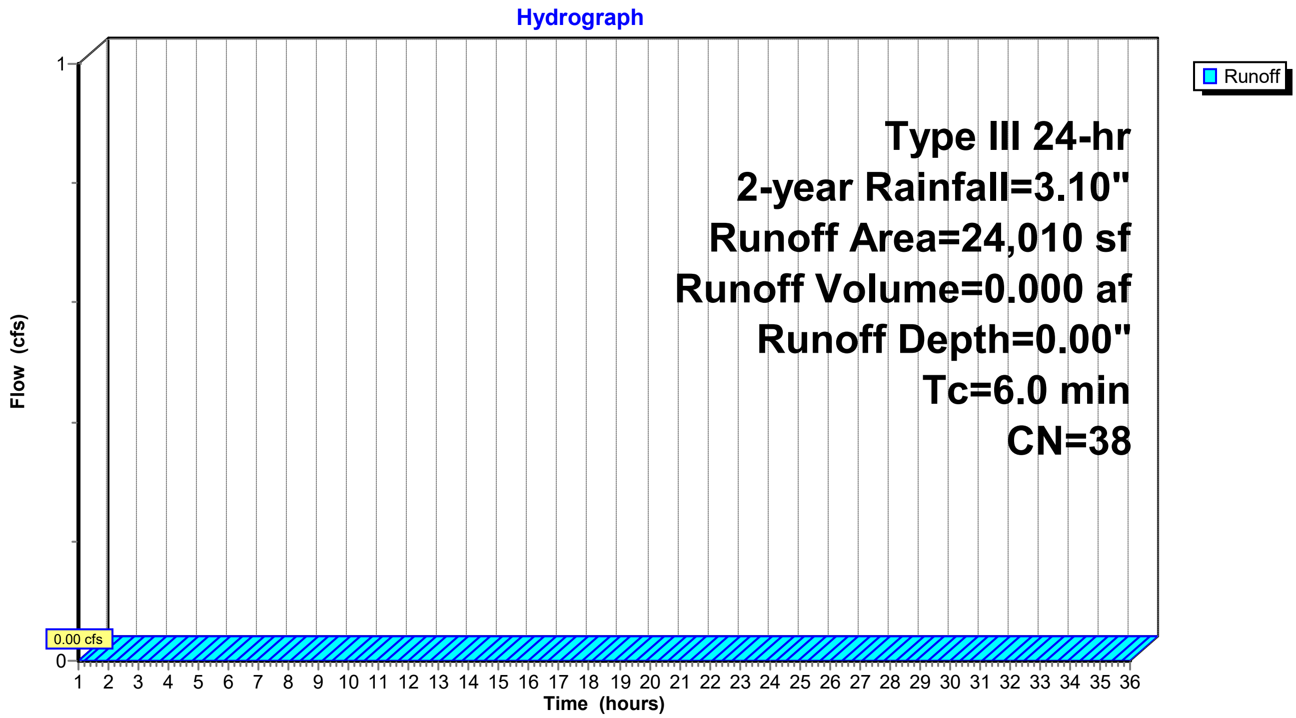
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	2,978	98	Paved parking, HSG A
*	21,032	30	Grass
	24,010	38	Weighted Average
	21,032		87.60% Pervious Area
	2,978		12.40% Impervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

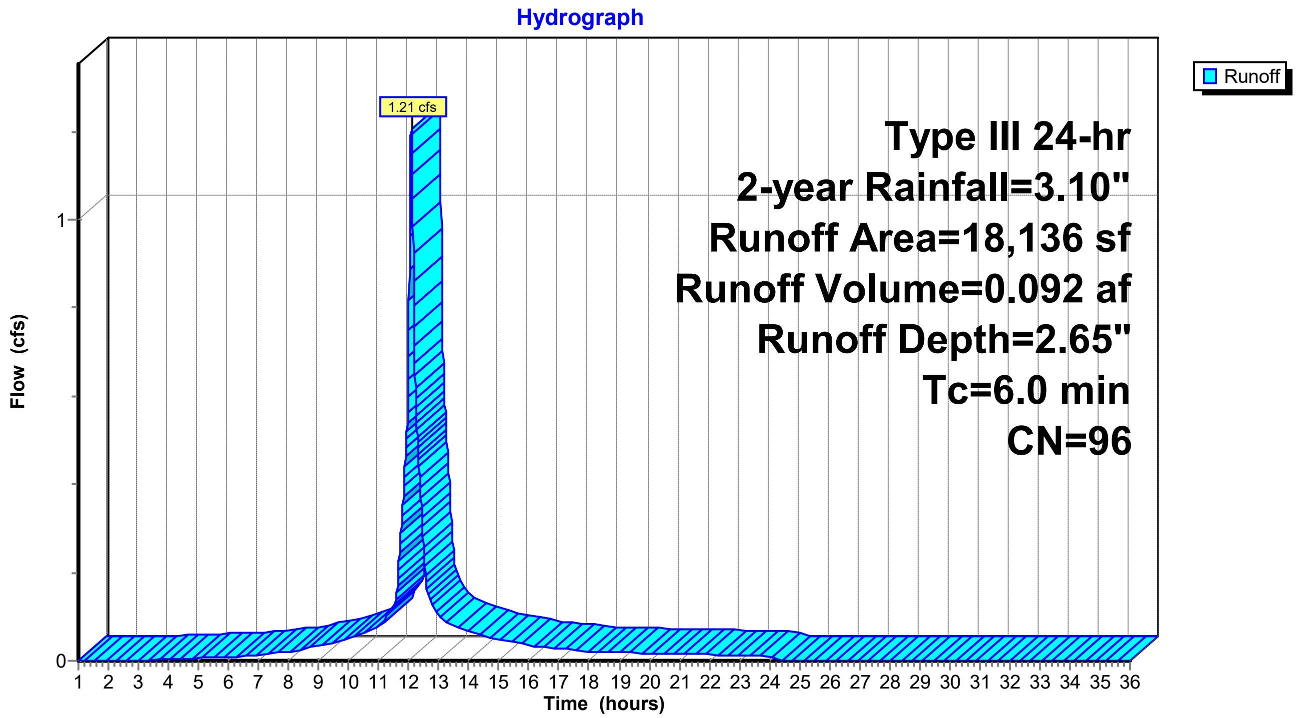
Runoff = 1.21 cfs @ 12.08 hrs, Volume= 0.092 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	17,644	98	Paved parking, HSG A
*	492	30	Grass
	18,136	96	Weighted Average
	492		2.71% Pervious Area
	17,644		97.29% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

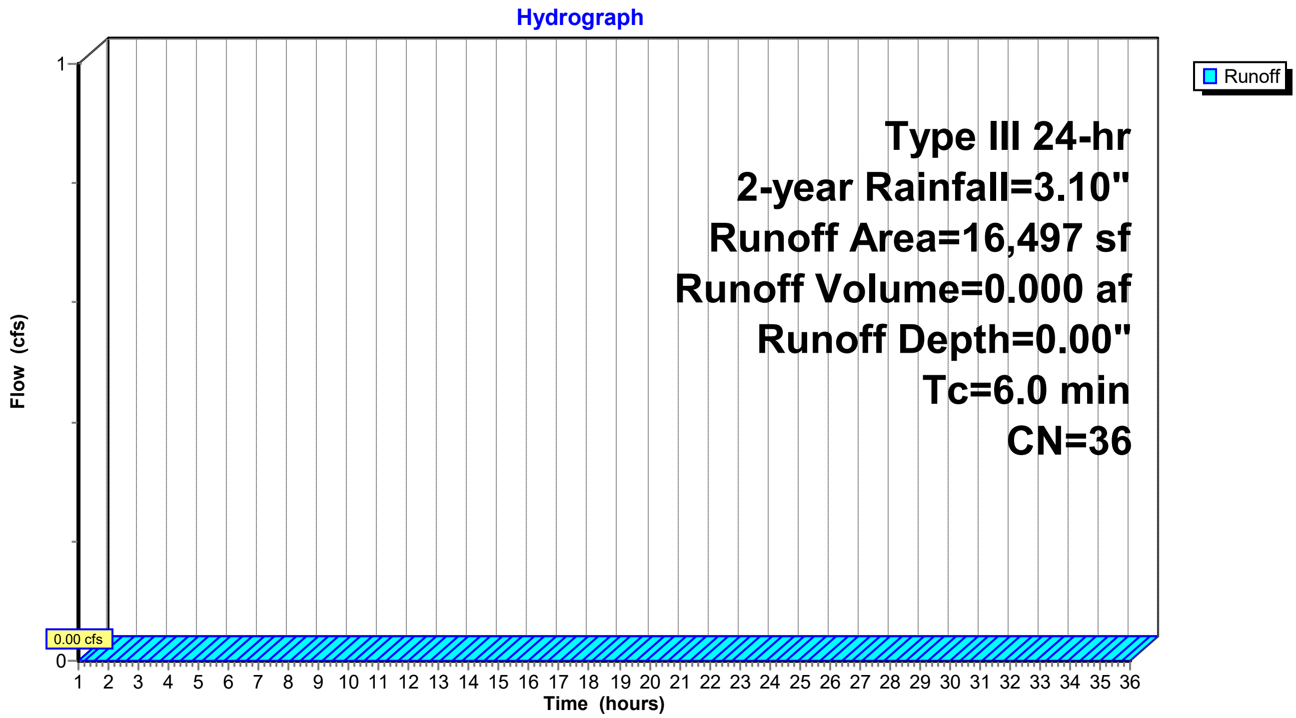
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	1,488	98	Paved parking, HSG A
*	15,009	30	Grass
	16,497	36	Weighted Average
	15,009		90.98% Pervious Area
	1,488		9.02% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

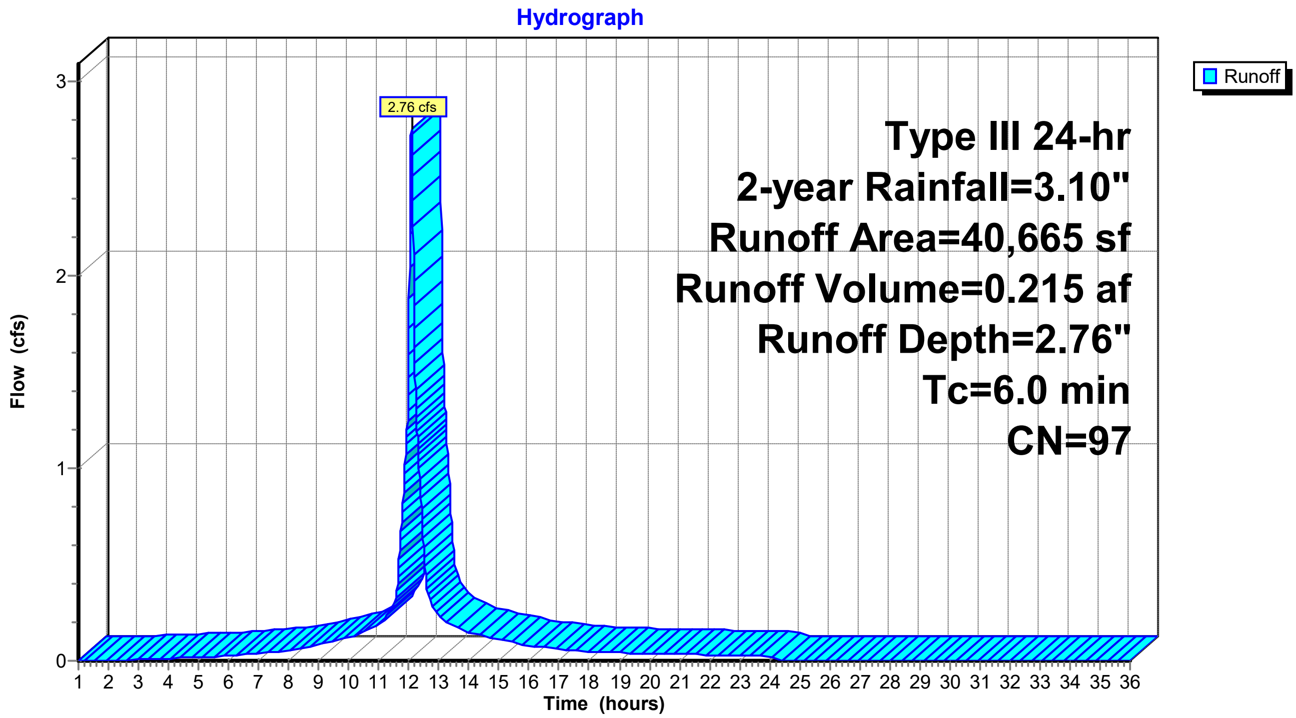
Runoff = 2.76 cfs @ 12.08 hrs, Volume= 0.215 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	39,934	98	Paved parking, HSG A
*	731	30	Grass
	40,665	97	Weighted Average
	731		1.80% Pervious Area
	39,934		98.20% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

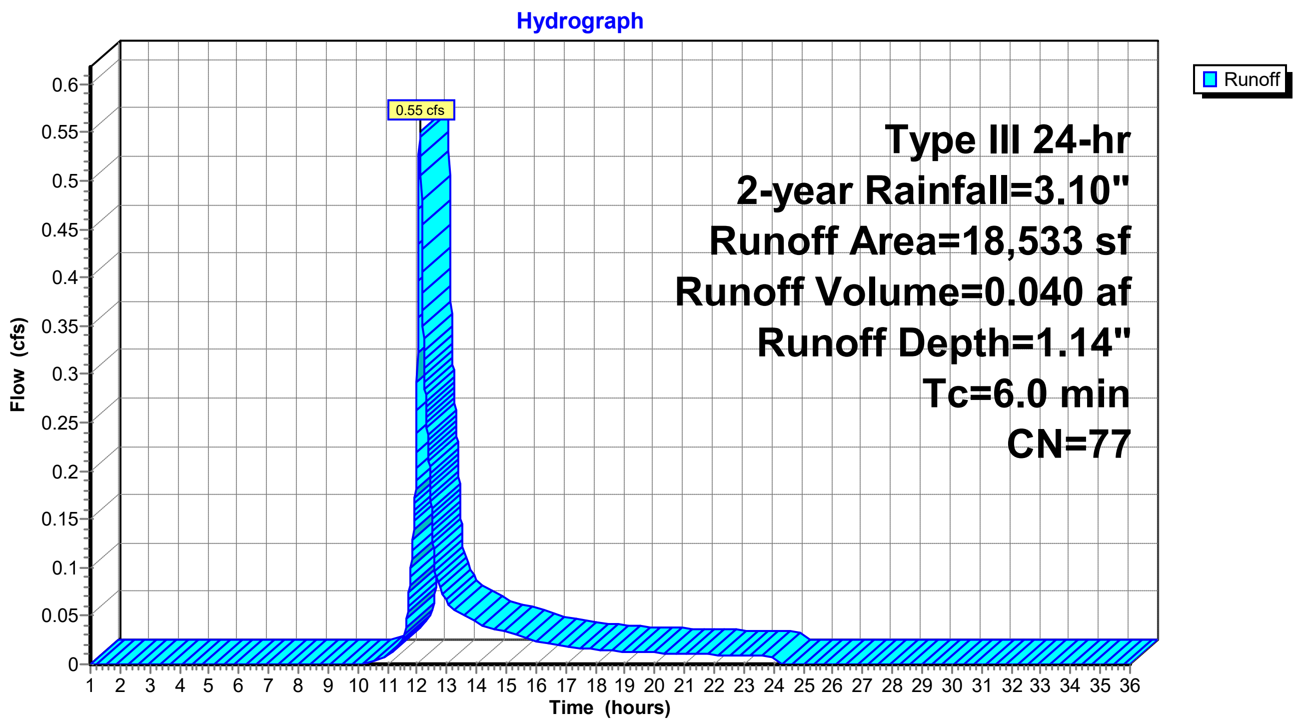
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	12,797	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,533	77	Weighted Average
	5,736		30.95% Pervious Area
	12,797		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

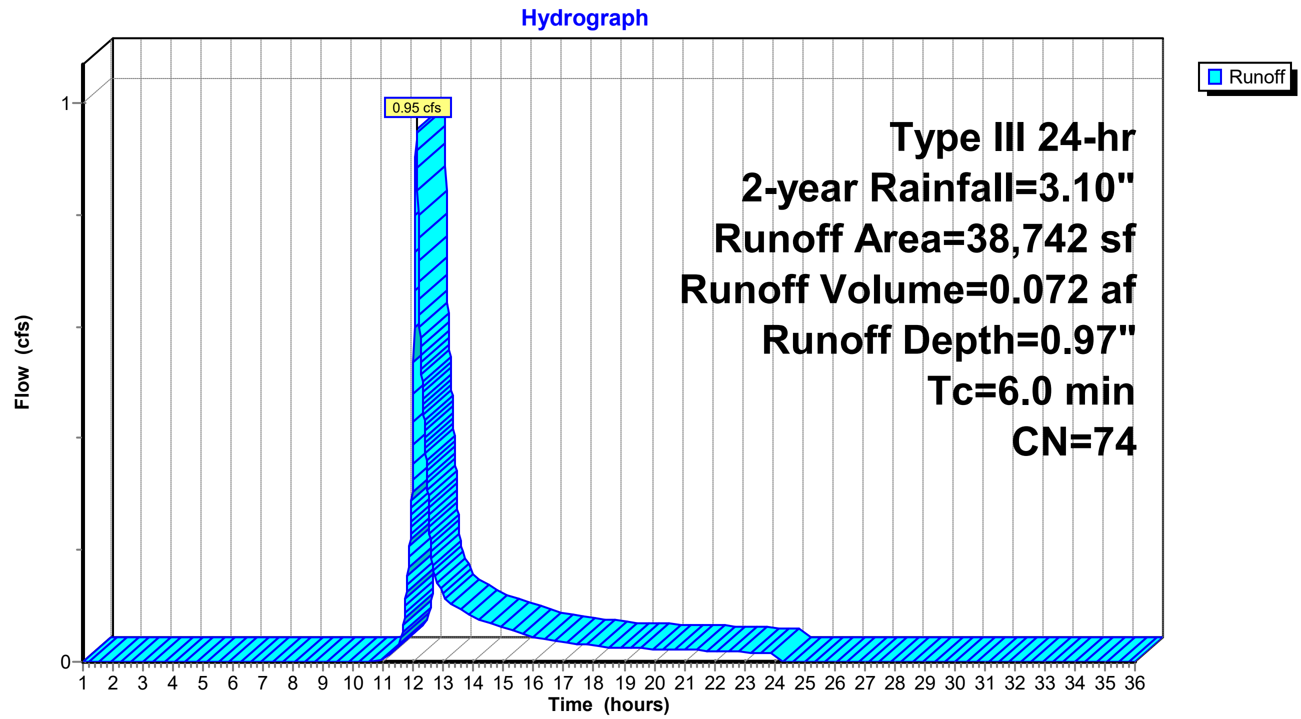
Runoff = 0.95 cfs @ 12.10 hrs, Volume= 0.072 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	5,533	98	Paved parking, HSG A
	4,499	30	Woods, Good, HSG A
*	9,300	30	Grass
*	19,410	98	Compacted Gravel
	38,742	74	Weighted Average
	13,799		35.62% Pervious Area
	24,943		64.38% Impervious Area

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

Subcatchment 11S: Sub 11

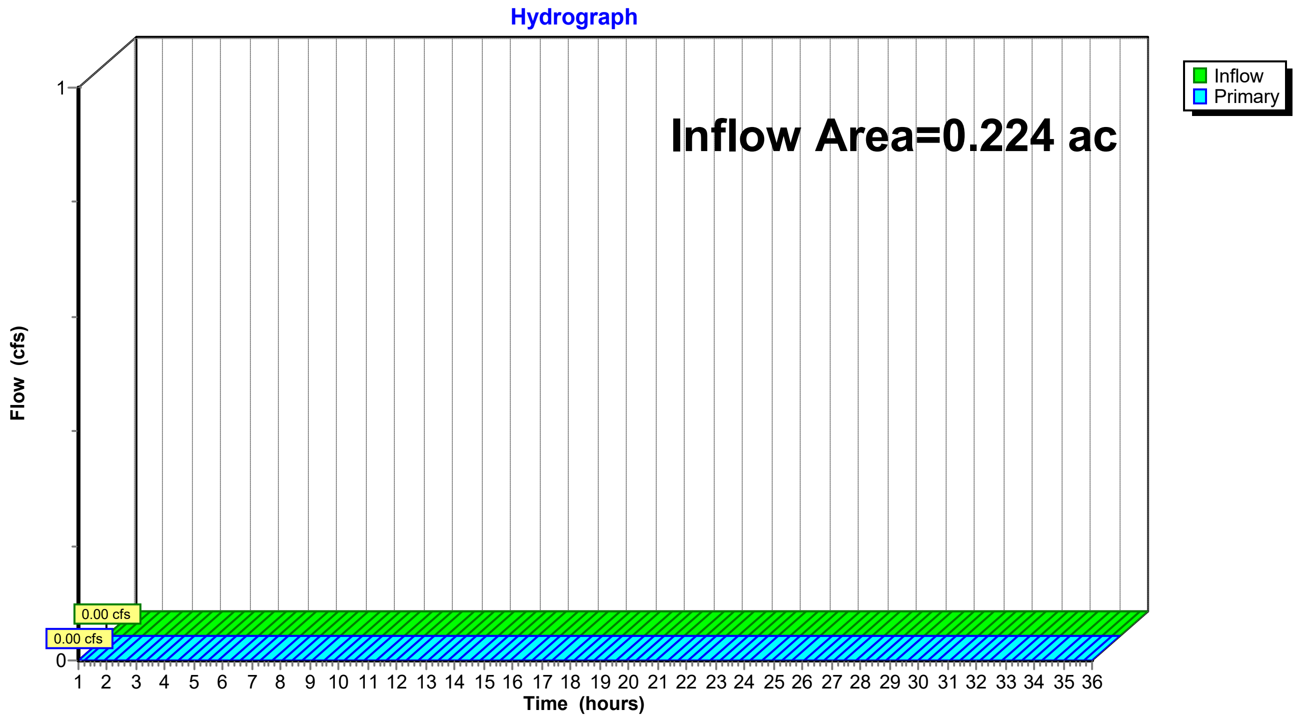


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

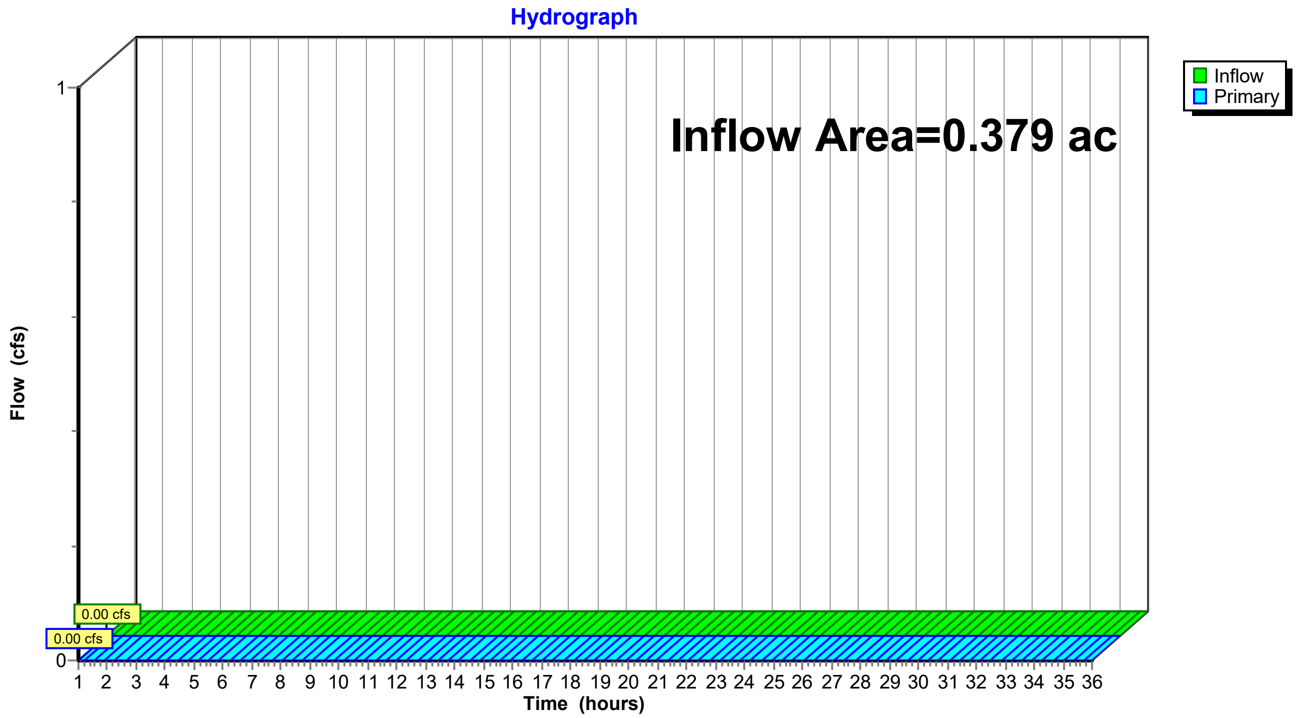


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.379 ac, 9.02% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

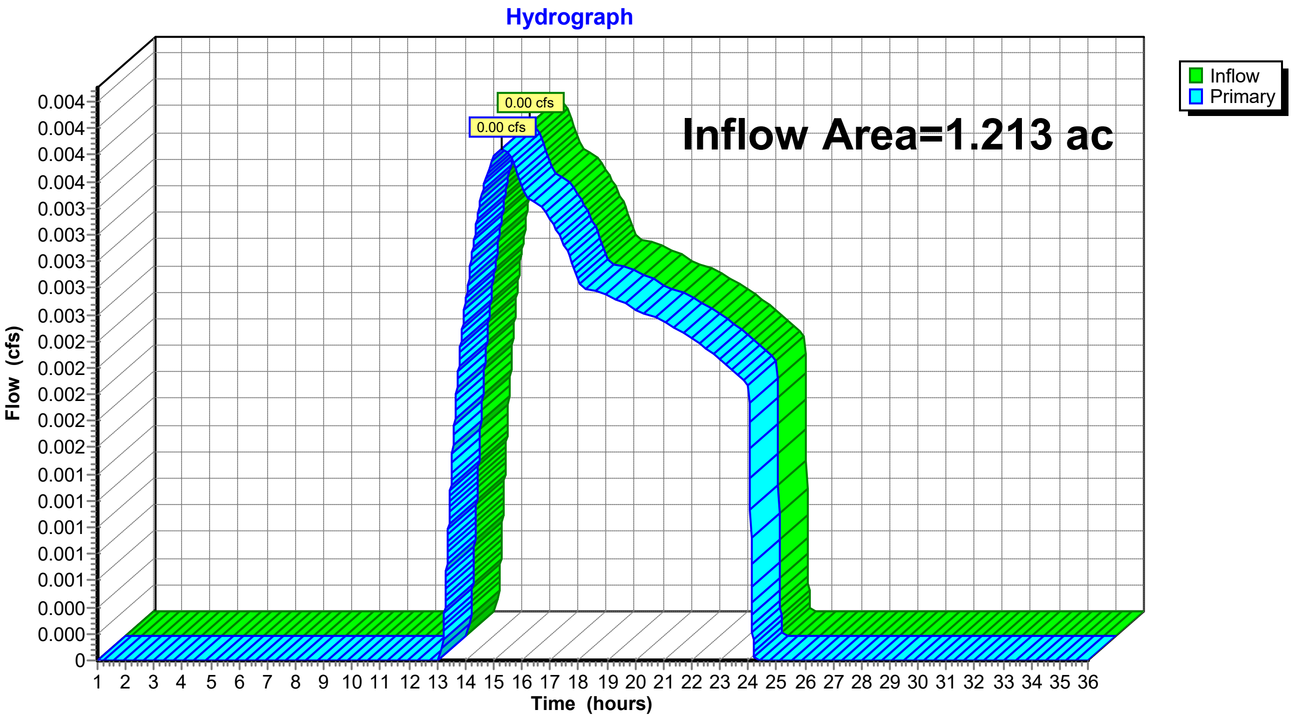


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 1.213 ac, 18.39% Impervious, Inflow Depth = 0.02" for 2-year event
Inflow = 0.00 cfs @ 15.30 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 15.30 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

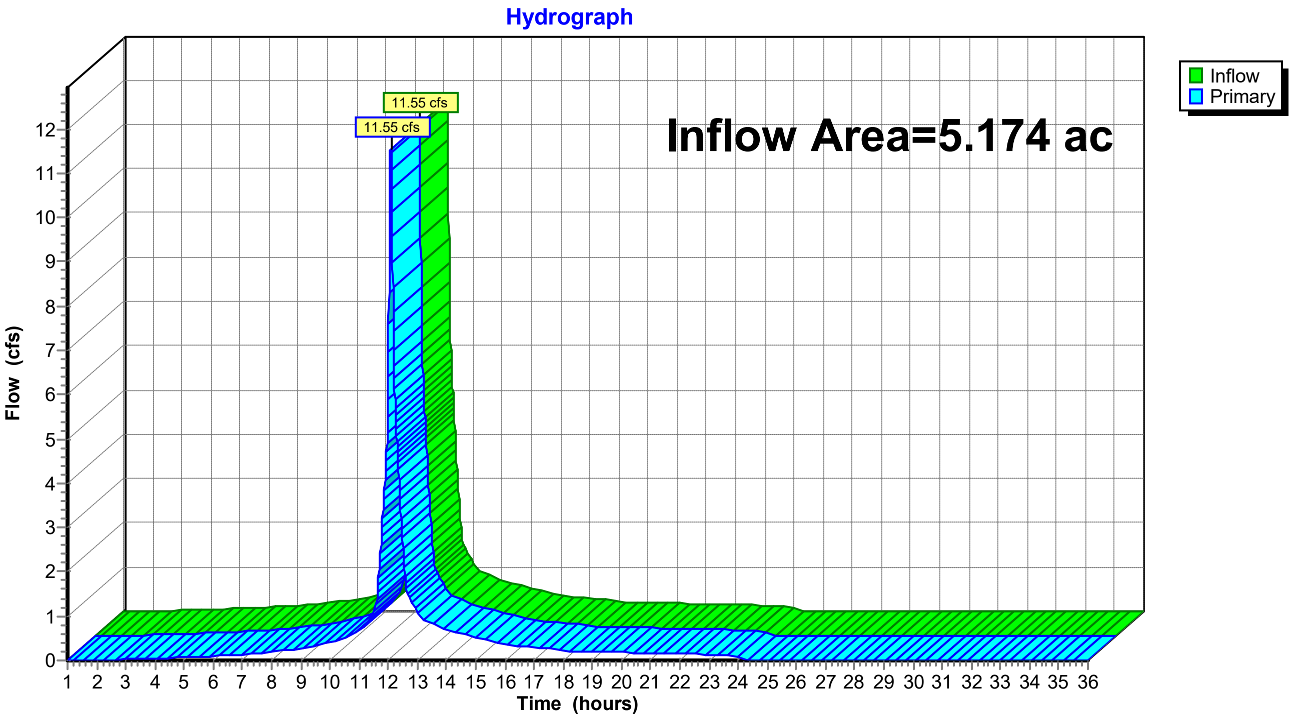


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.174 ac, 85.66% Impervious, Inflow Depth = 2.08" for 2-year event
Inflow = 11.55 cfs @ 12.09 hrs, Volume= 0.896 af
Primary = 11.55 cfs @ 12.09 hrs, Volume= 0.896 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>4.46"
Tc=6.0 min CN=98 Runoff=7.51 cfs 0.608 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=80 Runoff=1.75 cfs 0.125 af

Subcatchment 4S: Sub 4 Runoff Area=13,434 sf 63.43% Impervious Runoff Depth=2.05"
Tc=6.0 min CN=73 Runoff=0.73 cfs 0.053 af

Subcatchment 5S: Sub 5 Runoff Area=28,818 sf 23.38% Impervious Runoff Depth=0.39"
Tc=6.0 min CN=46 Runoff=0.11 cfs 0.022 af

Subcatchment 6S: Sub 6 Runoff Area=24,010 sf 12.40% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=38 Runoff=0.01 cfs 0.005 af

Subcatchment 7S: Sub 7 Runoff Area=18,136 sf 97.29% Impervious Runoff Depth=4.23"
Tc=6.0 min CN=96 Runoff=1.88 cfs 0.147 af

Subcatchment 8S: Sub 8 Runoff Area=16,497 sf 9.02% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=36 Runoff=0.00 cfs 0.002 af

Subcatchment 9S: Sub 9 Runoff Area=40,665 sf 98.20% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=97 Runoff=4.26 cfs 0.338 af

Subcatchment 10S: Sub 10 Runoff Area=18,533 sf 69.05% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=77 Runoff=1.18 cfs 0.084 af

Subcatchment 11S: Sub 11 Runoff Area=38,742 sf 64.38% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=74 Runoff=2.20 cfs 0.158 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2L: Isolated Wetlands Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Link 3L: Spofford Pond Wetlands Inflow=0.11 cfs 0.027 af
Primary=0.11 cfs 0.027 af

Link 4L: Vernal Pool Wetlands Inflow=19.50 cfs 1.512 af
Primary=19.50 cfs 1.512 af

Total Runoff Area = 6.990 ac Runoff Volume = 1.541 af Average Runoff Depth = 2.65"
32.91% Pervious = 2.301 ac 67.09% Impervious = 4.690 ac

Summary for Subcatchment 1S: Roof

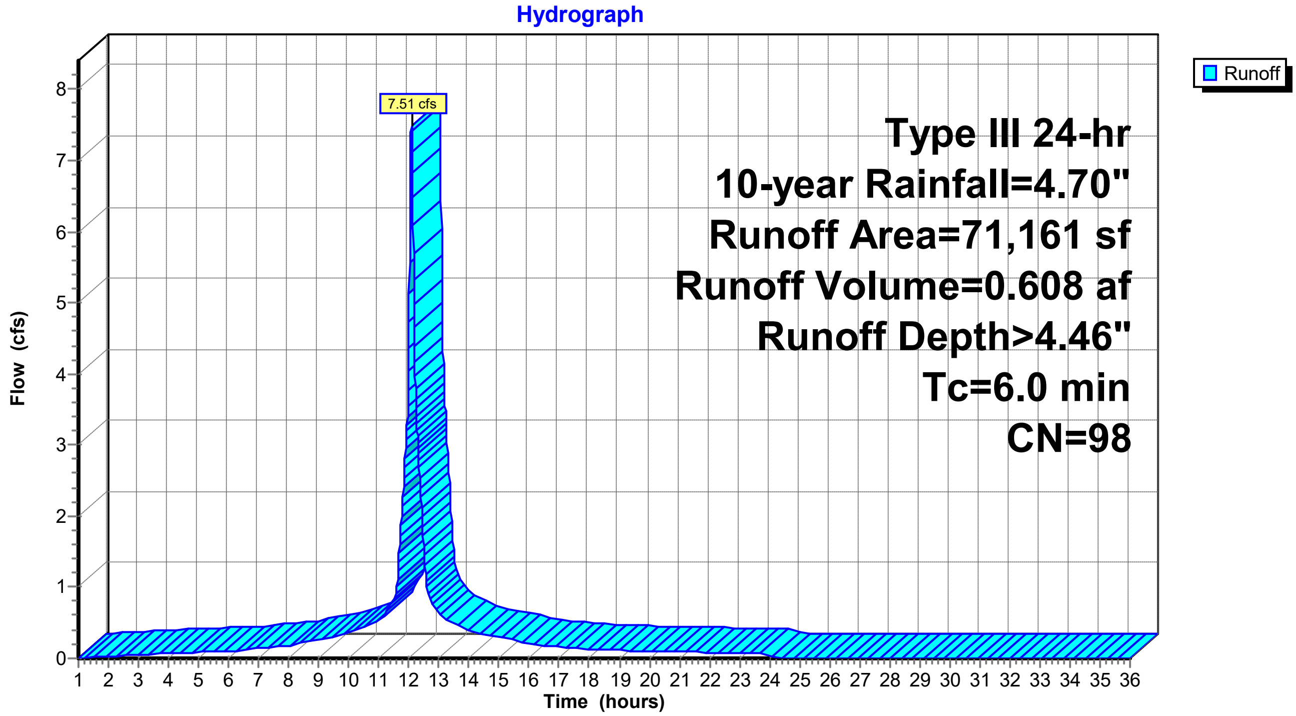
Runoff = 7.51 cfs @ 12.08 hrs, Volume= 0.608 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

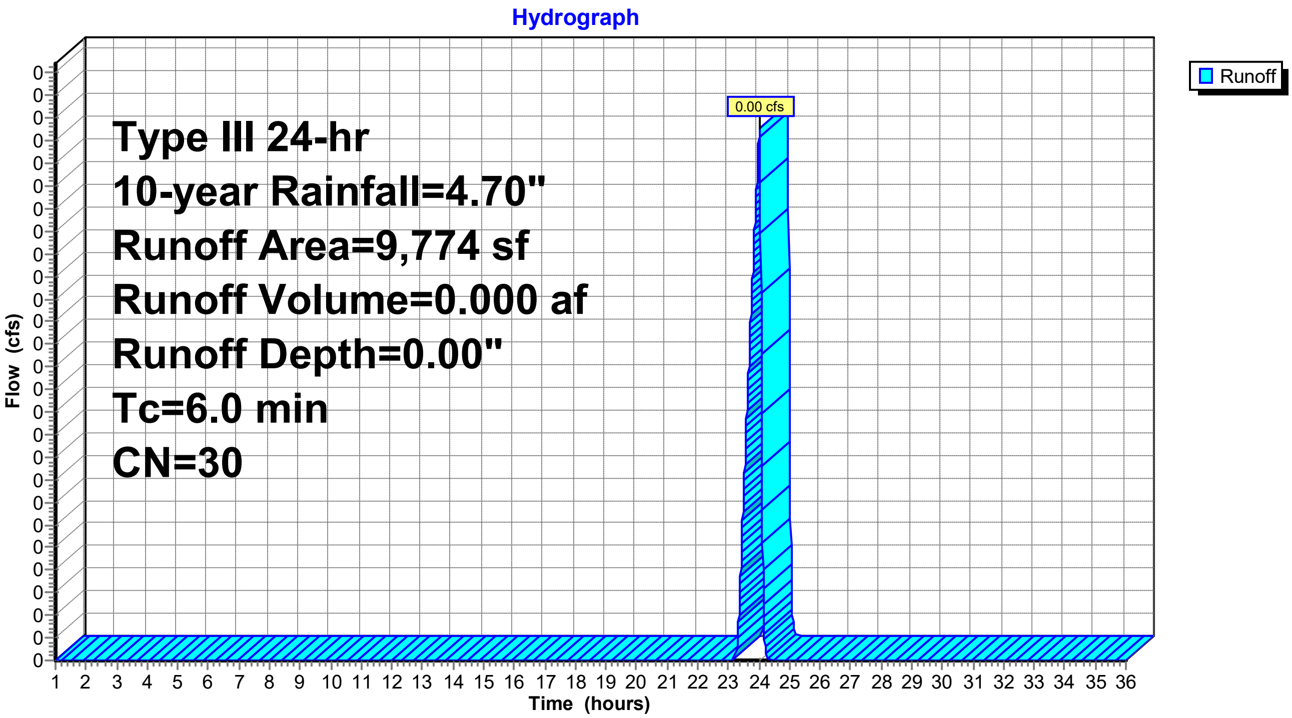
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

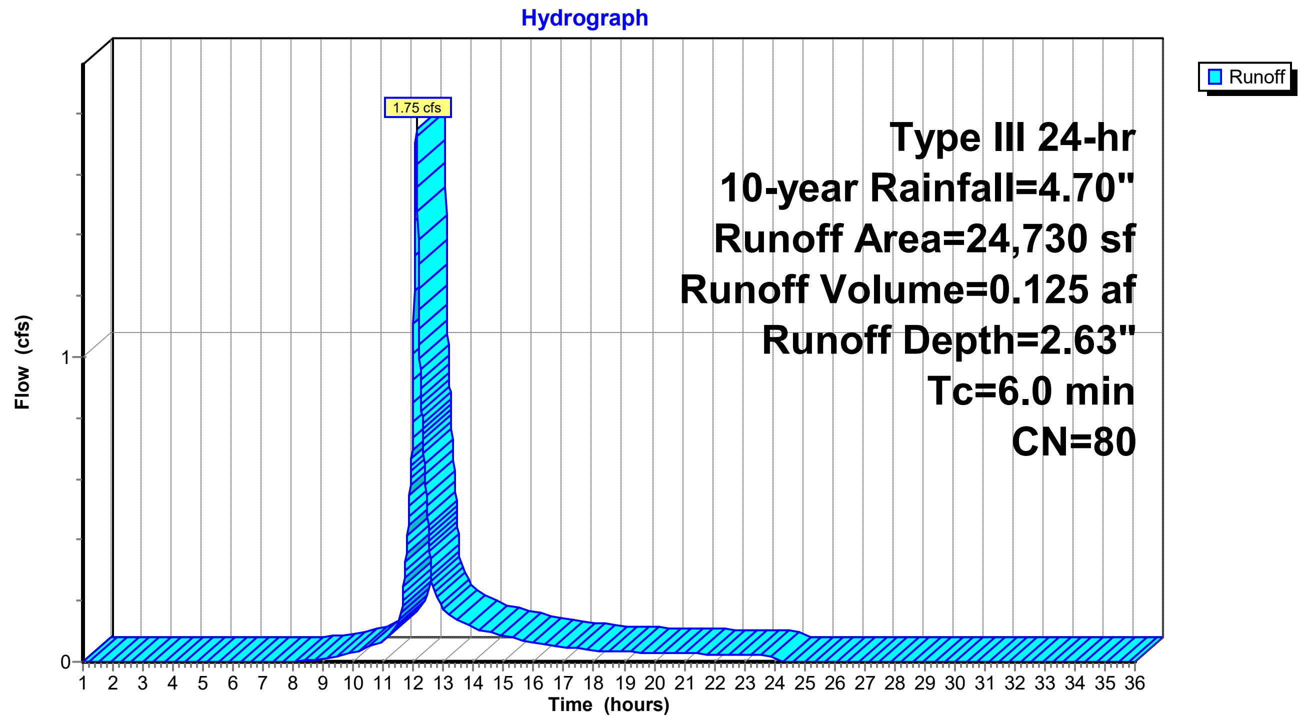
Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.125 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

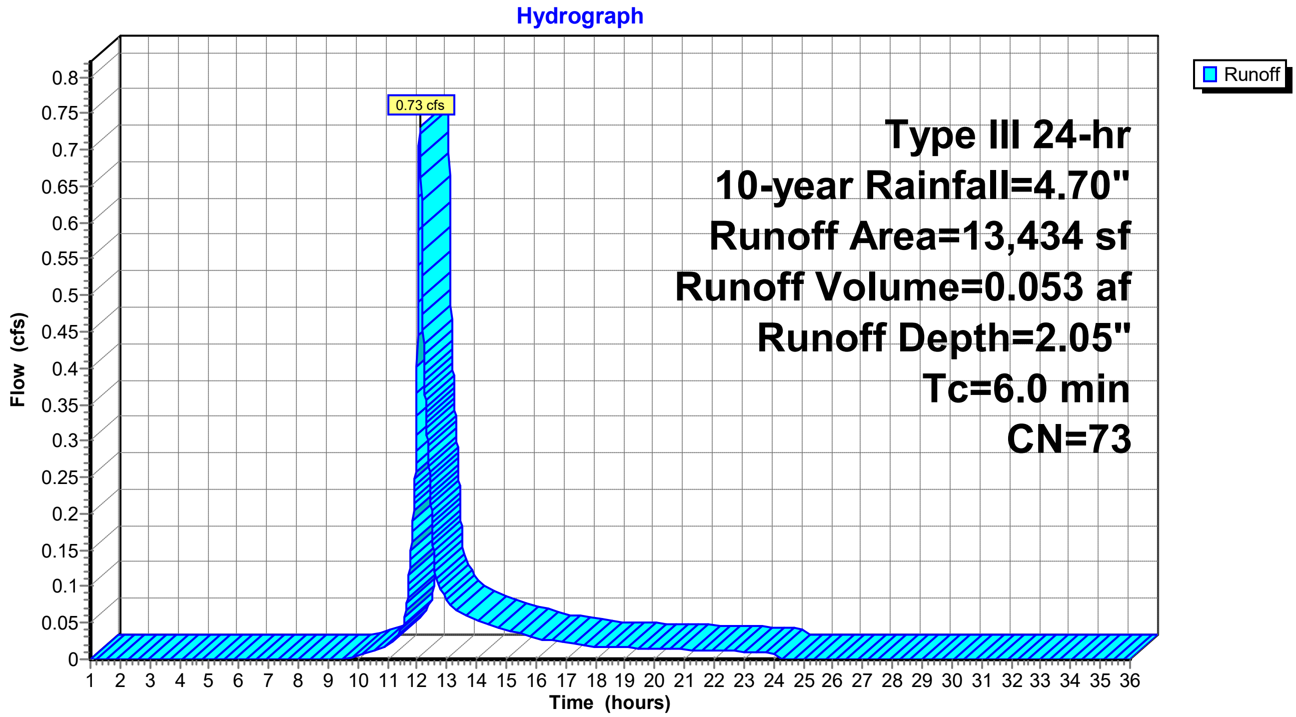
Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	8,521	98	Paved parking, HSG A
	2,064	30	Woods, Good, HSG A
*	2,849	30	Grass
	13,434	73	Weighted Average
	4,913		36.57% Pervious Area
	8,521		63.43% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

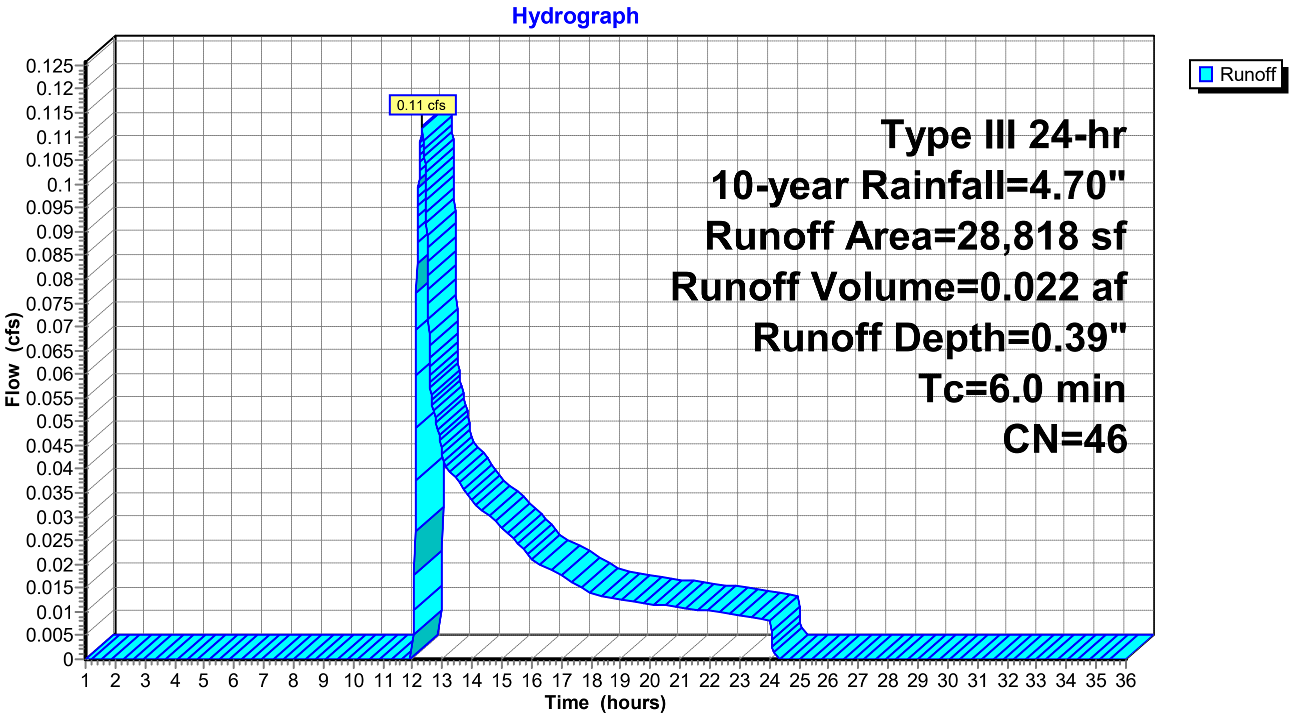
Runoff = 0.11 cfs @ 12.32 hrs, Volume= 0.022 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	6,737	98	Paved parking, HSG A
	9,957	30	Woods, Good, HSG A
*	12,124	30	Grass
	28,818	46	Weighted Average
	22,081		76.62% Pervious Area
	6,737		23.38% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

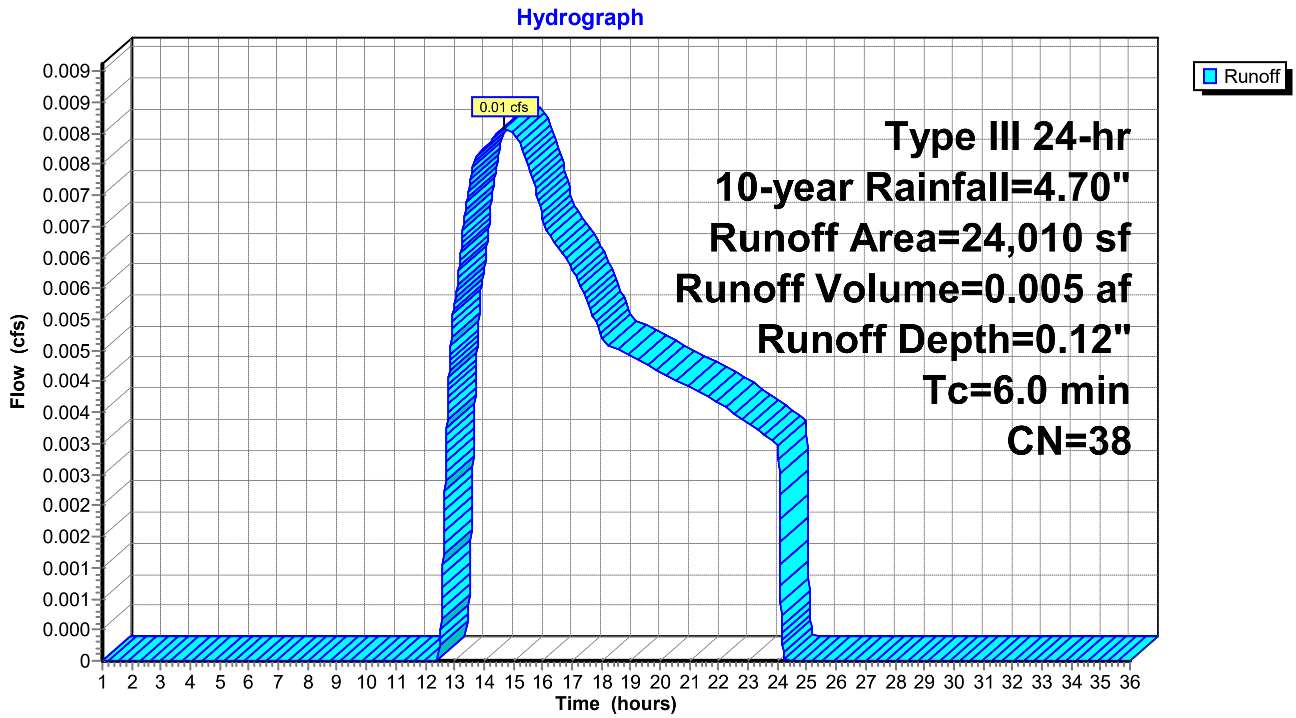
Runoff = 0.01 cfs @ 14.70 hrs, Volume= 0.005 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	2,978	98	Paved parking, HSG A
*	21,032	30	Grass
	24,010	38	Weighted Average
	21,032		87.60% Pervious Area
	2,978		12.40% Impervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

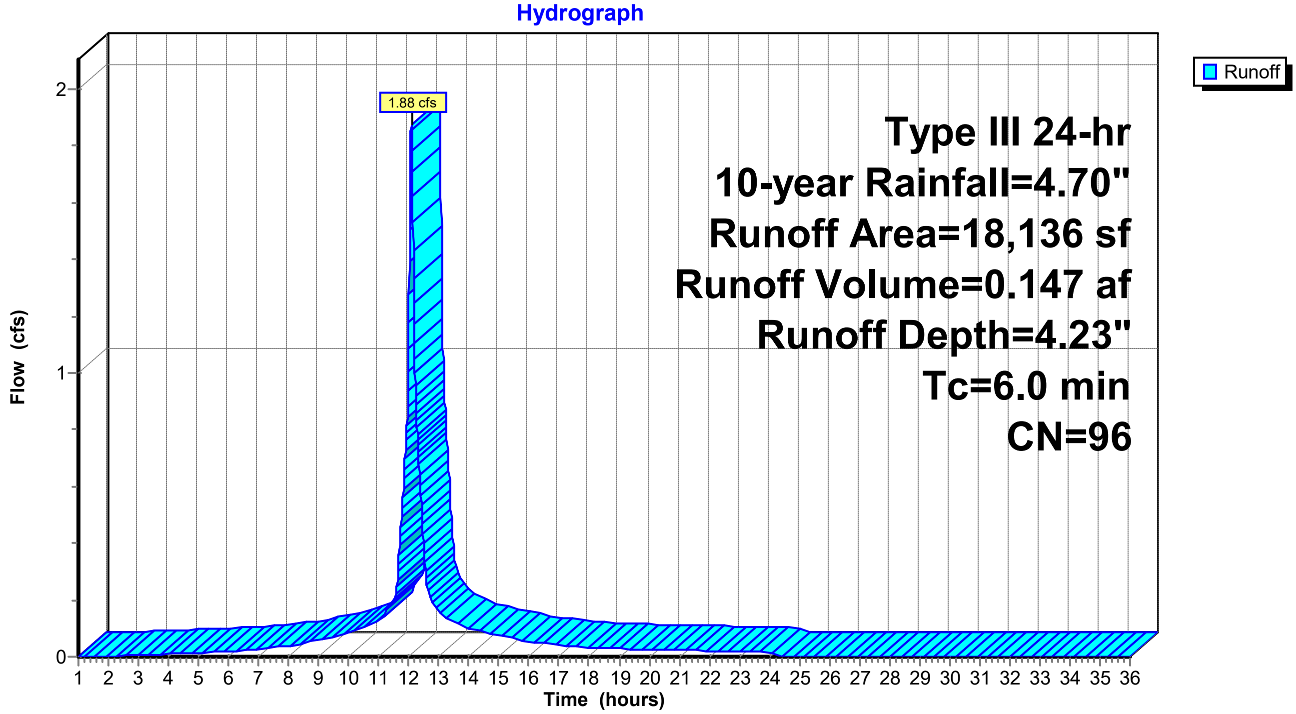
Runoff = 1.88 cfs @ 12.08 hrs, Volume= 0.147 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	17,644	98	Paved parking, HSG A
*	492	30	Grass
	18,136	96	Weighted Average
	492		2.71% Pervious Area
	17,644		97.29% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

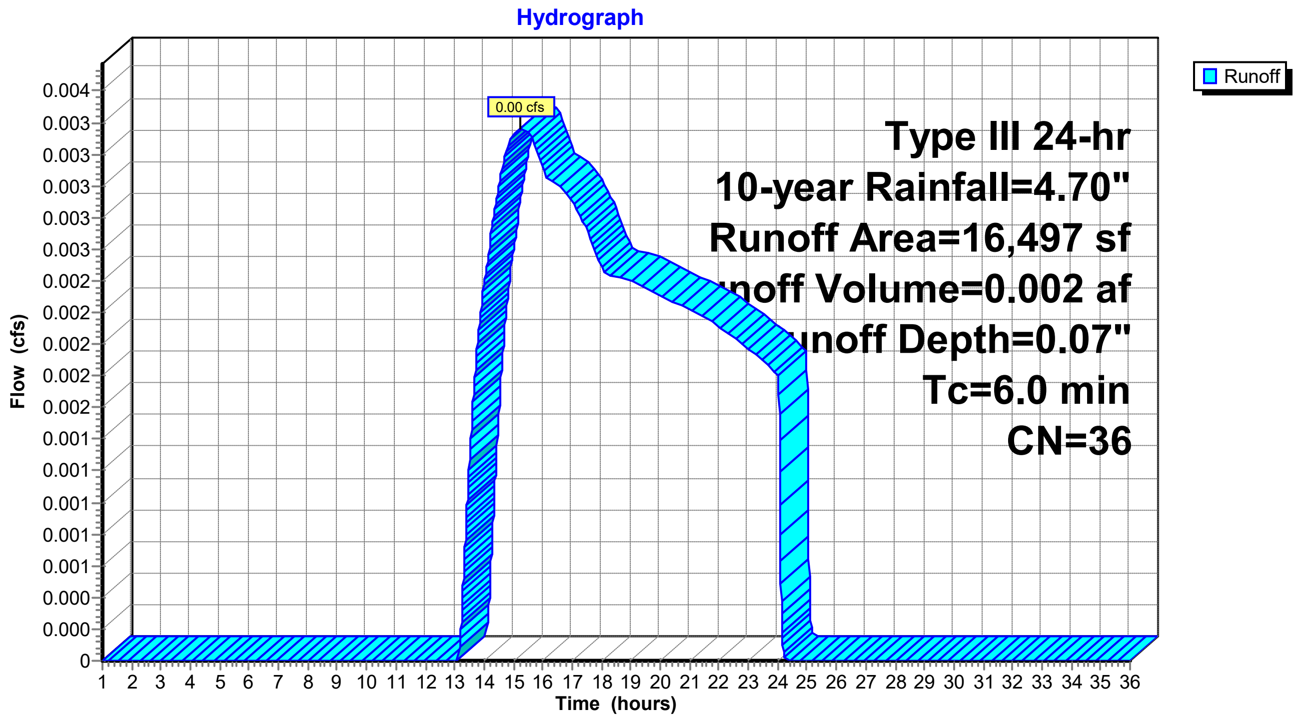
Runoff = 0.00 cfs @ 15.26 hrs, Volume= 0.002 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	1,488	98	Paved parking, HSG A
*	15,009	30	Grass
	16,497	36	Weighted Average
	15,009		90.98% Pervious Area
	1,488		9.02% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

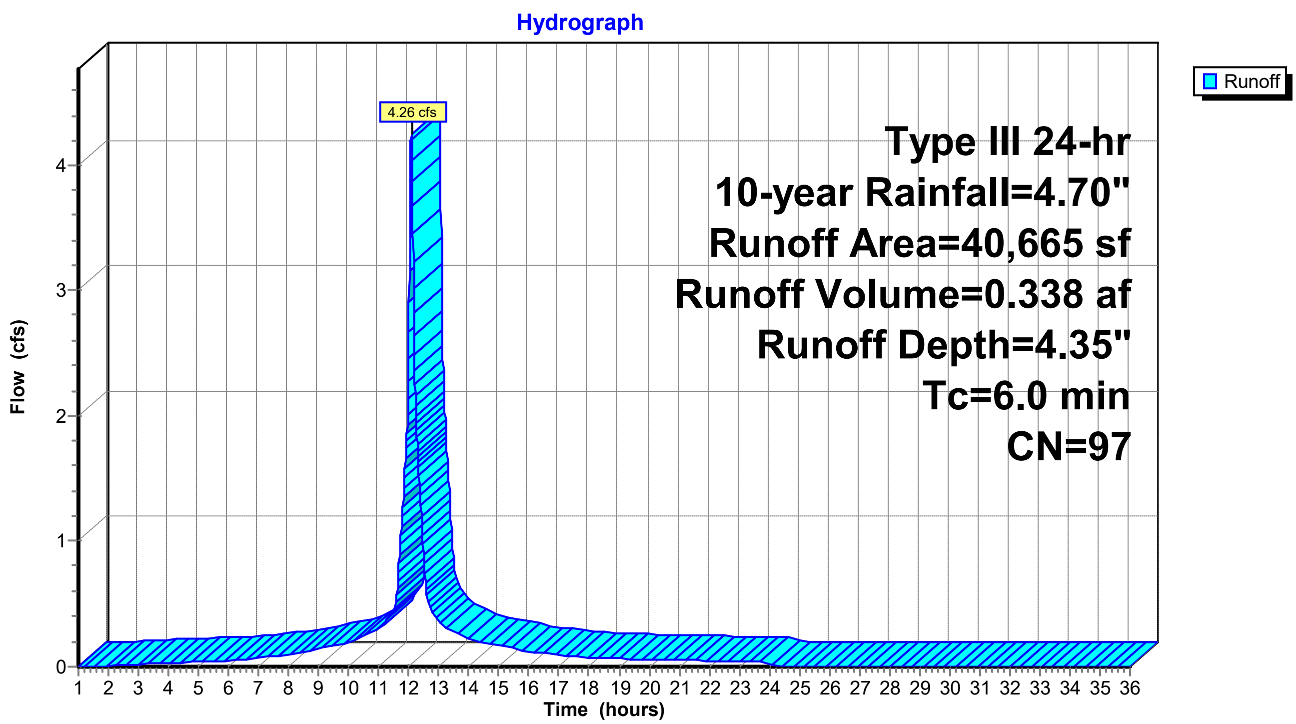
Runoff = 4.26 cfs @ 12.08 hrs, Volume= 0.338 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	39,934	98	Paved parking, HSG A
*	731	30	Grass
	40,665	97	Weighted Average
	731		1.80% Pervious Area
	39,934		98.20% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

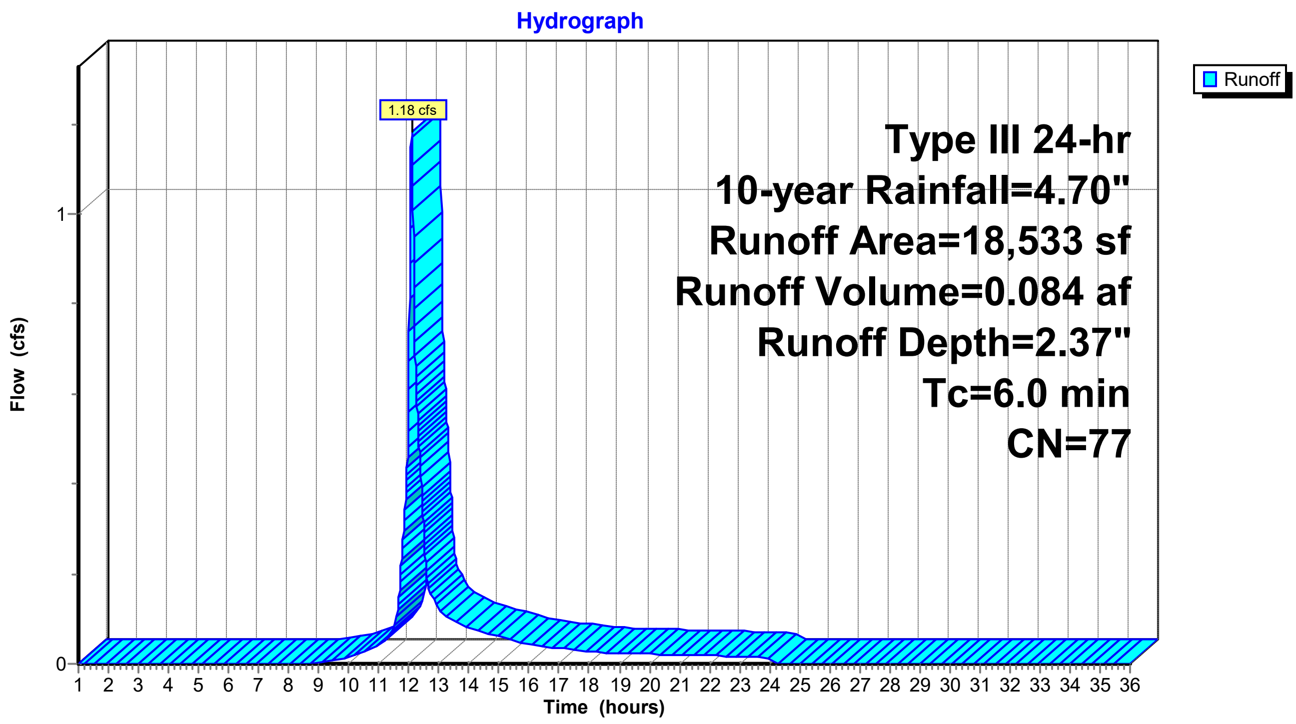
Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	12,797	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,533	77	Weighted Average
	5,736		30.95% Pervious Area
	12,797		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

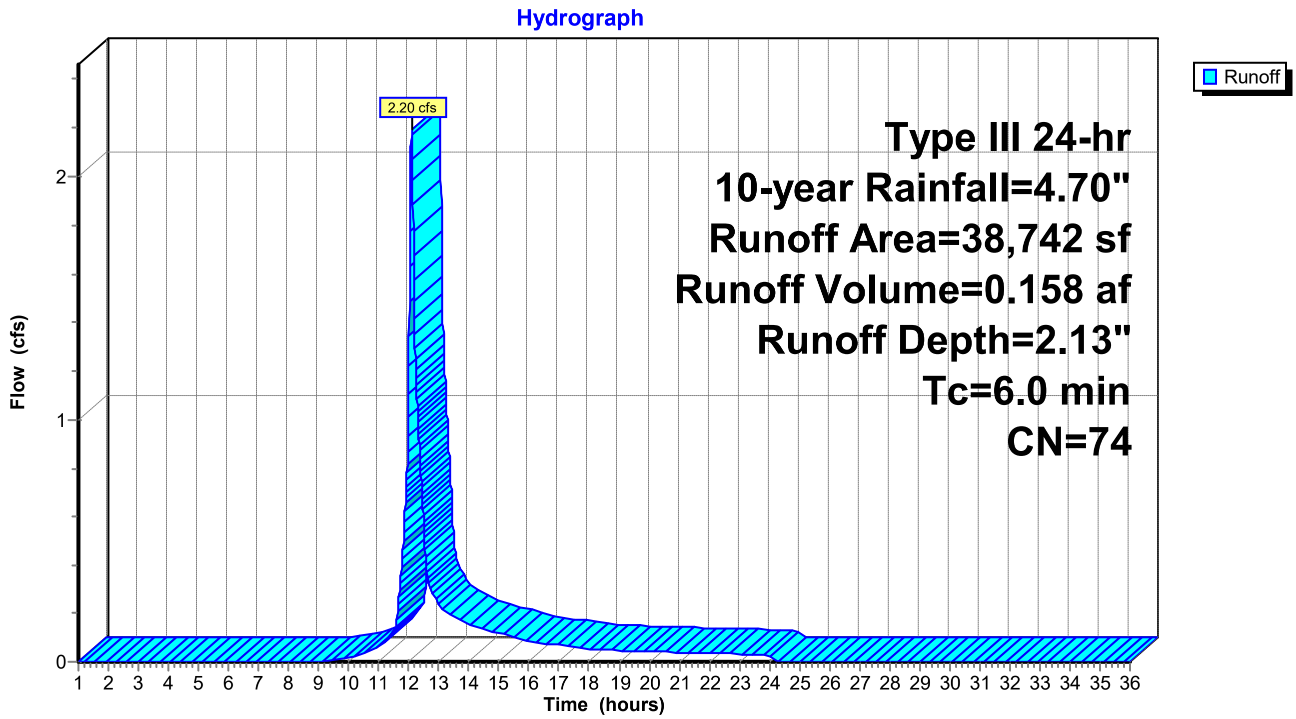
Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	5,533	98	Paved parking, HSG A
	4,499	30	Woods, Good, HSG A
*	9,300	30	Grass
*	19,410	98	Compacted Gravel
	38,742	74	Weighted Average
	13,799		35.62% Pervious Area
	24,943		64.38% Impervious Area

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

Subcatchment 11S: Sub 11

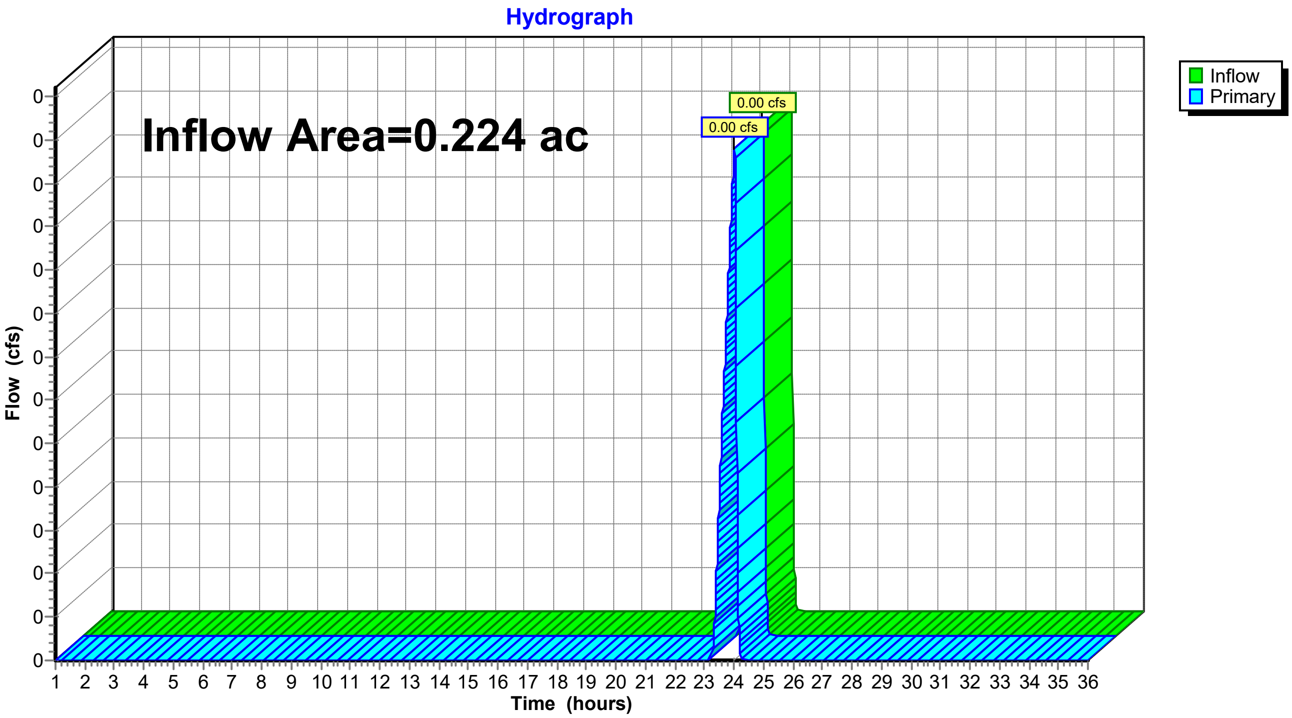


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

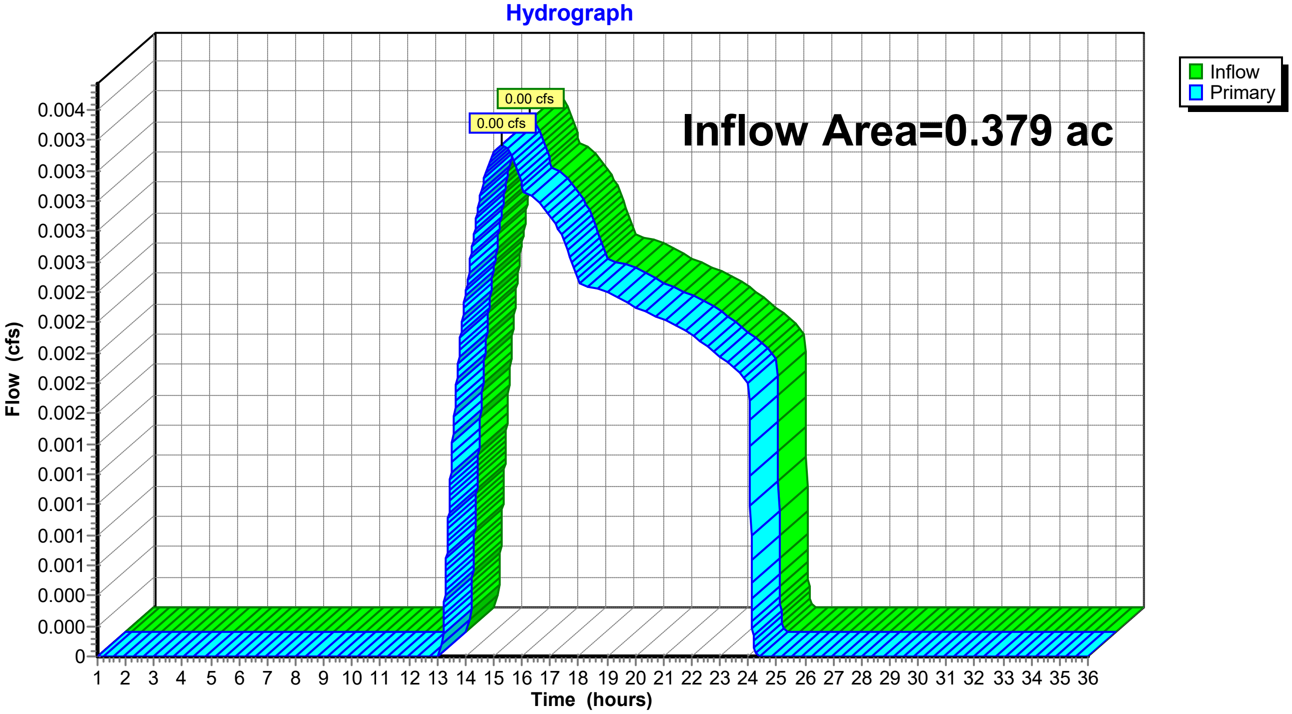


Summary for Link 2L: Isolated Wetlands

Inflow Area =	0.379 ac,	9.02% Impervious, Inflow Depth = 0.07"	for 10-year event	
Inflow =	0.00 cfs @	15.26 hrs, Volume=	0.002 af	
Primary =	0.00 cfs @	15.26 hrs, Volume=	0.002 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

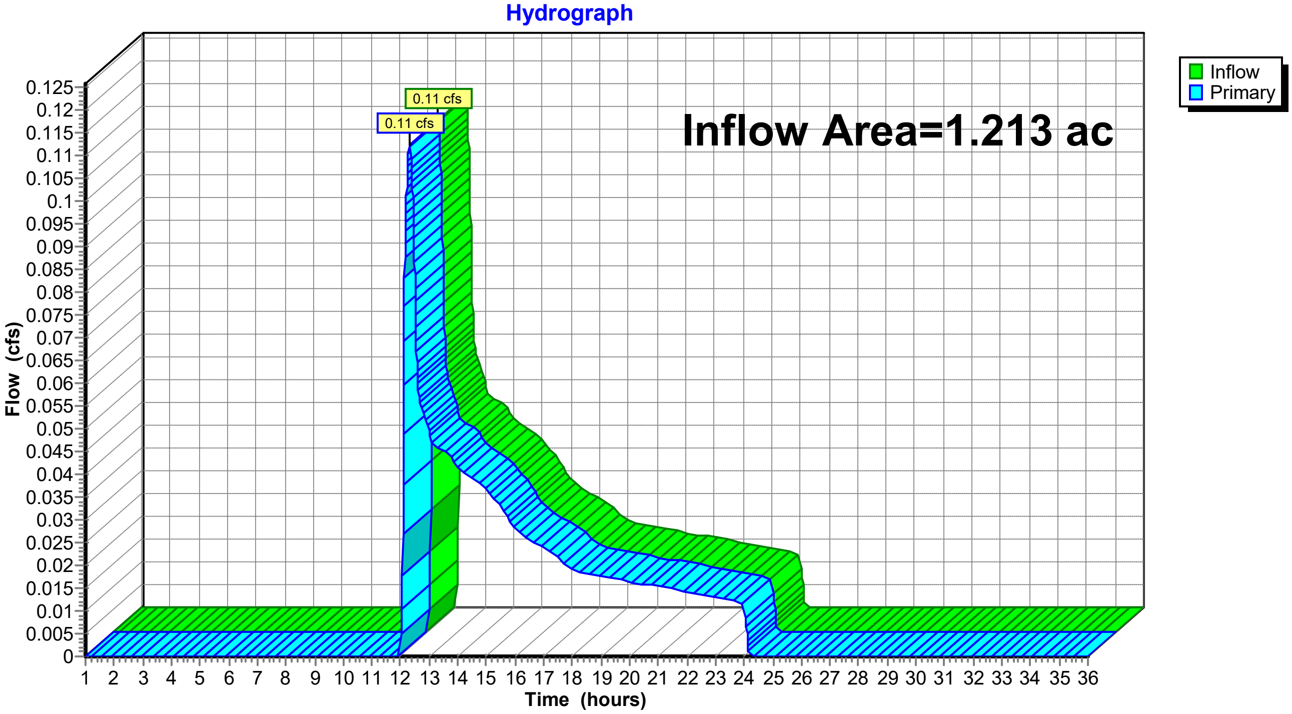


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 1.213 ac, 18.39% Impervious, Inflow Depth = 0.27" for 10-year event
Inflow = 0.11 cfs @ 12.32 hrs, Volume= 0.027 af
Primary = 0.11 cfs @ 12.32 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

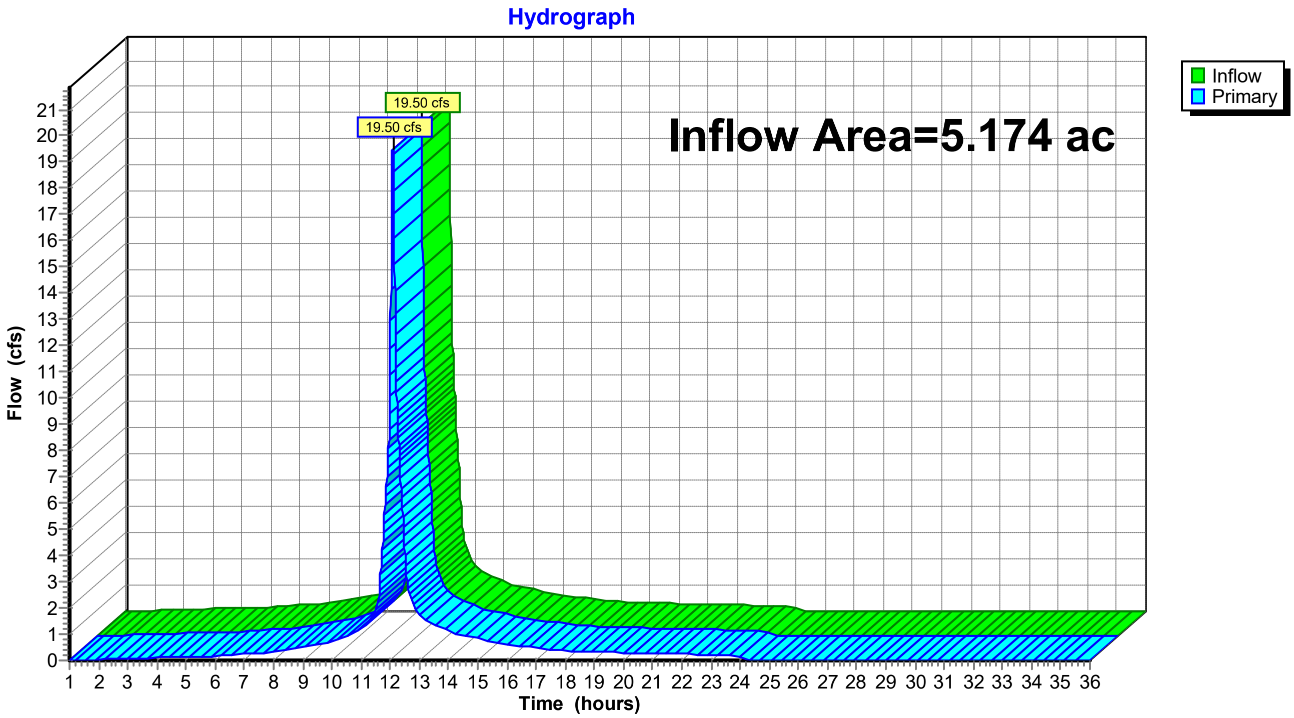


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.174 ac, 85.66% Impervious, Inflow Depth > 3.51" for 10-year event
Inflow = 19.50 cfs @ 12.09 hrs, Volume= 1.512 af
Primary = 19.50 cfs @ 12.09 hrs, Volume= 1.512 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=9.28 cfs 0.757 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=3.60"
Tc=6.0 min CN=80 Runoff=2.39 cfs 0.170 af

Subcatchment 4S: Sub 4 Runoff Area=13,434 sf 63.43% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=73 Runoff=1.06 cfs 0.075 af

Subcatchment 5S: Sub 5 Runoff Area=28,818 sf 23.38% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=46 Runoff=0.37 cfs 0.043 af

Subcatchment 6S: Sub 6 Runoff Area=24,010 sf 12.40% Impervious Runoff Depth=0.34"
Tc=6.0 min CN=38 Runoff=0.06 cfs 0.016 af

Subcatchment 7S: Sub 7 Runoff Area=18,136 sf 97.29% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=2.34 cfs 0.185 af

Subcatchment 8S: Sub 8 Runoff Area=16,497 sf 9.02% Impervious Runoff Depth=0.25"
Tc=6.0 min CN=36 Runoff=0.02 cfs 0.008 af

Subcatchment 9S: Sub 9 Runoff Area=40,665 sf 98.20% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=5.28 cfs 0.424 af

Subcatchment 10S: Sub 10 Runoff Area=18,533 sf 69.05% Impervious Runoff Depth=3.31"
Tc=6.0 min CN=77 Runoff=1.65 cfs 0.117 af

Subcatchment 11S: Sub 11 Runoff Area=38,742 sf 64.38% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=74 Runoff=3.15 cfs 0.224 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Link 2L: Isolated Wetlands Inflow=0.02 cfs 0.008 af
Primary=0.02 cfs 0.008 af

Link 3L: Spofford Pond Wetlands Inflow=0.37 cfs 0.059 af
Primary=0.37 cfs 0.059 af

Link 4L: Vernal Pool Wetlands Inflow=25.12 cfs 1.952 af
Primary=25.12 cfs 1.952 af

Total Runoff Area = 6.990 ac Runoff Volume = 2.020 af Average Runoff Depth = 3.47"
32.91% Pervious = 2.301 ac 67.09% Impervious = 4.690 ac

Summary for Subcatchment 1S: Roof

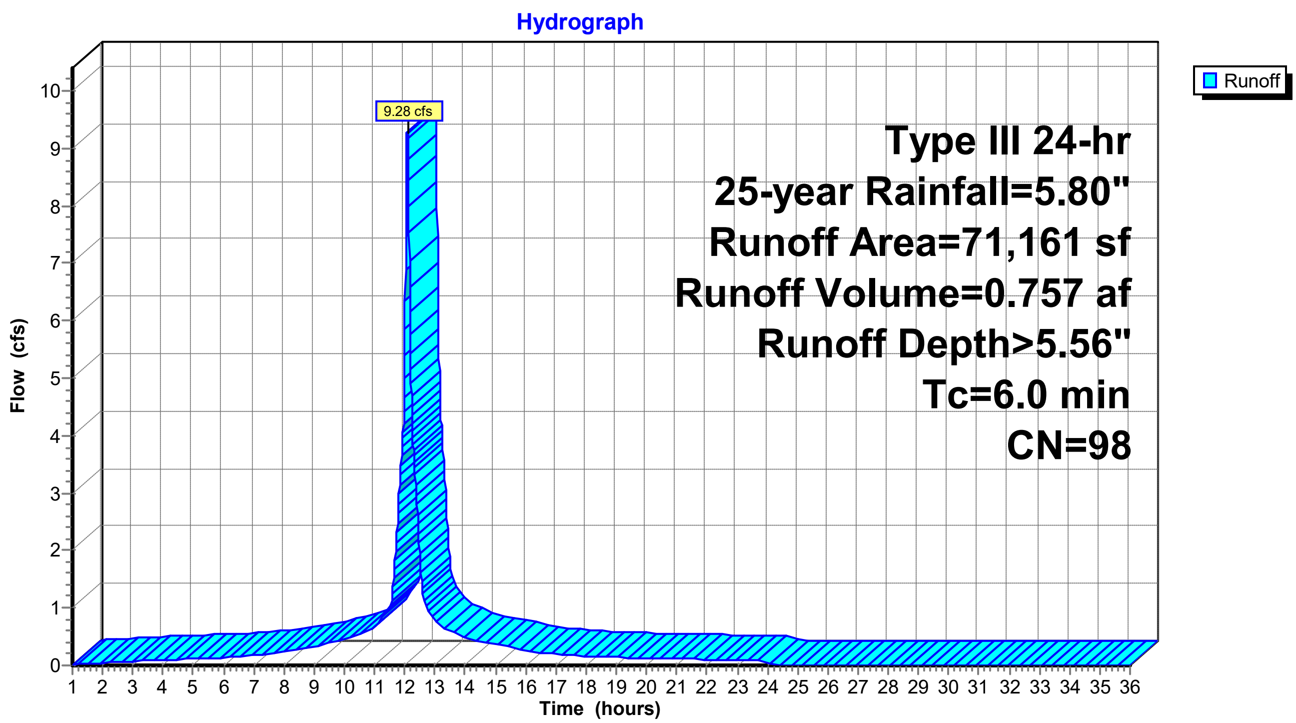
Runoff = 9.28 cfs @ 12.08 hrs, Volume= 0.757 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

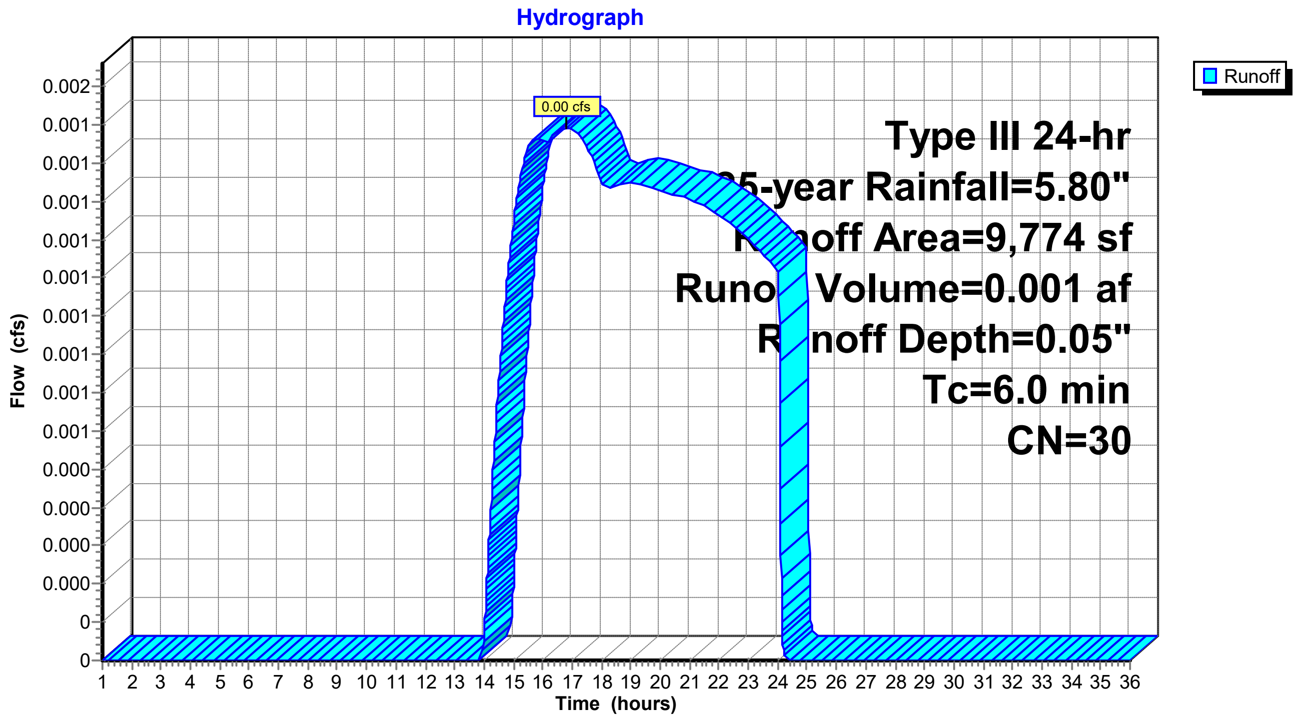
Runoff = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

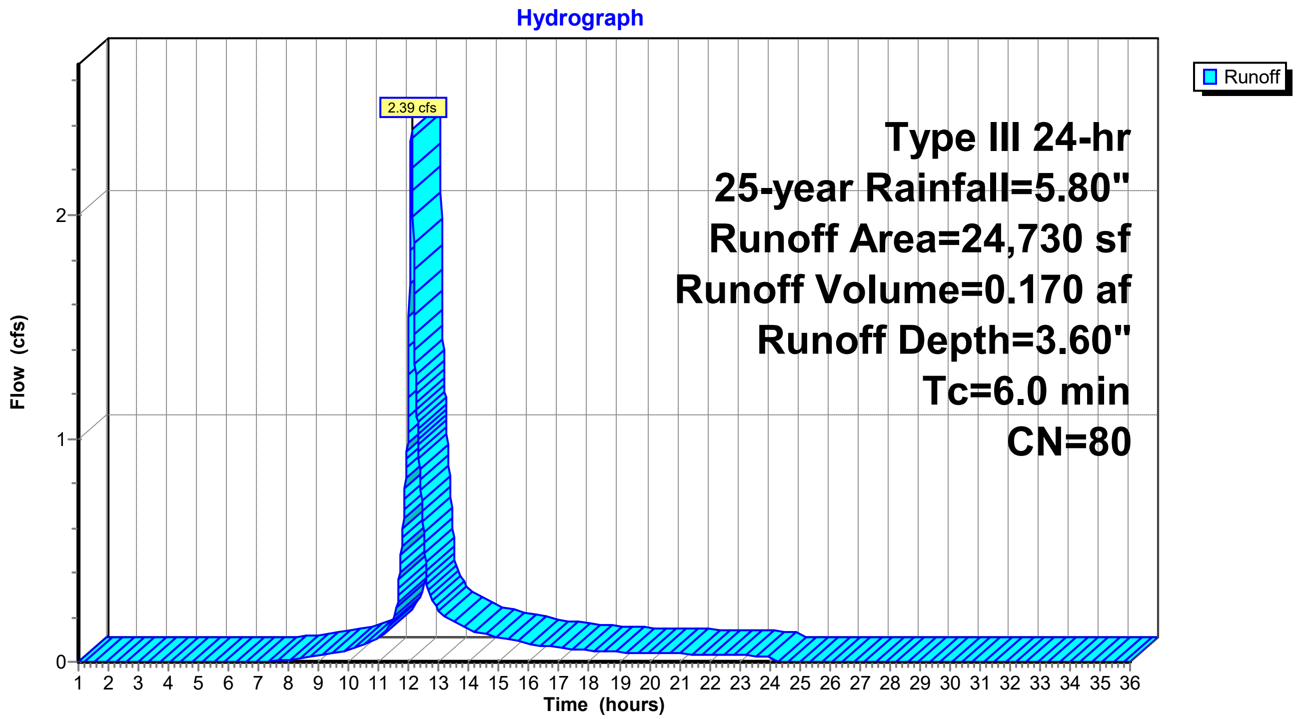
Runoff = 2.39 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

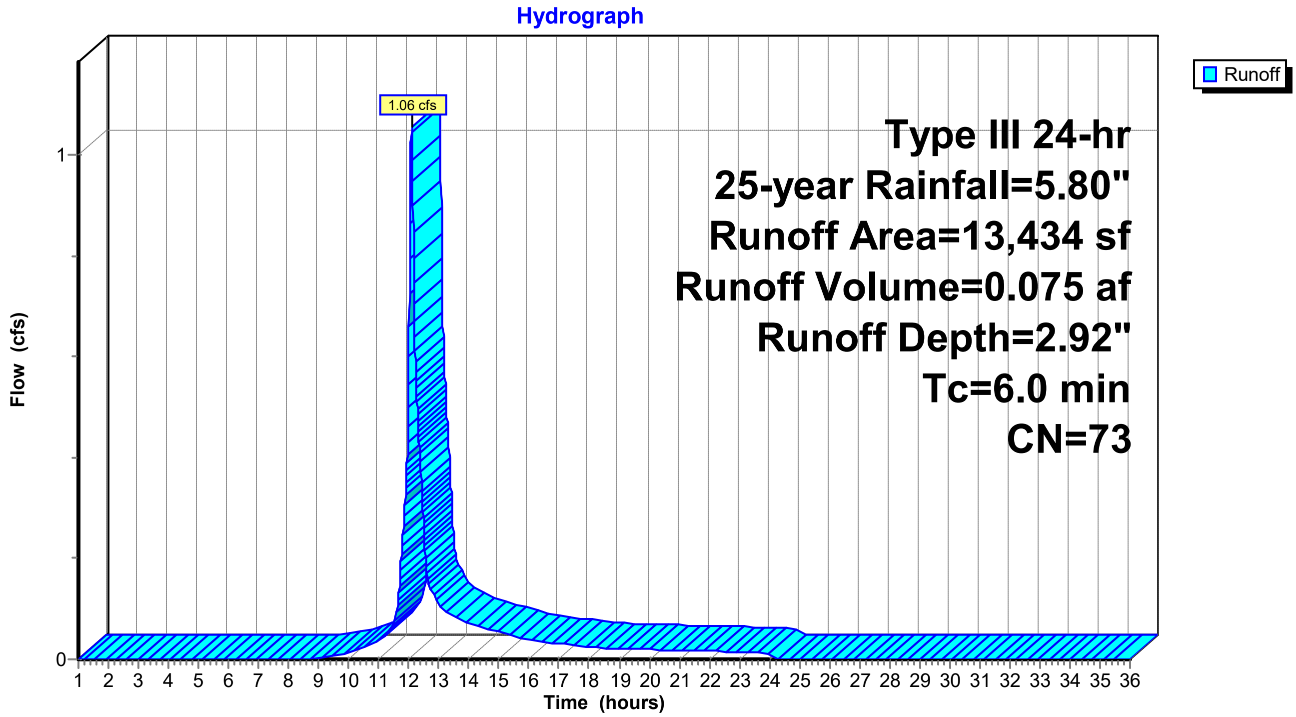
Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	8,521	98	Paved parking, HSG A
	2,064	30	Woods, Good, HSG A
*	2,849	30	Grass
	13,434	73	Weighted Average
	4,913		36.57% Pervious Area
	8,521		63.43% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

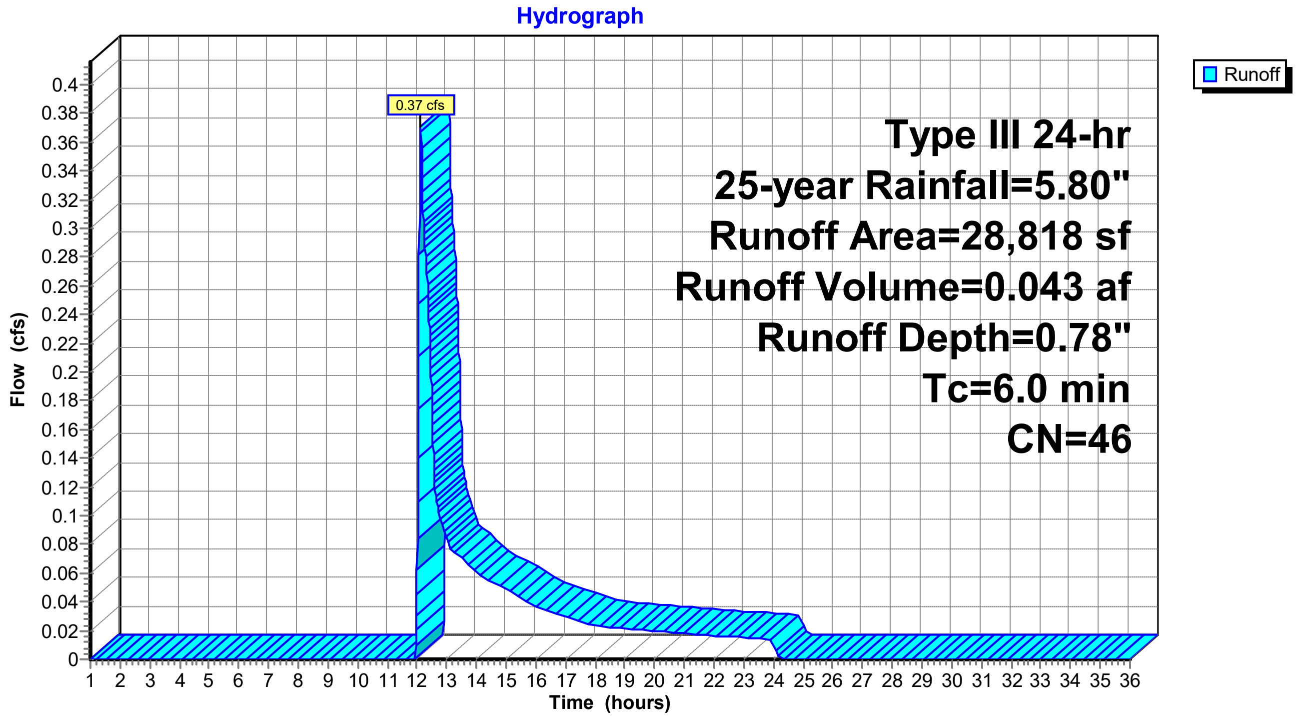
Runoff = 0.37 cfs @ 12.12 hrs, Volume= 0.043 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	6,737	98	Paved parking, HSG A
	9,957	30	Woods, Good, HSG A
*	12,124	30	Grass
	28,818	46	Weighted Average
	22,081		76.62% Pervious Area
	6,737		23.38% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

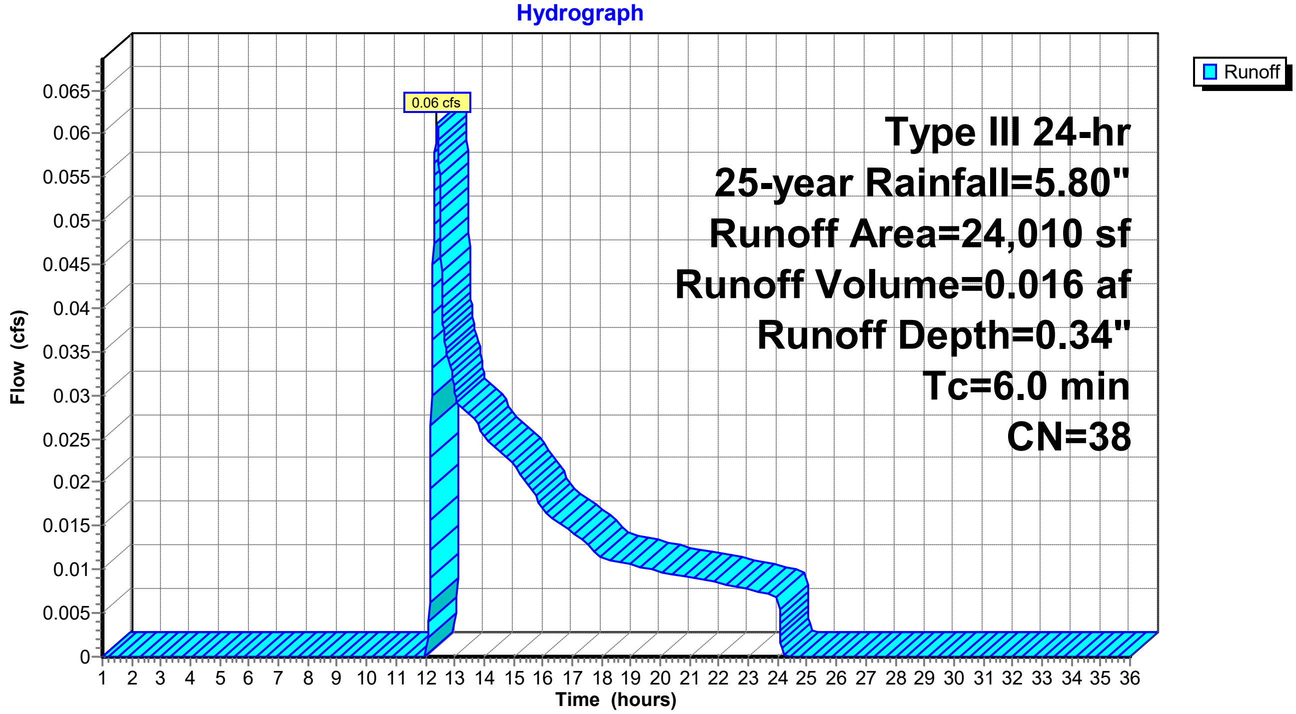
Runoff = 0.06 cfs @ 12.39 hrs, Volume= 0.016 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	2,978	98	Paved parking, HSG A
*	21,032	30	Grass
	24,010	38	Weighted Average
	21,032		87.60% Pervious Area
	2,978		12.40% Impervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

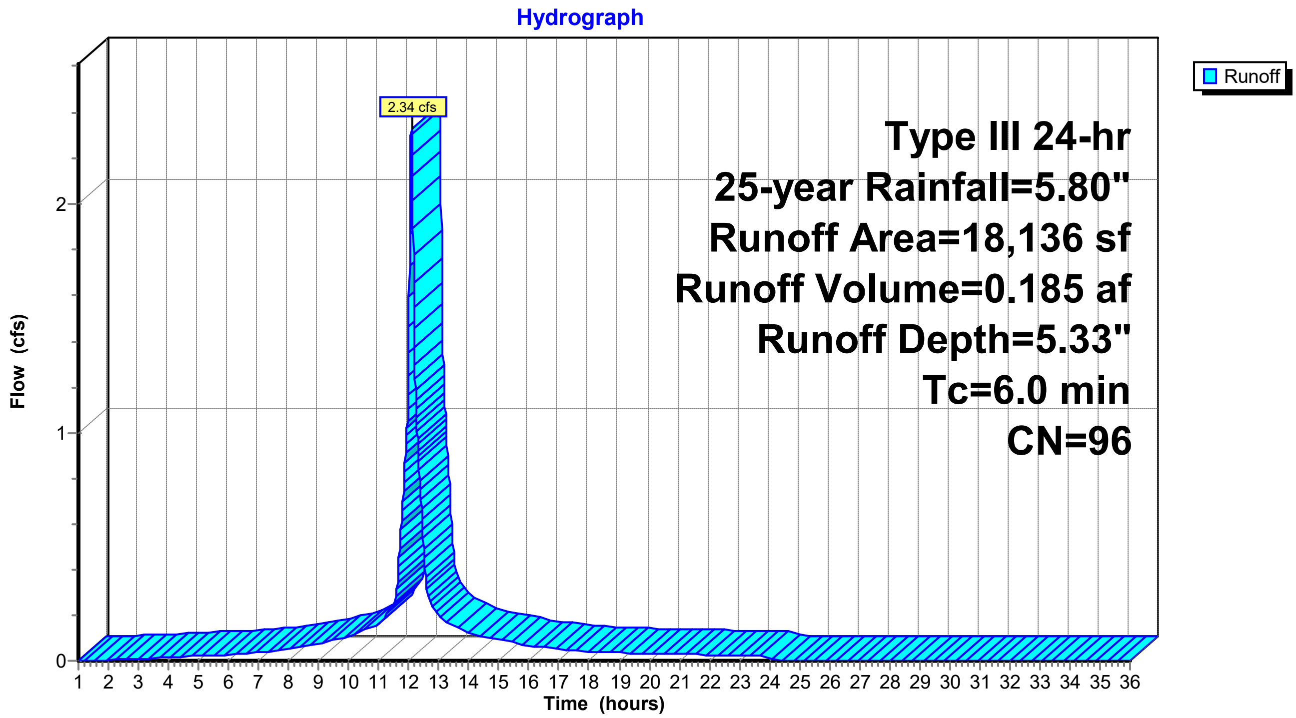
Runoff = 2.34 cfs @ 12.08 hrs, Volume= 0.185 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	17,644	98	Paved parking, HSG A
*	492	30	Grass
	18,136	96	Weighted Average
	492		2.71% Pervious Area
	17,644		97.29% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

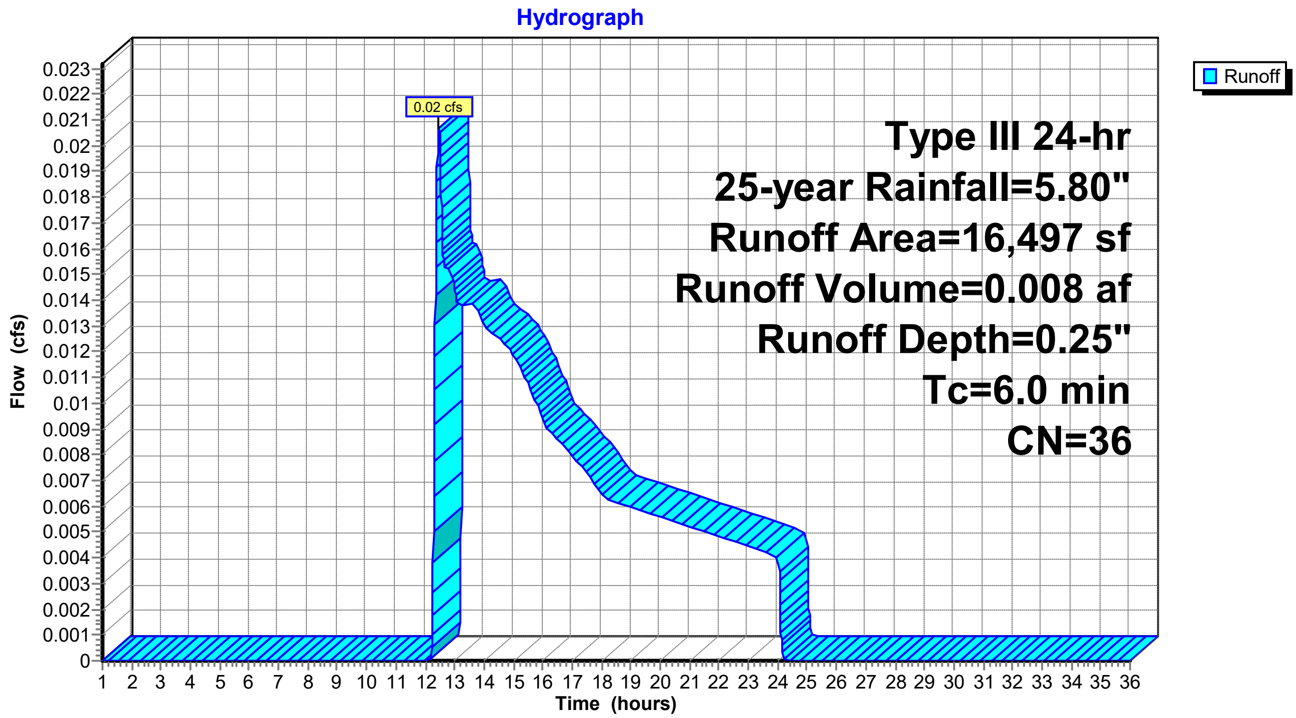
Runoff = 0.02 cfs @ 12.46 hrs, Volume= 0.008 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	1,488	98	Paved parking, HSG A
*	15,009	30	Grass
	16,497	36	Weighted Average
	15,009		90.98% Pervious Area
	1,488		9.02% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

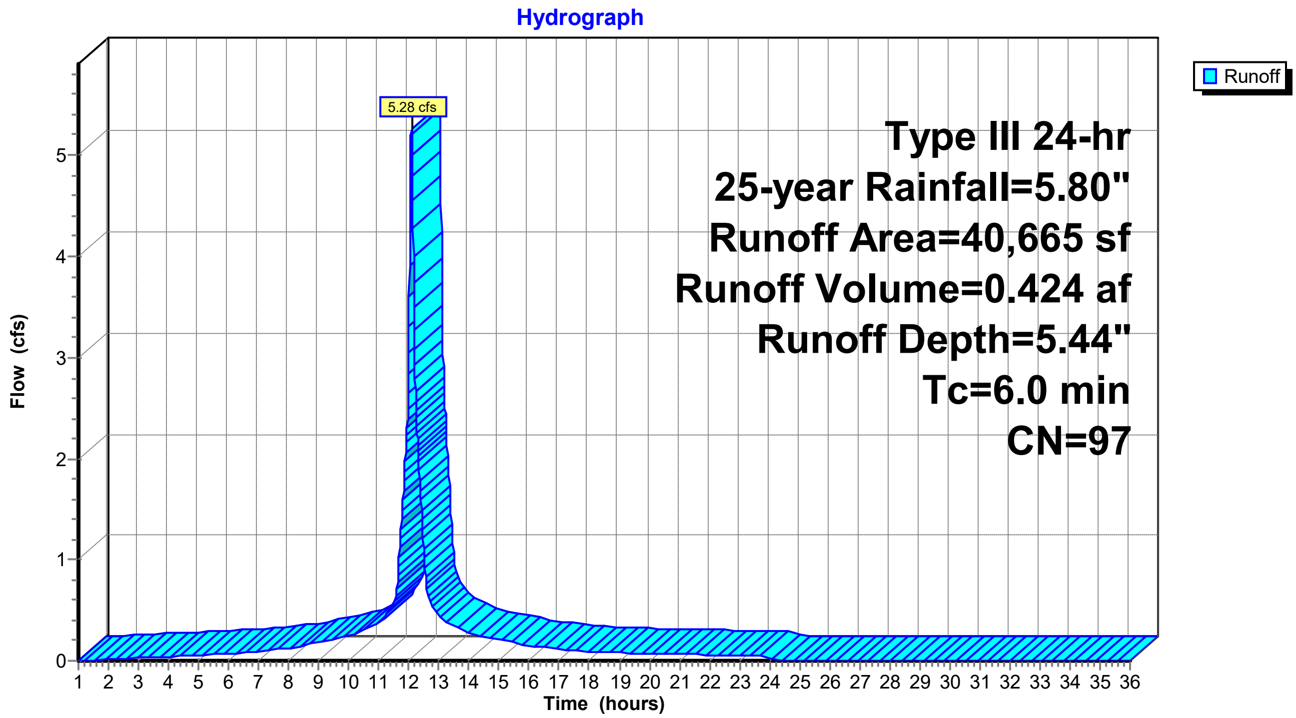
Runoff = 5.28 cfs @ 12.08 hrs, Volume= 0.424 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	39,934	98	Paved parking, HSG A
*	731	30	Grass
	40,665	97	Weighted Average
	731		1.80% Pervious Area
	39,934		98.20% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

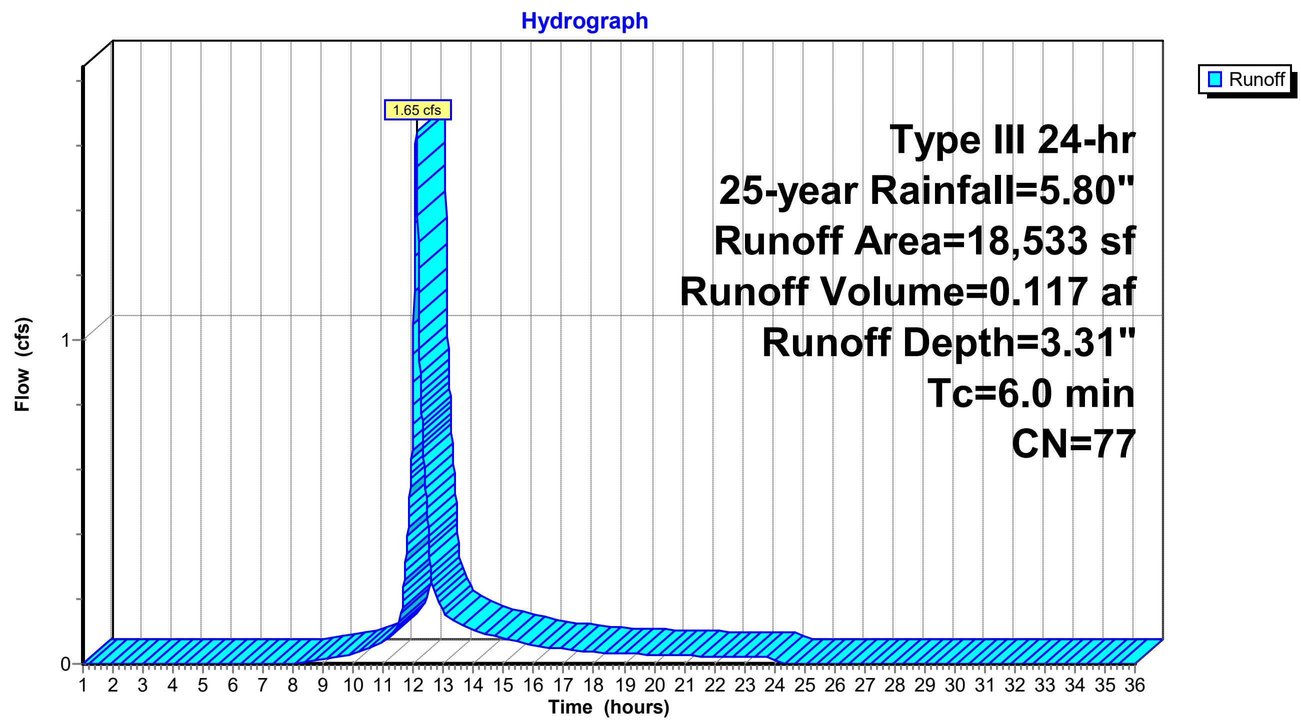
Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	12,797	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,533	77	Weighted Average
	5,736		30.95% Pervious Area
	12,797		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

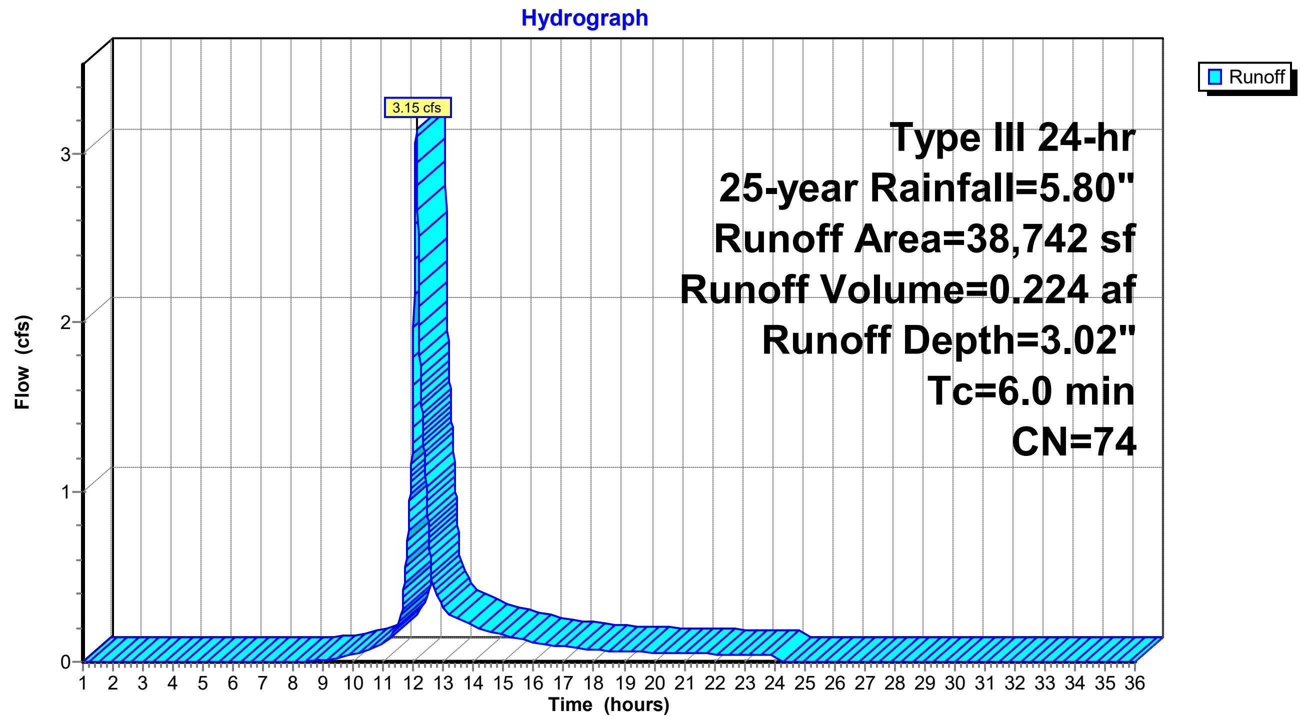
Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.224 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	5,533	98	Paved parking, HSG A
	4,499	30	Woods, Good, HSG A
*	9,300	30	Grass
*	19,410	98	Compacted Gravel
	38,742	74	Weighted Average
	13,799		35.62% Pervious Area
	24,943		64.38% Impervious Area

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

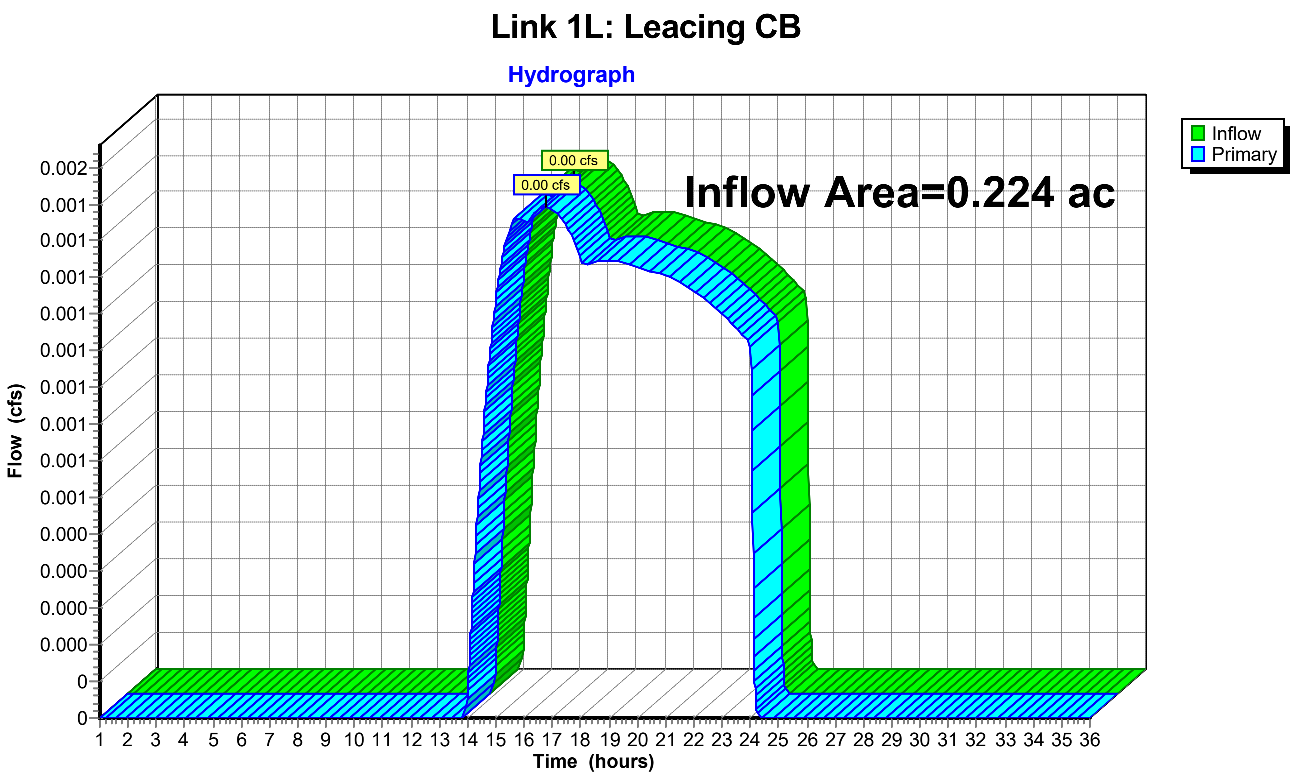
Subcatchment 11S: Sub 11



Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.05" for 25-year event
Inflow = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

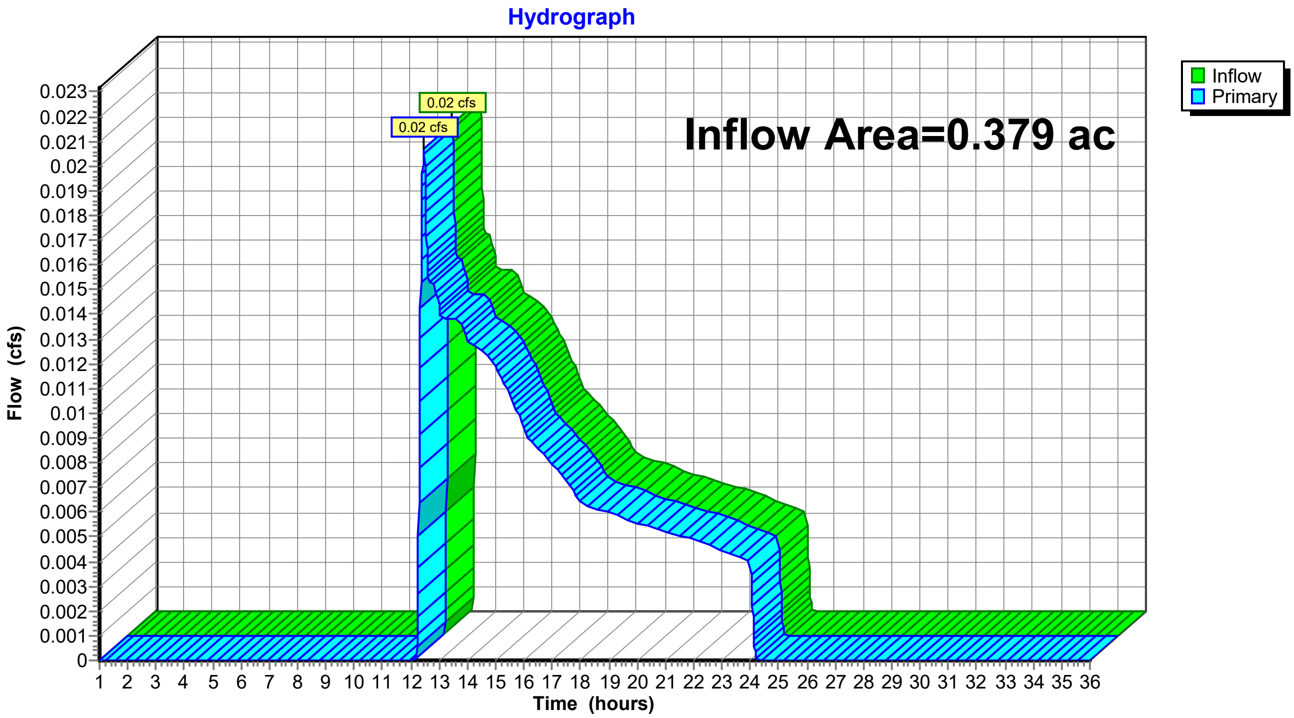


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.379 ac, 9.02% Impervious, Inflow Depth = 0.25" for 25-year event
Inflow = 0.02 cfs @ 12.46 hrs, Volume= 0.008 af
Primary = 0.02 cfs @ 12.46 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

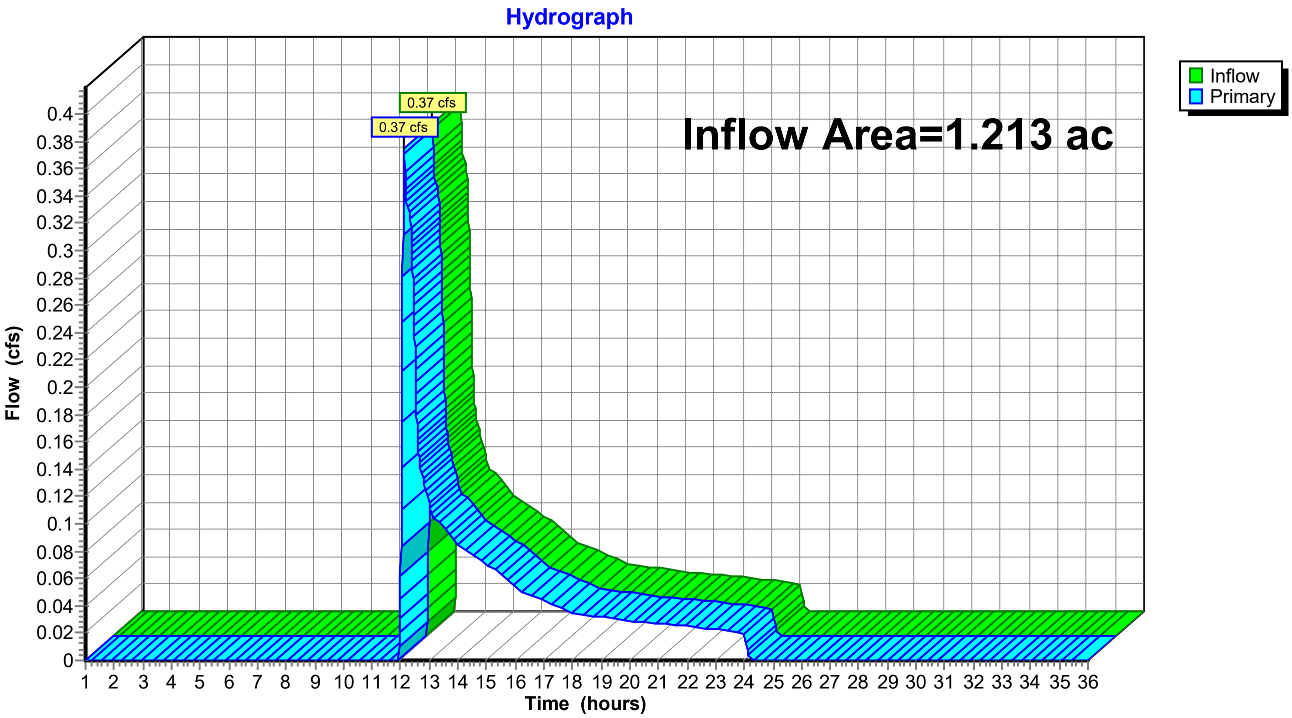


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 1.213 ac, 18.39% Impervious, Inflow Depth = 0.58" for 25-year event
Inflow = 0.37 cfs @ 12.13 hrs, Volume= 0.059 af
Primary = 0.37 cfs @ 12.13 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

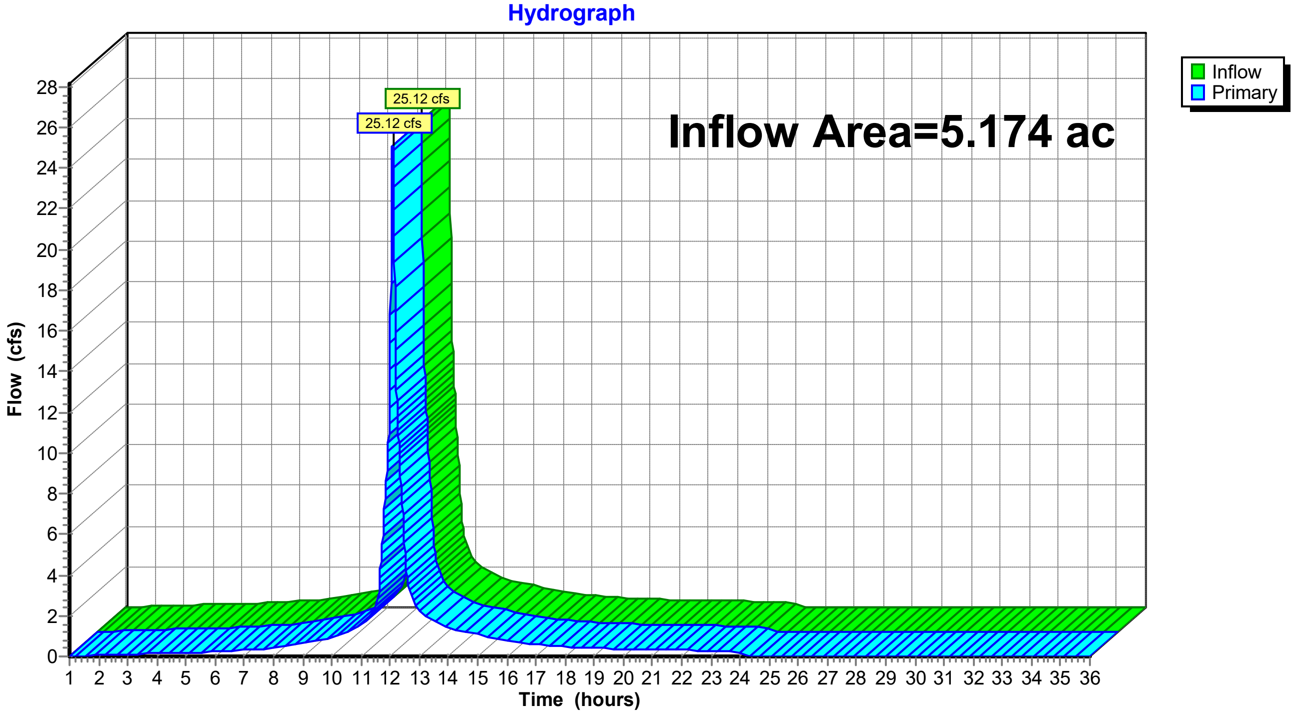


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.174 ac, 85.66% Impervious, Inflow Depth > 4.53" for 25-year event
Inflow = 25.12 cfs @ 12.09 hrs, Volume= 1.952 af
Primary = 25.12 cfs @ 12.09 hrs, Volume= 1.952 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=98 Runoff=11.38 cfs 0.934 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.23"
Tc=6.0 min CN=30 Runoff=0.01 cfs 0.004 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=80 Runoff=3.15 cfs 0.226 af

Subcatchment 4S: Sub 4 Runoff Area=13,434 sf 63.43% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=73 Runoff=1.45 cfs 0.103 af

Subcatchment 5S: Sub 5 Runoff Area=28,818 sf 23.38% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=46 Runoff=0.84 cfs 0.075 af

Subcatchment 6S: Sub 6 Runoff Area=24,010 sf 12.40% Impervious Runoff Depth=0.73"
Tc=6.0 min CN=38 Runoff=0.21 cfs 0.034 af

Subcatchment 7S: Sub 7 Runoff Area=18,136 sf 97.29% Impervious Runoff Depth=6.62"
Tc=6.0 min CN=96 Runoff=2.88 cfs 0.230 af

Subcatchment 8S: Sub 8 Runoff Area=16,497 sf 9.02% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=36 Runoff=0.10 cfs 0.019 af

Subcatchment 9S: Sub 9 Runoff Area=40,665 sf 98.20% Impervious Runoff Depth>6.74"
Tc=6.0 min CN=97 Runoff=6.48 cfs 0.524 af

Subcatchment 10S: Sub 10 Runoff Area=18,533 sf 69.05% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=77 Runoff=2.21 cfs 0.158 af

Subcatchment 11S: Sub 11 Runoff Area=38,742 sf 64.38% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=74 Runoff=4.31 cfs 0.306 af

Link 1L: Leacing CB Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Link 2L: Isolated Wetlands Inflow=0.10 cfs 0.019 af
Primary=0.10 cfs 0.019 af

Link 3L: Spofford Pond Wetlands Inflow=1.03 cfs 0.109 af
Primary=1.03 cfs 0.109 af

Link 4L: Vernal Pool Wetlands Inflow=31.85 cfs 2.482 af
Primary=31.85 cfs 2.482 af

Total Runoff Area = 6.990 ac Runoff Volume = 2.614 af Average Runoff Depth = 4.49"
32.91% Pervious = 2.301 ac 67.09% Impervious = 4.690 ac

Summary for Subcatchment 1S: Roof

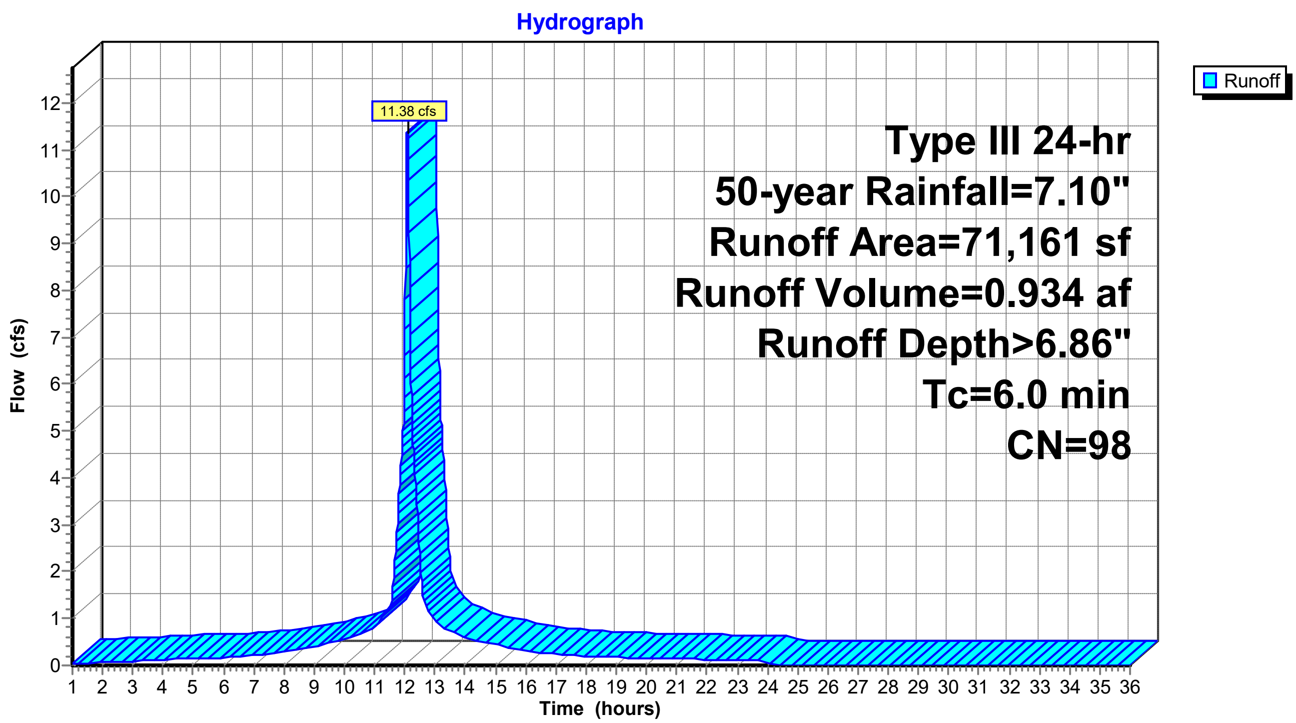
Runoff = 11.38 cfs @ 12.08 hrs, Volume= 0.934 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

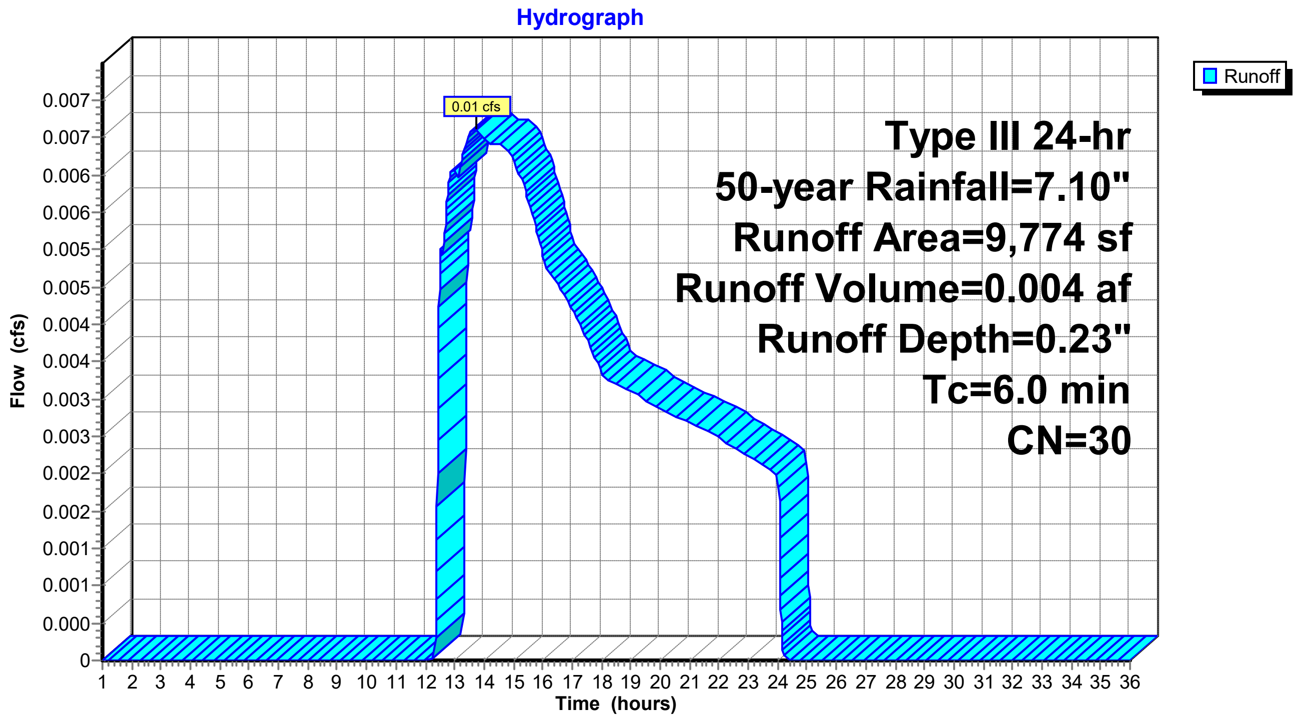
Runoff = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

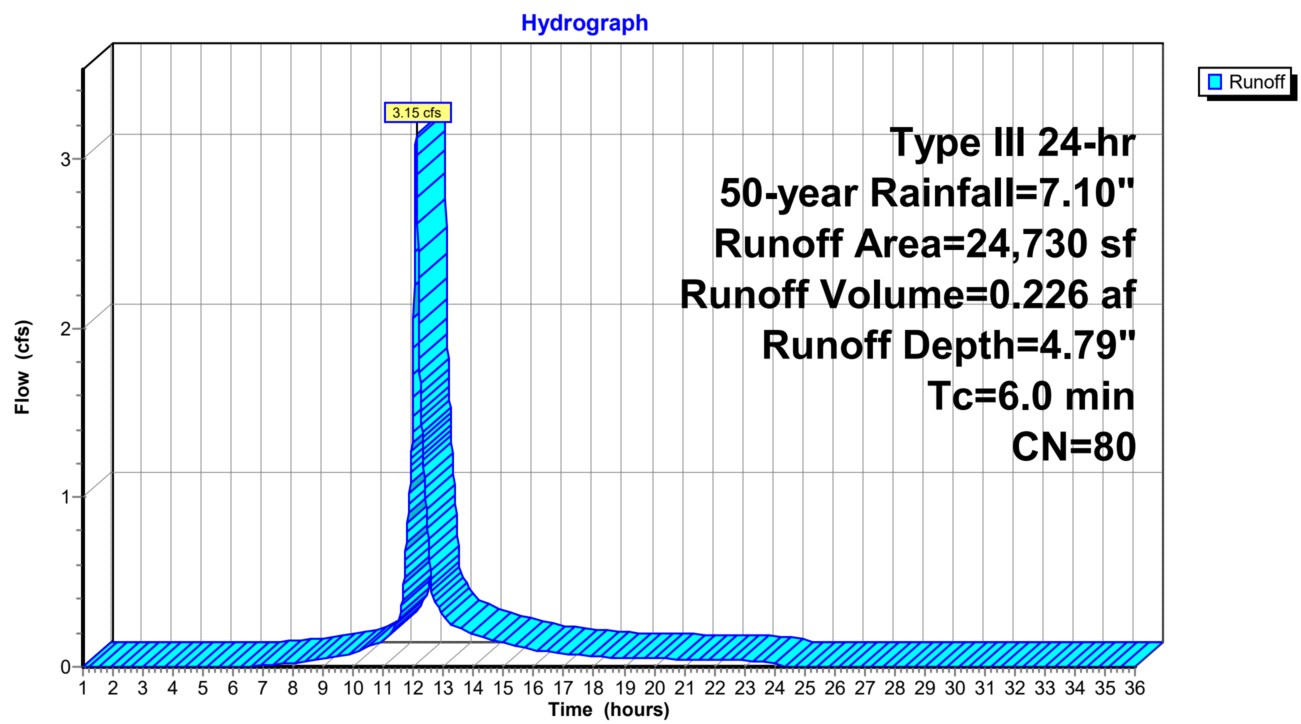
Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.226 af, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

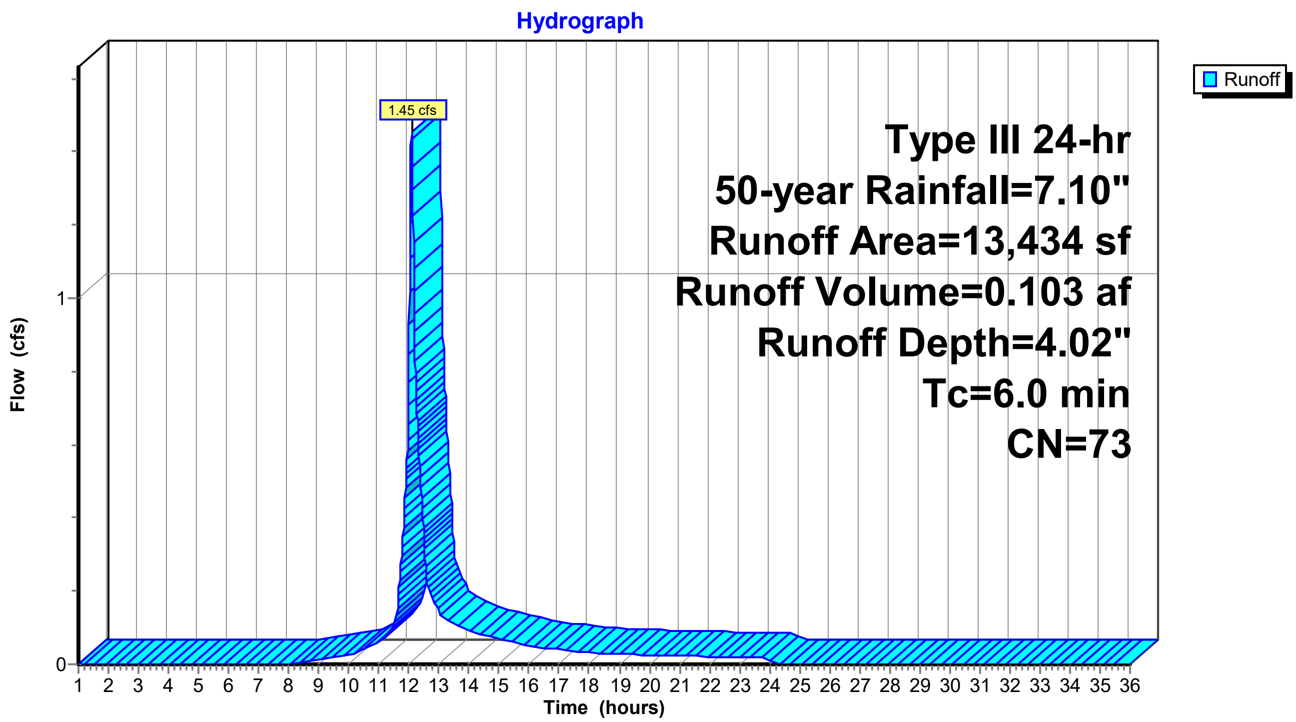
Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	8,521	98	Paved parking, HSG A
	2,064	30	Woods, Good, HSG A
*	2,849	30	Grass
	13,434	73	Weighted Average
	4,913		36.57% Pervious Area
	8,521		63.43% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

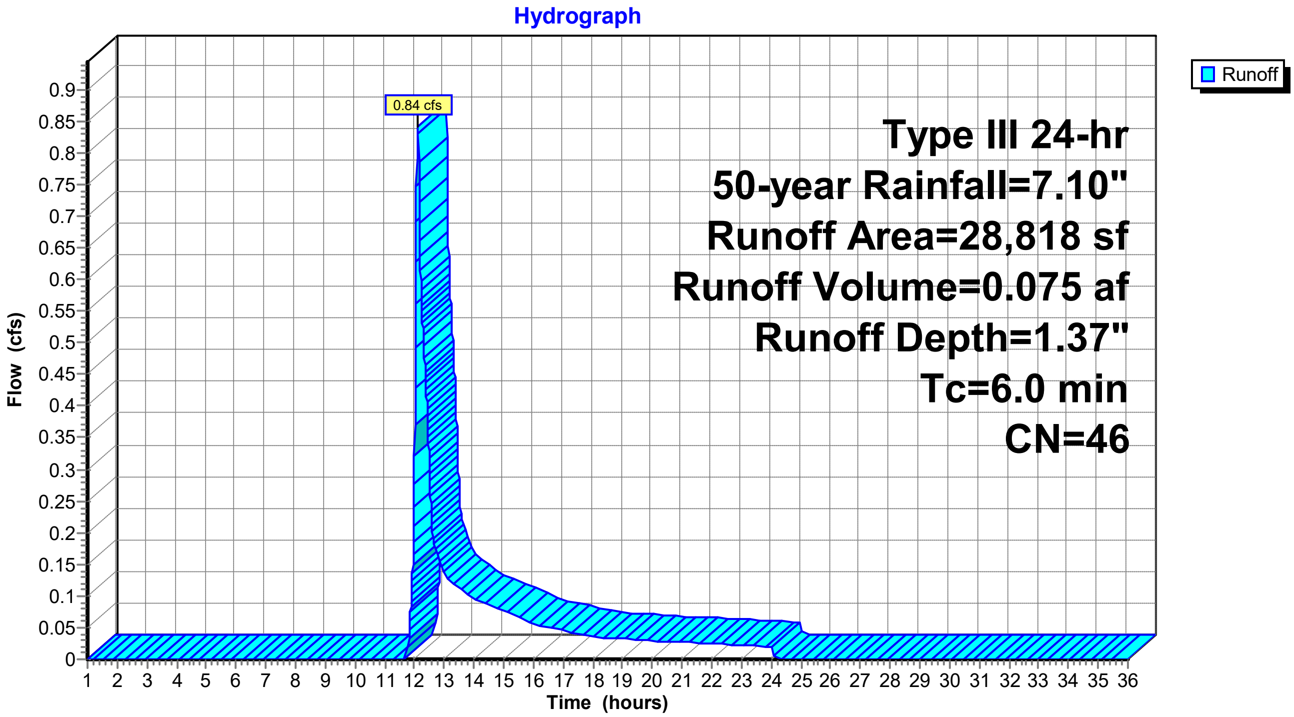
Runoff = 0.84 cfs @ 12.11 hrs, Volume= 0.075 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	6,737	98	Paved parking, HSG A
	9,957	30	Woods, Good, HSG A
*	12,124	30	Grass
	28,818	46	Weighted Average
	22,081		76.62% Pervious Area
	6,737		23.38% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

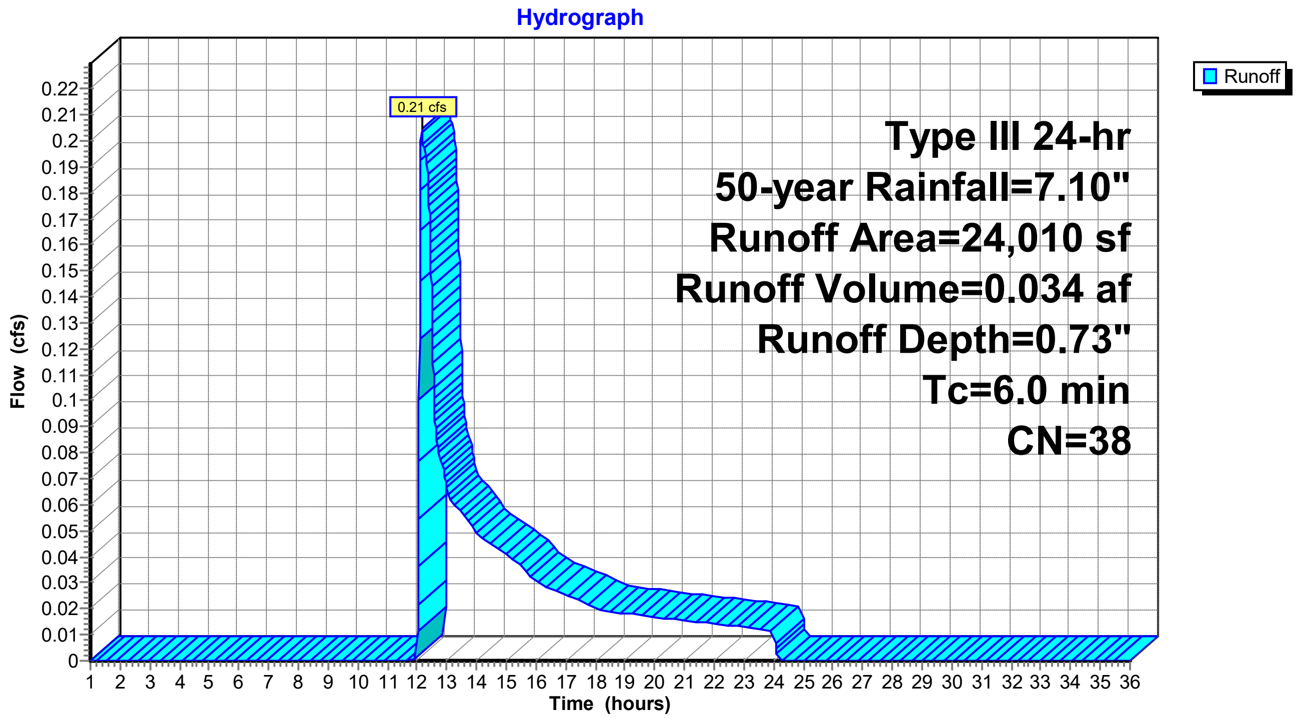
Runoff = 0.21 cfs @ 12.15 hrs, Volume= 0.034 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	2,978	98	Paved parking, HSG A
*	21,032	30	Grass
	24,010	38	Weighted Average
	21,032		87.60% Pervious Area
	2,978		12.40% Impervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

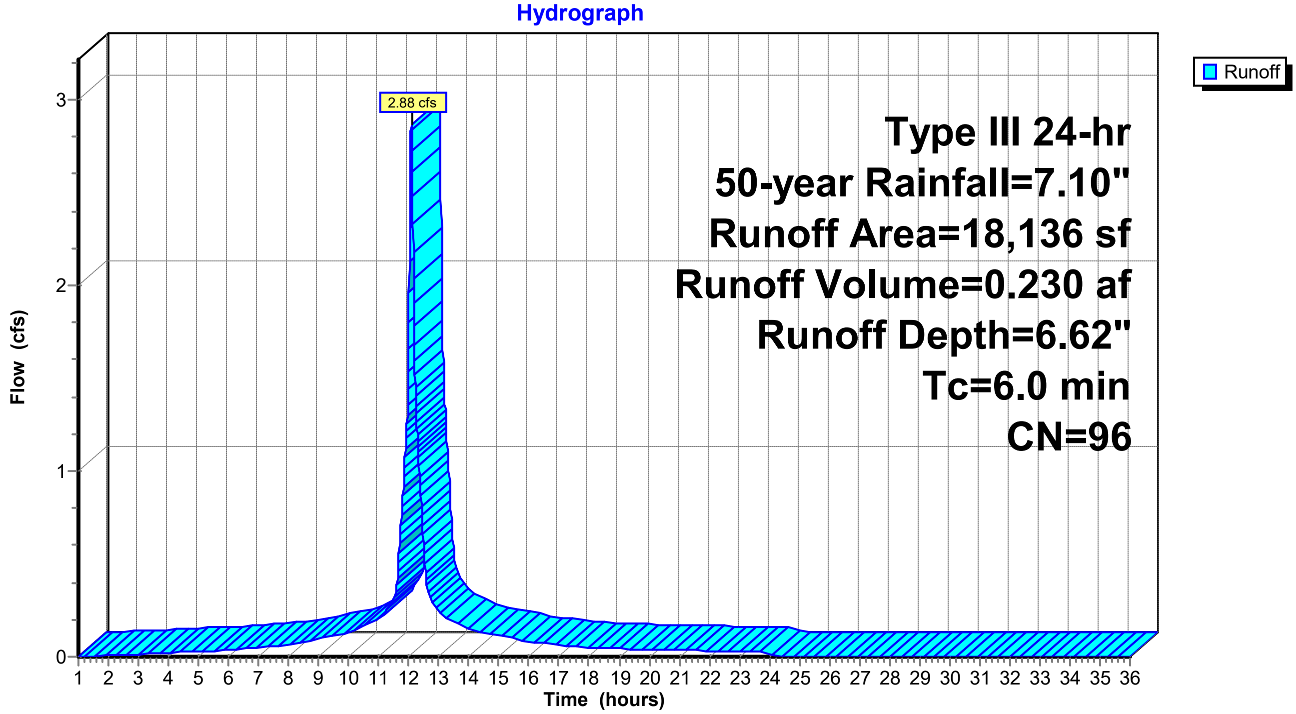
Runoff = 2.88 cfs @ 12.08 hrs, Volume= 0.230 af, Depth= 6.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	17,644	98	Paved parking, HSG A
*	492	30	Grass
	18,136	96	Weighted Average
	492		2.71% Pervious Area
	17,644		97.29% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

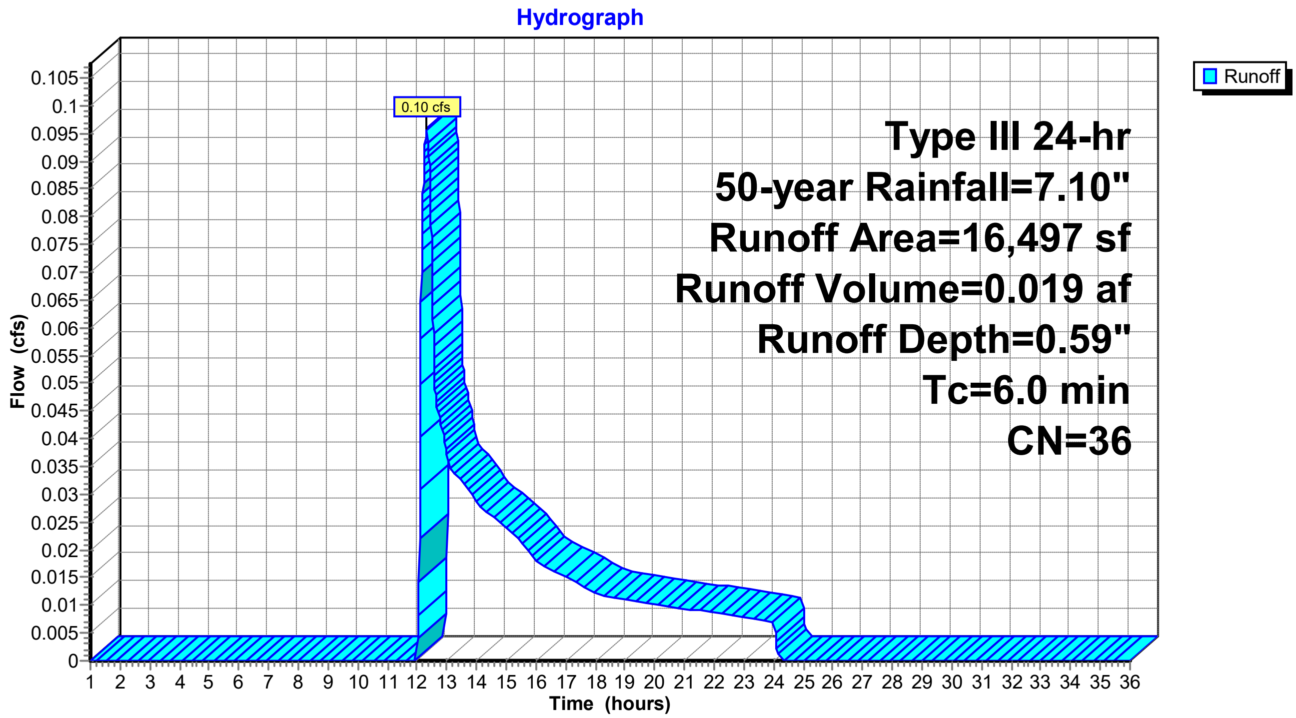
Runoff = 0.10 cfs @ 12.32 hrs, Volume= 0.019 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	1,488	98	Paved parking, HSG A
*	15,009	30	Grass
	16,497	36	Weighted Average
	15,009		90.98% Pervious Area
	1,488		9.02% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

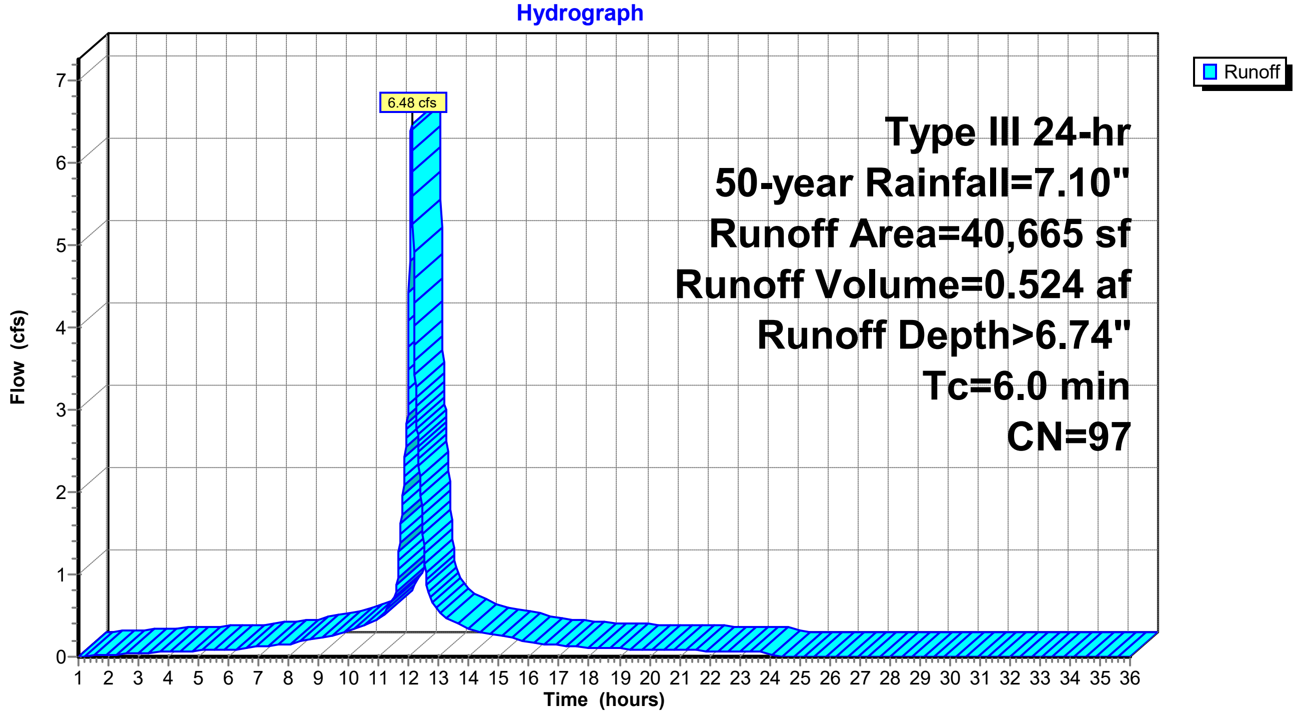
Runoff = 6.48 cfs @ 12.08 hrs, Volume= 0.524 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	39,934	98	Paved parking, HSG A
*	731	30	Grass
	40,665	97	Weighted Average
	731		1.80% Pervious Area
	39,934		98.20% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

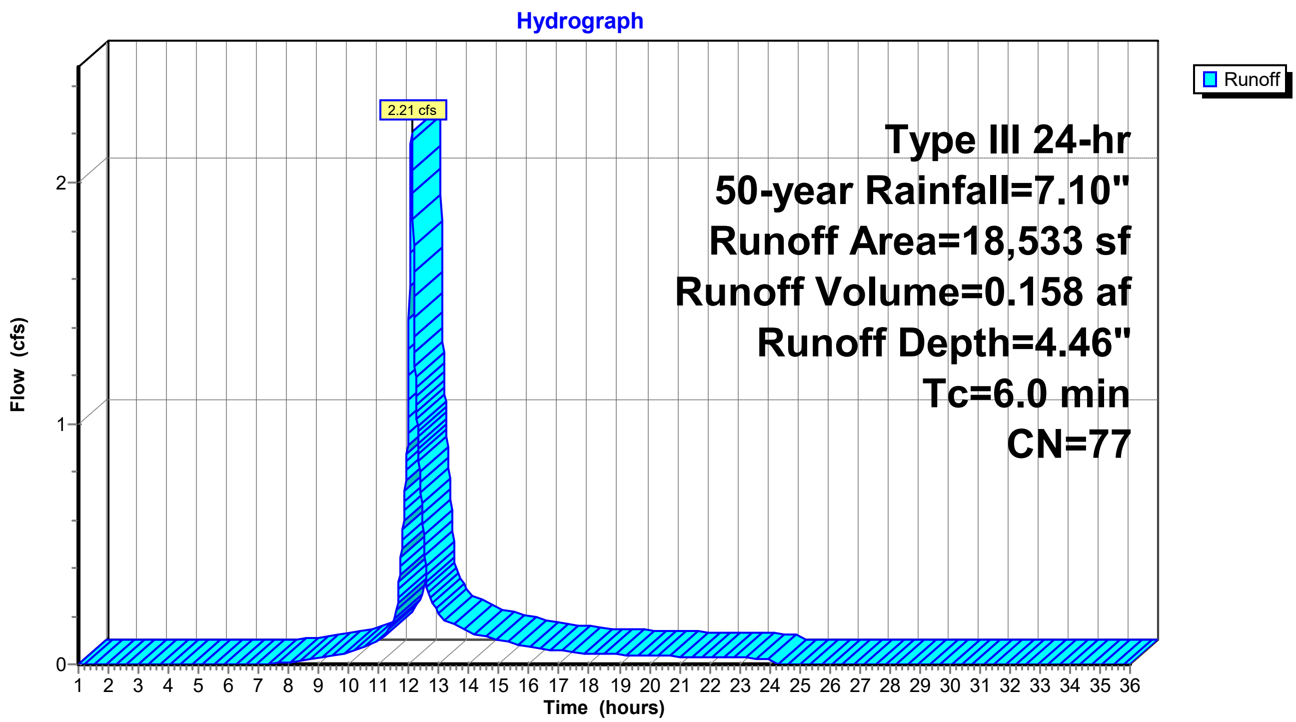
Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	12,797	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,533	77	Weighted Average
	5,736		30.95% Pervious Area
	12,797		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

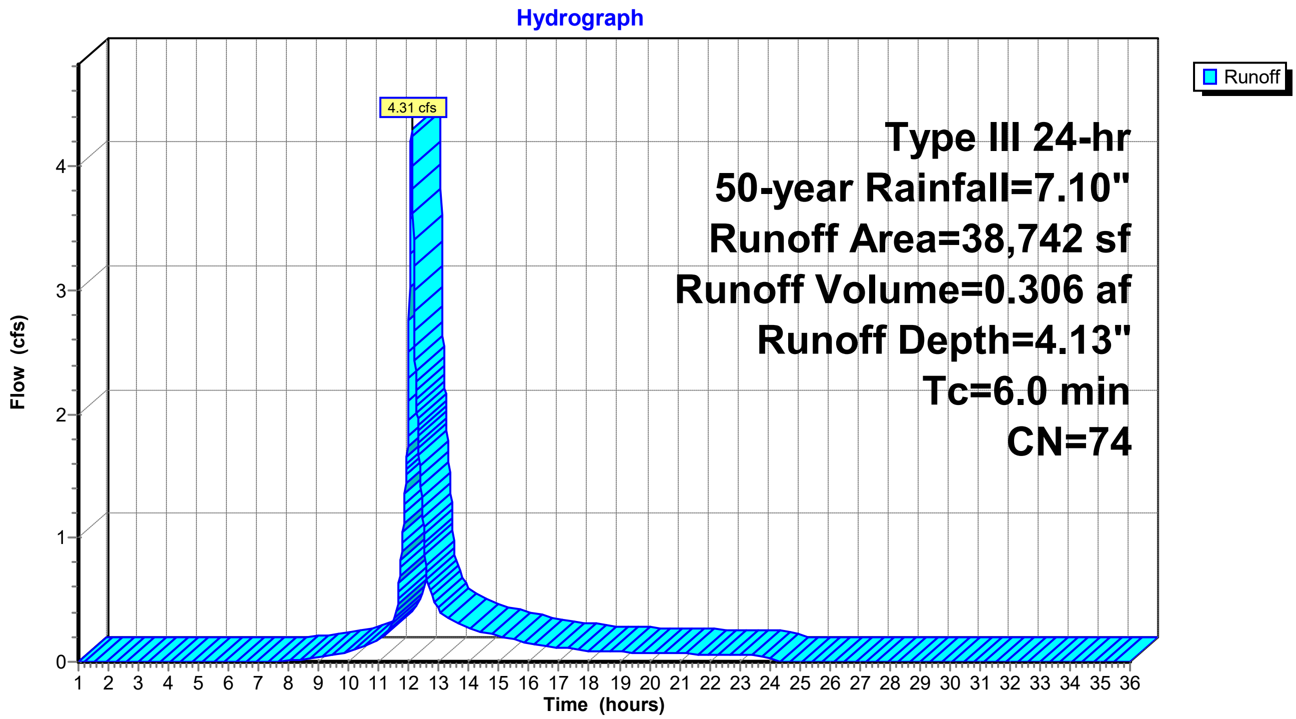
Runoff = 4.31 cfs @ 12.09 hrs, Volume= 0.306 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	5,533	98	Paved parking, HSG A
	4,499	30	Woods, Good, HSG A
*	9,300	30	Grass
*	19,410	98	Compacted Gravel
	38,742	74	Weighted Average
	13,799		35.62% Pervious Area
	24,943		64.38% Impervious Area

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

Subcatchment 11S: Sub 11

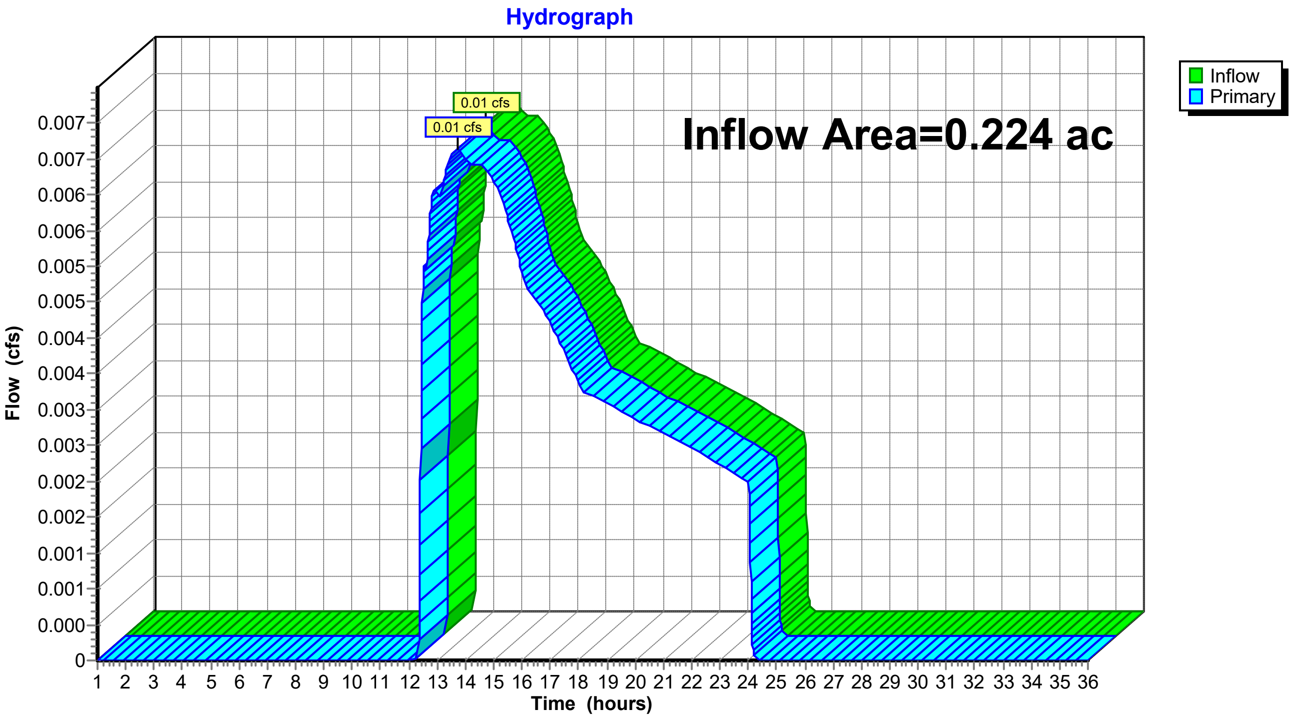


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.23" for 50-year event
Inflow = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

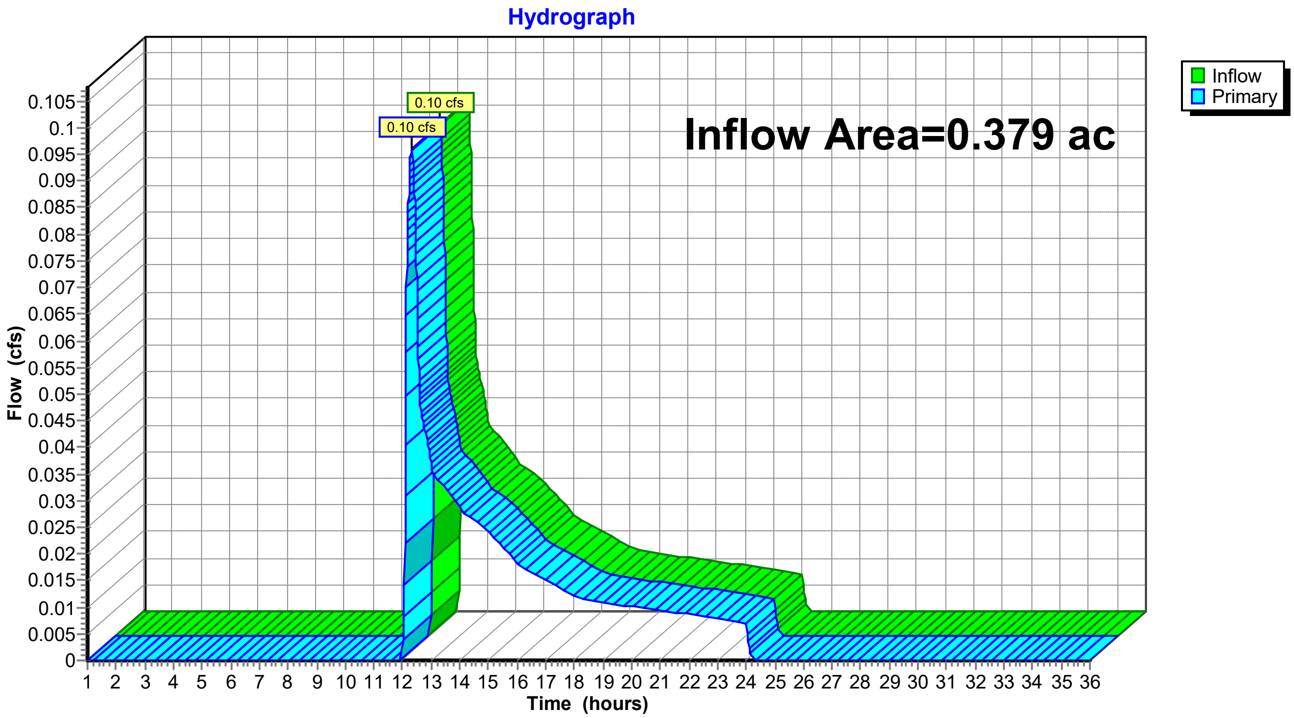


Summary for Link 2L: Isolated Wetlands

Inflow Area =	0.379 ac,	9.02% Impervious,	Inflow Depth = 0.59"	for 50-year event	
Inflow =	0.10 cfs @	12.32 hrs,	Volume=	0.019 af	
Primary =	0.10 cfs @	12.32 hrs,	Volume=	0.019 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

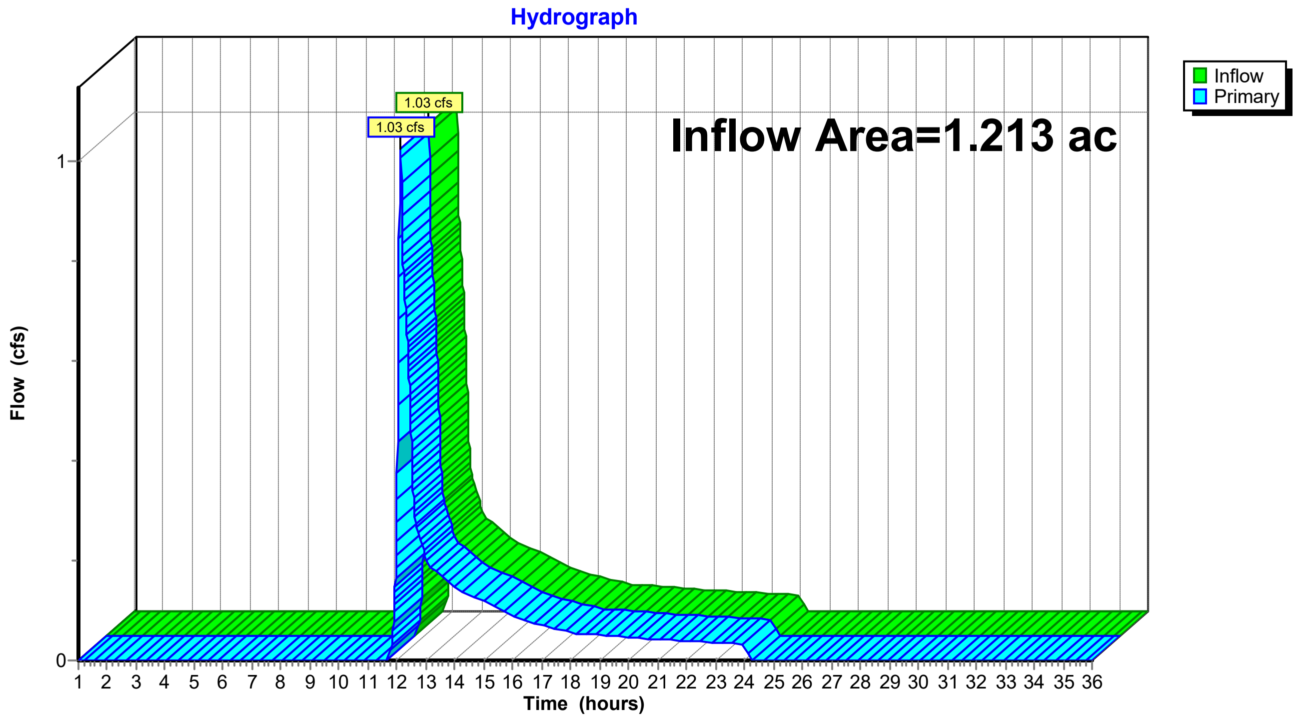


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 1.213 ac, 18.39% Impervious, Inflow Depth = 1.08" for 50-year event
Inflow = 1.03 cfs @ 12.12 hrs, Volume= 0.109 af
Primary = 1.03 cfs @ 12.12 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

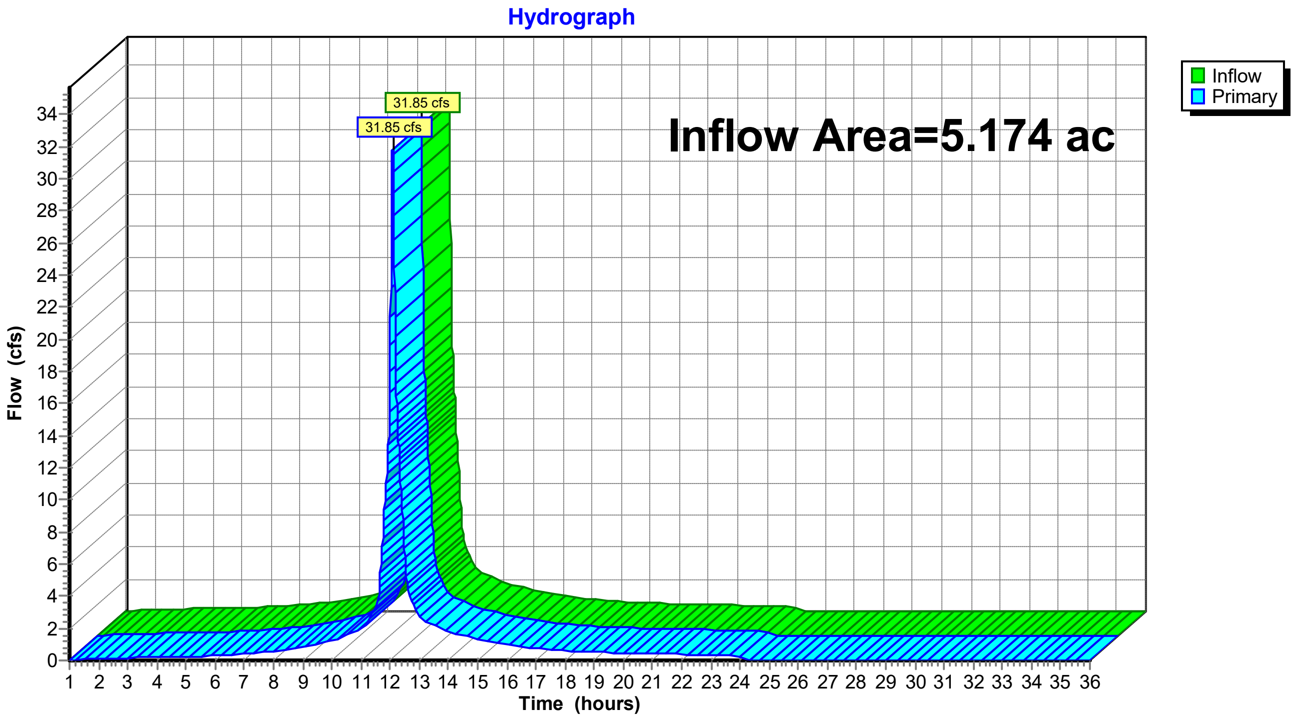


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.174 ac, 85.66% Impervious, Inflow Depth > 5.76" for 50-year event
Inflow = 31.85 cfs @ 12.08 hrs, Volume= 2.482 af
Primary = 31.85 cfs @ 12.08 hrs, Volume= 2.482 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>8.06"
Tc=6.0 min CN=98 Runoff=13.31 cfs 1.097 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=30 Runoff=0.04 cfs 0.009 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=5.91"
Tc=6.0 min CN=80 Runoff=3.86 cfs 0.279 af

Subcatchment 4S: Sub 4 Runoff Area=13,434 sf 63.43% Impervious Runoff Depth=5.08"
Tc=6.0 min CN=73 Runoff=1.83 cfs 0.130 af

Subcatchment 5S: Sub 5 Runoff Area=28,818 sf 23.38% Impervious Runoff Depth=2.00"
Tc=6.0 min CN=46 Runoff=1.36 cfs 0.110 af

Subcatchment 6S: Sub 6 Runoff Area=24,010 sf 12.40% Impervious Runoff Depth=1.19"
Tc=6.0 min CN=38 Runoff=0.49 cfs 0.055 af

Subcatchment 7S: Sub 7 Runoff Area=18,136 sf 97.29% Impervious Runoff Depth=7.82"
Tc=6.0 min CN=96 Runoff=3.37 cfs 0.271 af

Subcatchment 8S: Sub 8 Runoff Area=16,497 sf 9.02% Impervious Runoff Depth=1.00"
Tc=6.0 min CN=36 Runoff=0.24 cfs 0.032 af

Subcatchment 9S: Sub 9 Runoff Area=40,665 sf 98.20% Impervious Runoff Depth>7.94"
Tc=6.0 min CN=97 Runoff=7.59 cfs 0.618 af

Subcatchment 10S: Sub 10 Runoff Area=18,533 sf 69.05% Impervious Runoff Depth=5.55"
Tc=6.0 min CN=77 Runoff=2.74 cfs 0.197 af

Subcatchment 11S: Sub 11 Runoff Area=38,742 sf 64.38% Impervious Runoff Depth=5.19"
Tc=6.0 min CN=74 Runoff=5.40 cfs 0.385 af

Link 1L: Leacing CB Inflow=0.04 cfs 0.009 af
Primary=0.04 cfs 0.009 af

Link 2L: Isolated Wetlands Inflow=0.24 cfs 0.032 af
Primary=0.24 cfs 0.032 af

Link 3L: Spofford Pond Wetlands Inflow=1.84 cfs 0.165 af
Primary=1.84 cfs 0.165 af

Link 4L: Vernal Pool Wetlands Inflow=38.10 cfs 2.977 af
Primary=38.10 cfs 2.977 af

Total Runoff Area = 6.990 ac Runoff Volume = 3.183 af Average Runoff Depth = 5.46"
32.91% Pervious = 2.301 ac 67.09% Impervious = 4.690 ac

Summary for Subcatchment 1S: Roof

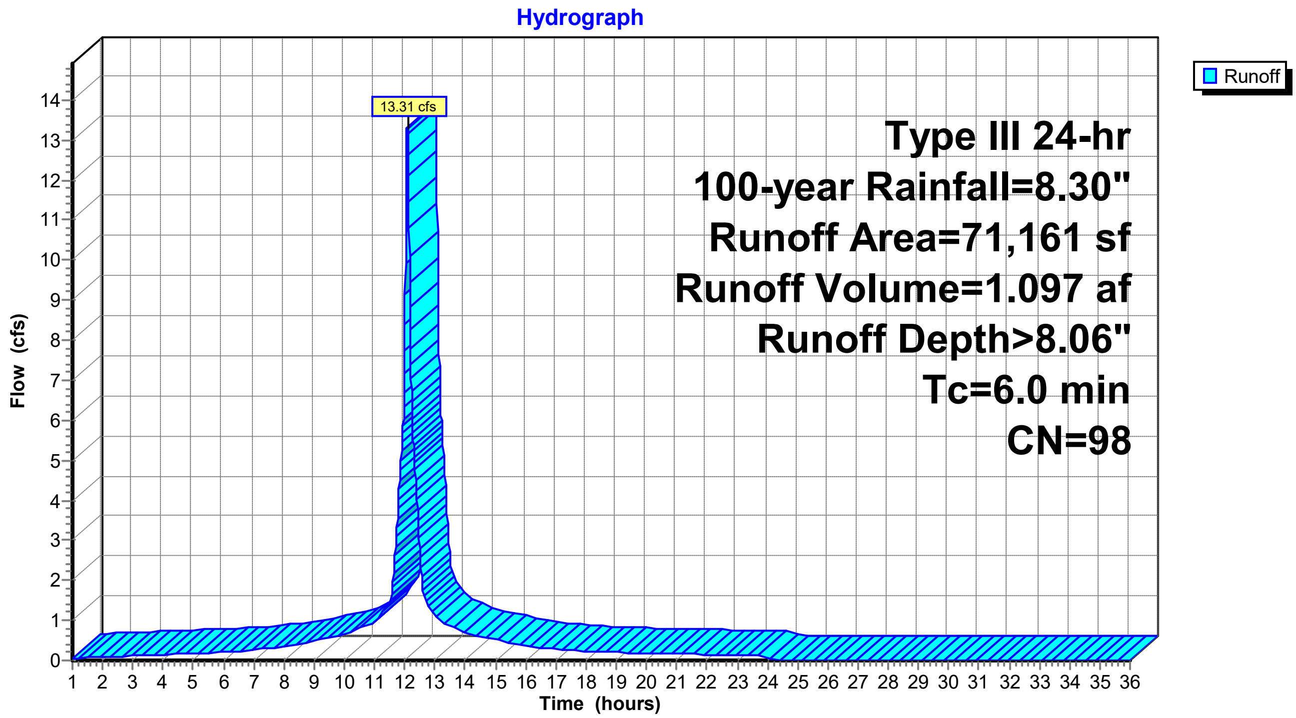
Runoff = 13.31 cfs @ 12.08 hrs, Volume= 1.097 af, Depth> 8.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

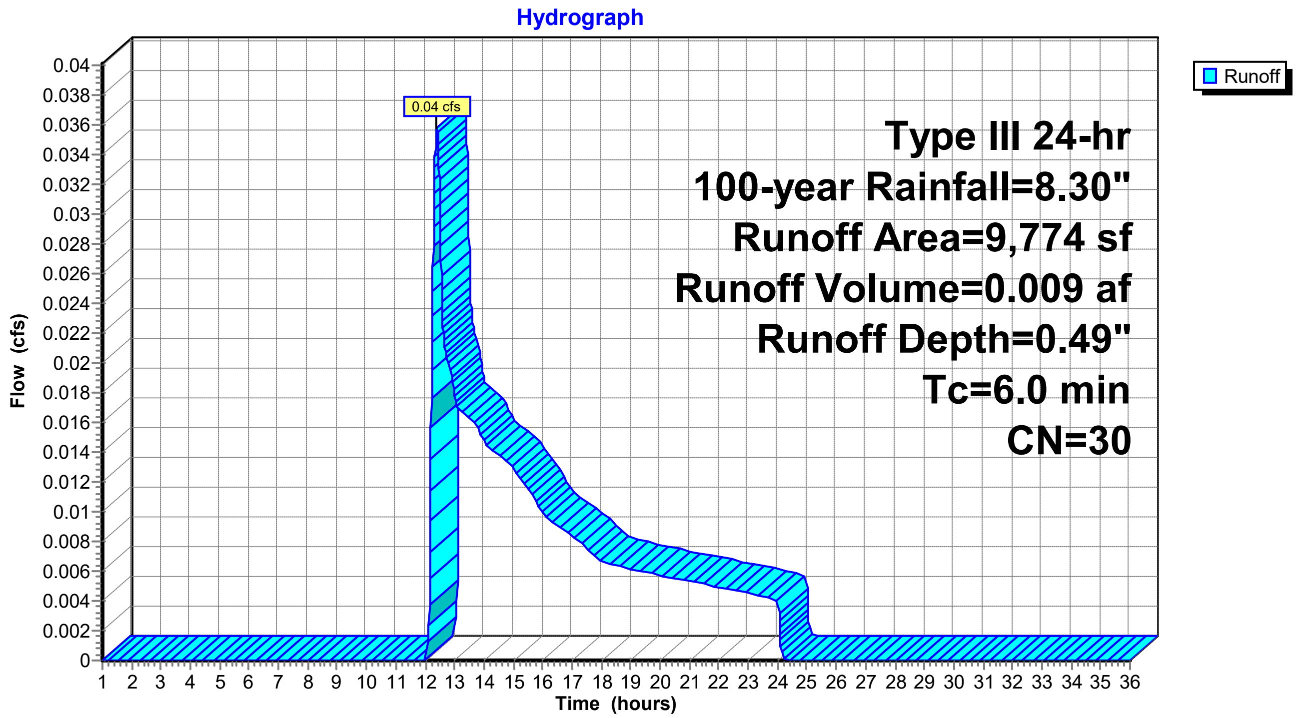
Runoff = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

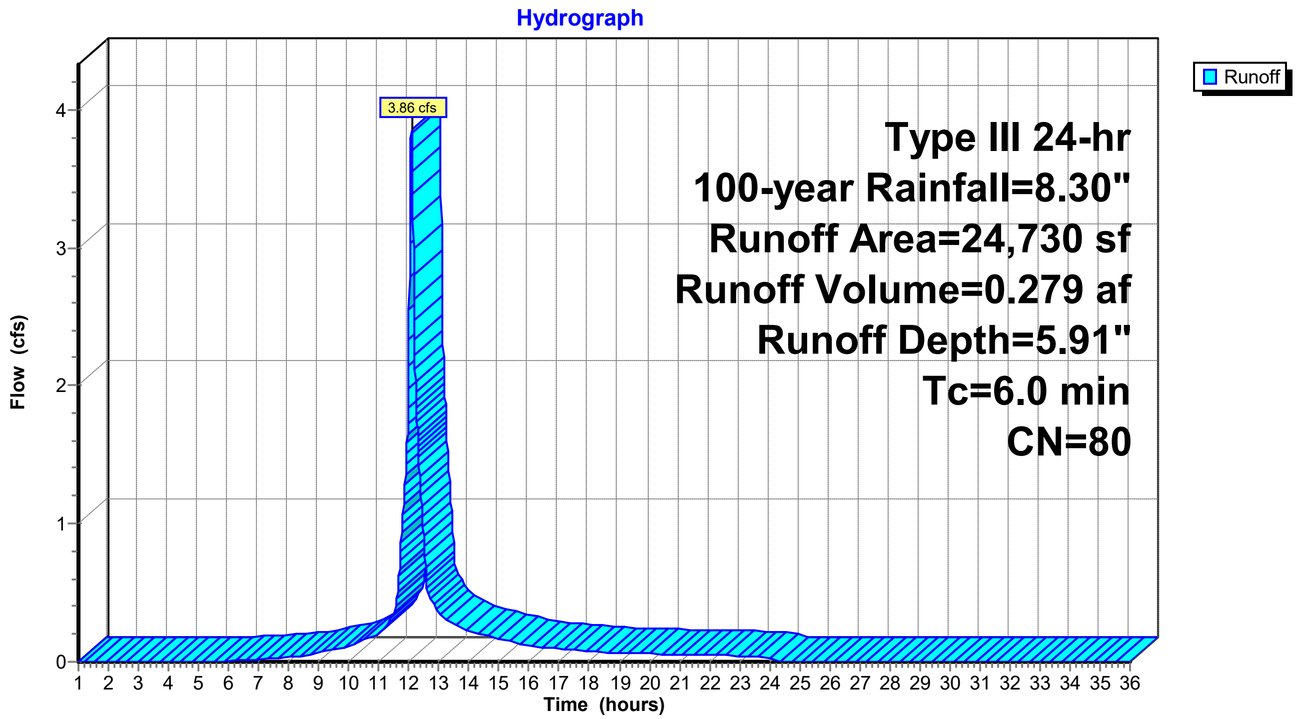
Runoff = 3.86 cfs @ 12.09 hrs, Volume= 0.279 af, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

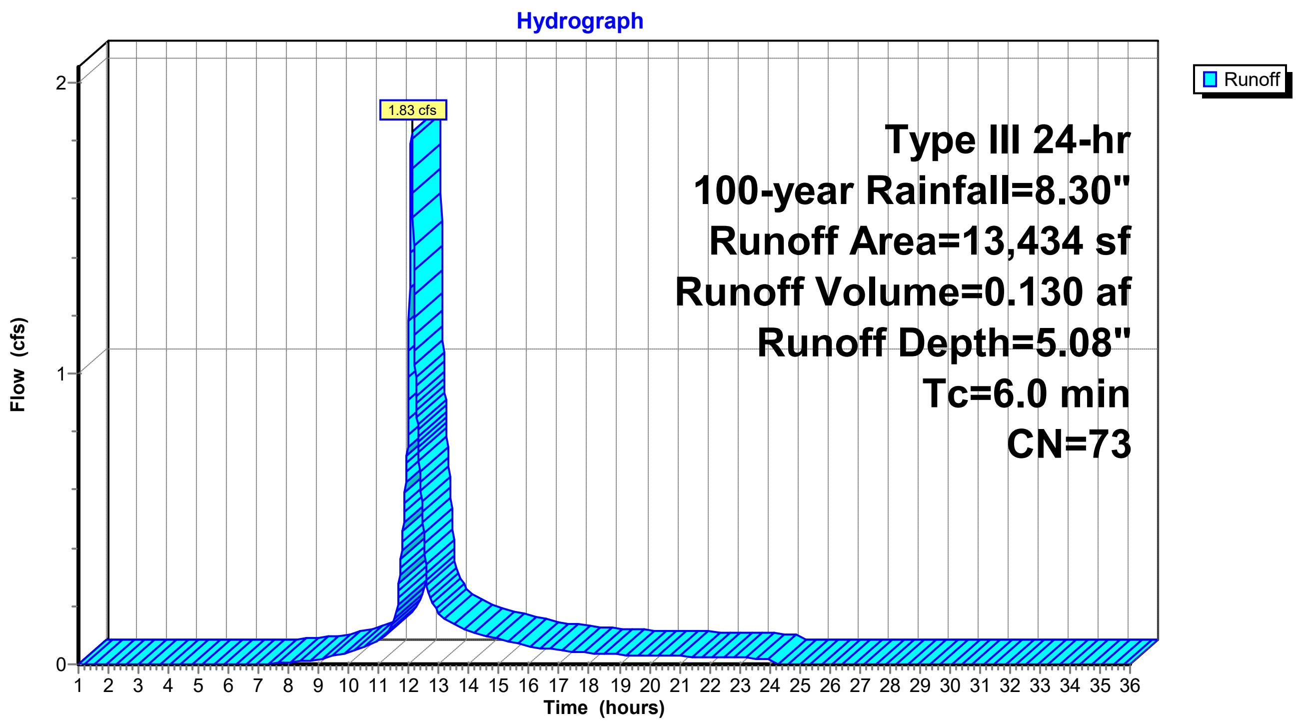
Runoff = 1.83 cfs @ 12.09 hrs, Volume= 0.130 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	8,521	98	Paved parking, HSG A
	2,064	30	Woods, Good, HSG A
*	2,849	30	Grass
	13,434	73	Weighted Average
	4,913		36.57% Pervious Area
	8,521		63.43% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

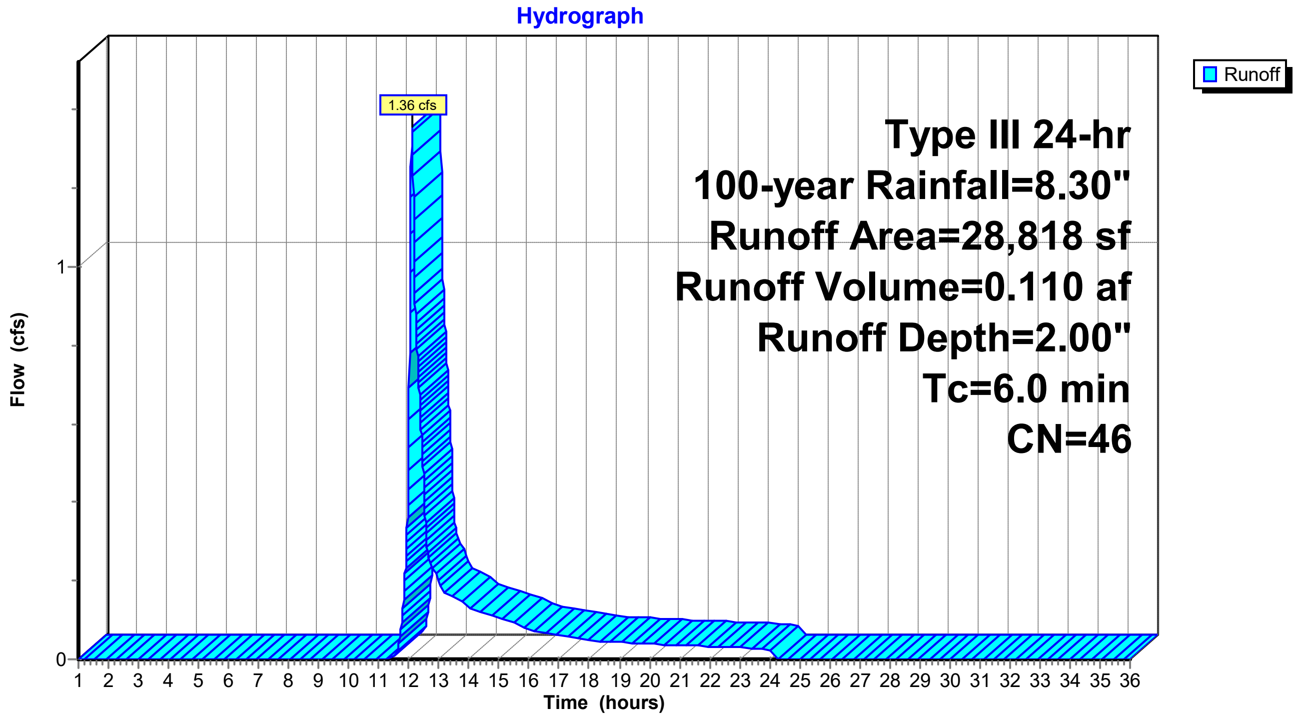
Runoff = 1.36 cfs @ 12.10 hrs, Volume= 0.110 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	6,737	98	Paved parking, HSG A
	9,957	30	Woods, Good, HSG A
*	12,124	30	Grass
	28,818	46	Weighted Average
	22,081		76.62% Pervious Area
	6,737		23.38% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

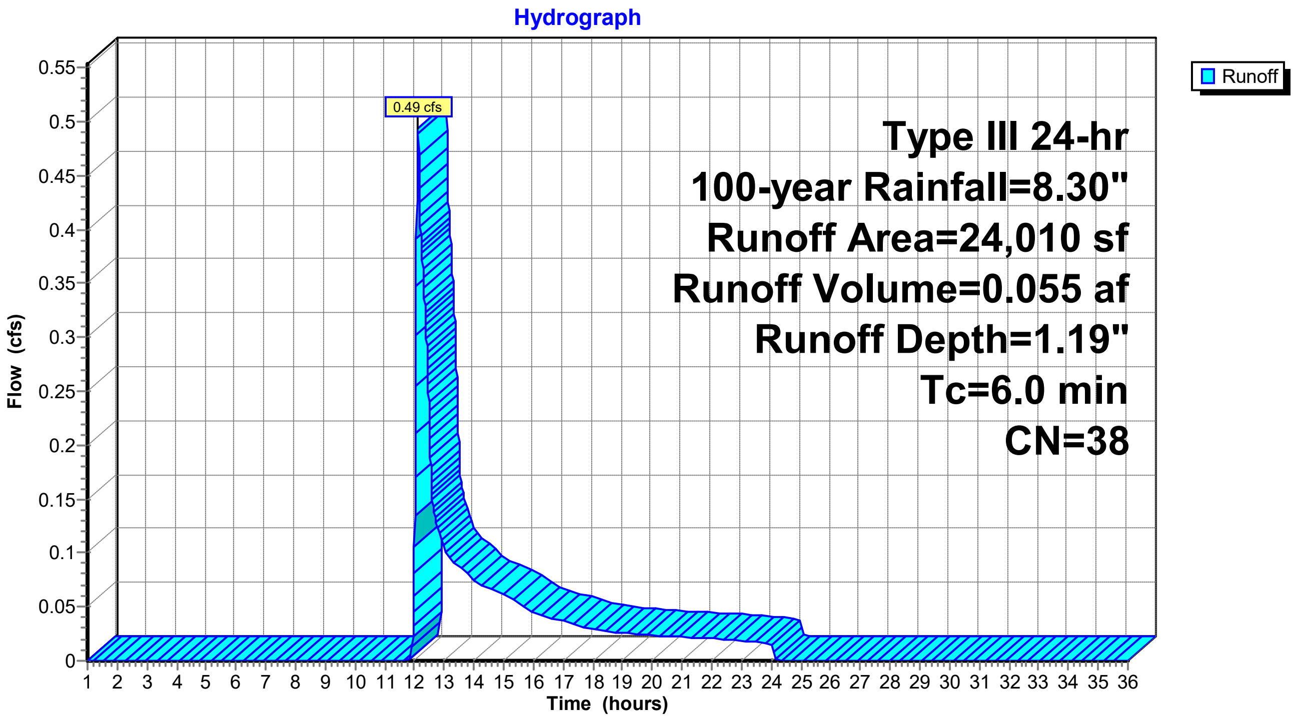
Runoff = 0.49 cfs @ 12.12 hrs, Volume= 0.055 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	2,978	98	Paved parking, HSG A
*	21,032	30	Grass
	24,010	38	Weighted Average
	21,032		87.60% Pervious Area
	2,978		12.40% Impervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

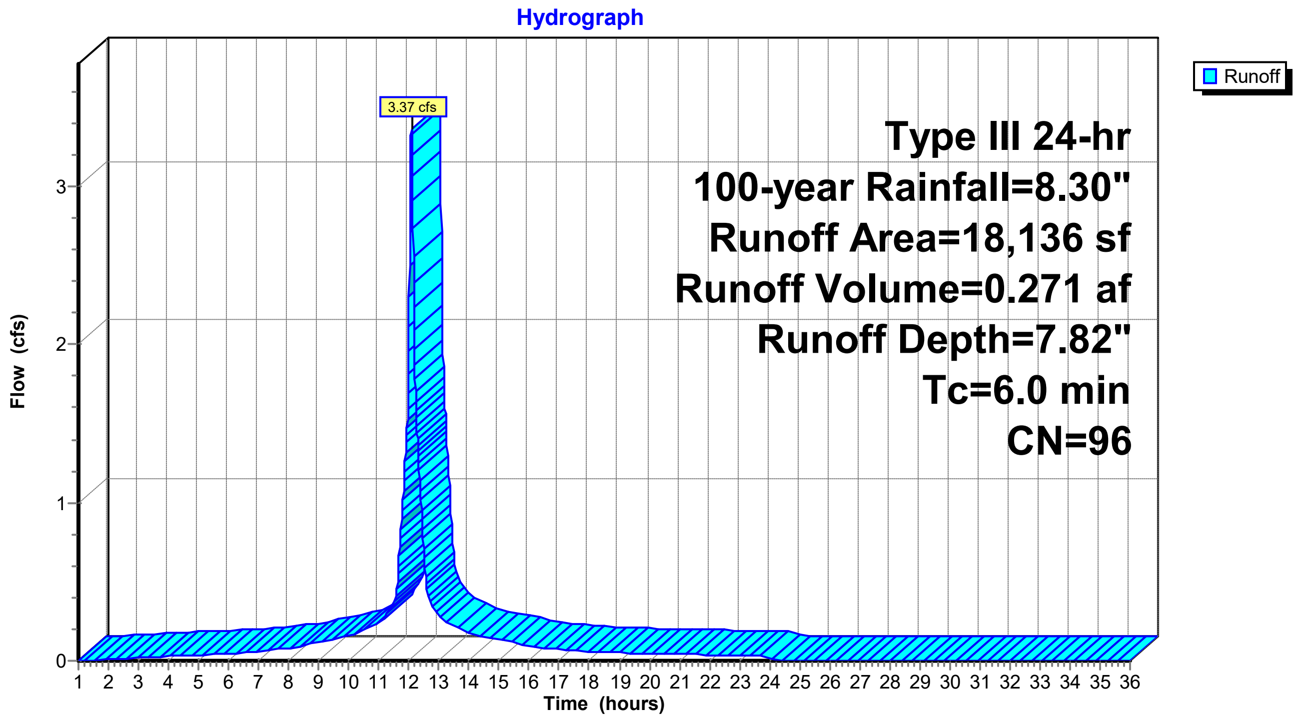
Runoff = 3.37 cfs @ 12.08 hrs, Volume= 0.271 af, Depth= 7.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	17,644	98	Paved parking, HSG A
*	492	30	Grass
	18,136	96	Weighted Average
	492		2.71% Pervious Area
	17,644		97.29% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

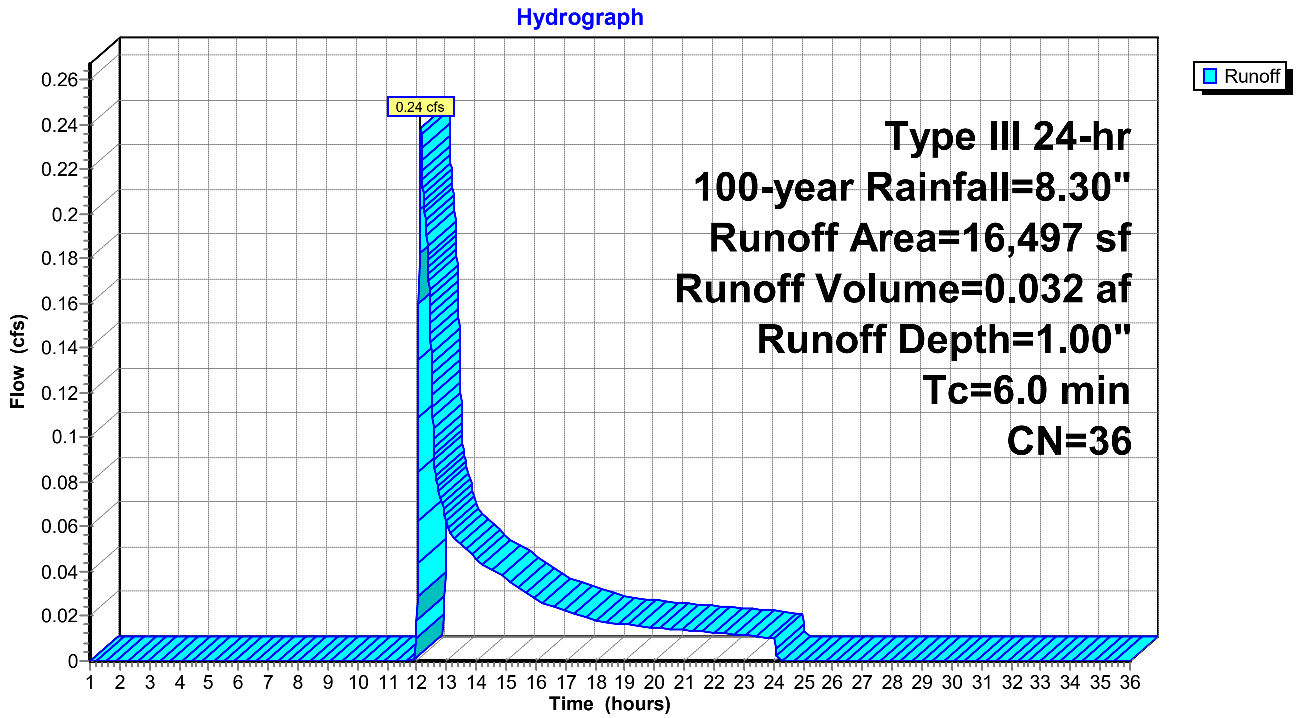
Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.032 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	1,488	98	Paved parking, HSG A
*	15,009	30	Grass
	16,497	36	Weighted Average
	15,009		90.98% Pervious Area
	1,488		9.02% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

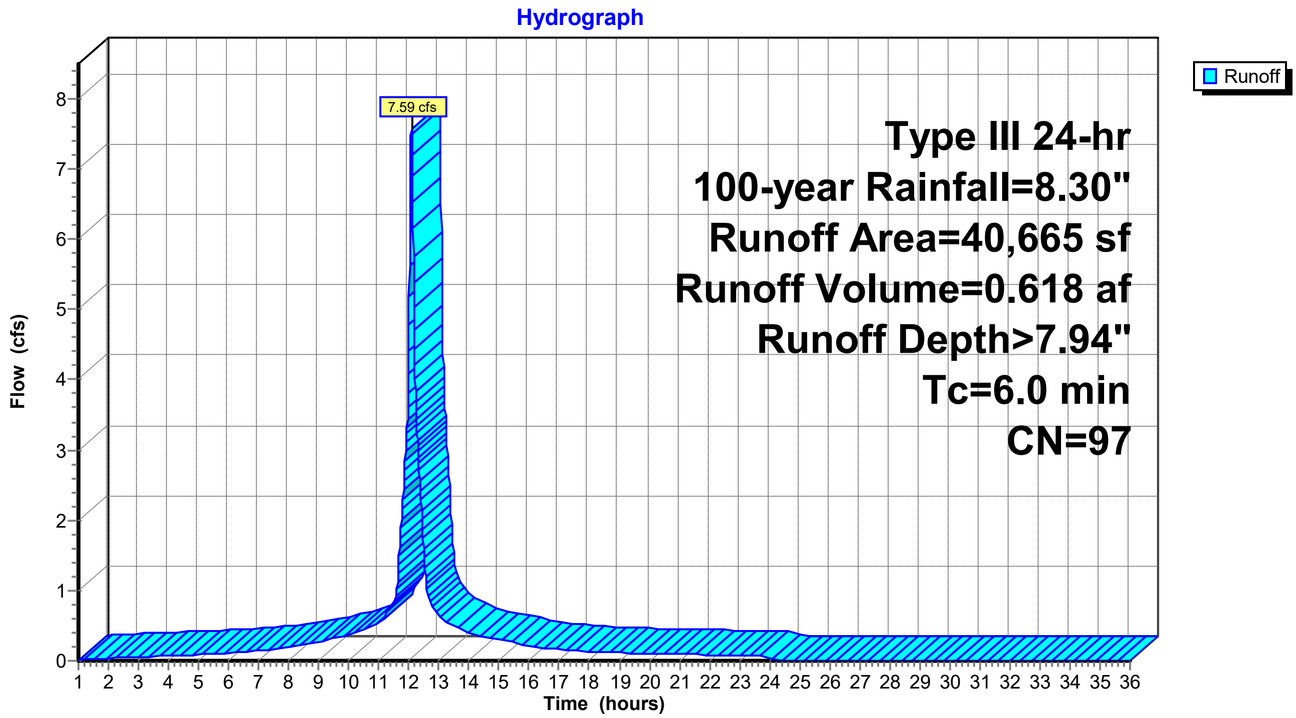
Runoff = 7.59 cfs @ 12.08 hrs, Volume= 0.618 af, Depth> 7.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	39,934	98	Paved parking, HSG A
*	731	30	Grass
	40,665	97	Weighted Average
	731		1.80% Pervious Area
	39,934		98.20% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

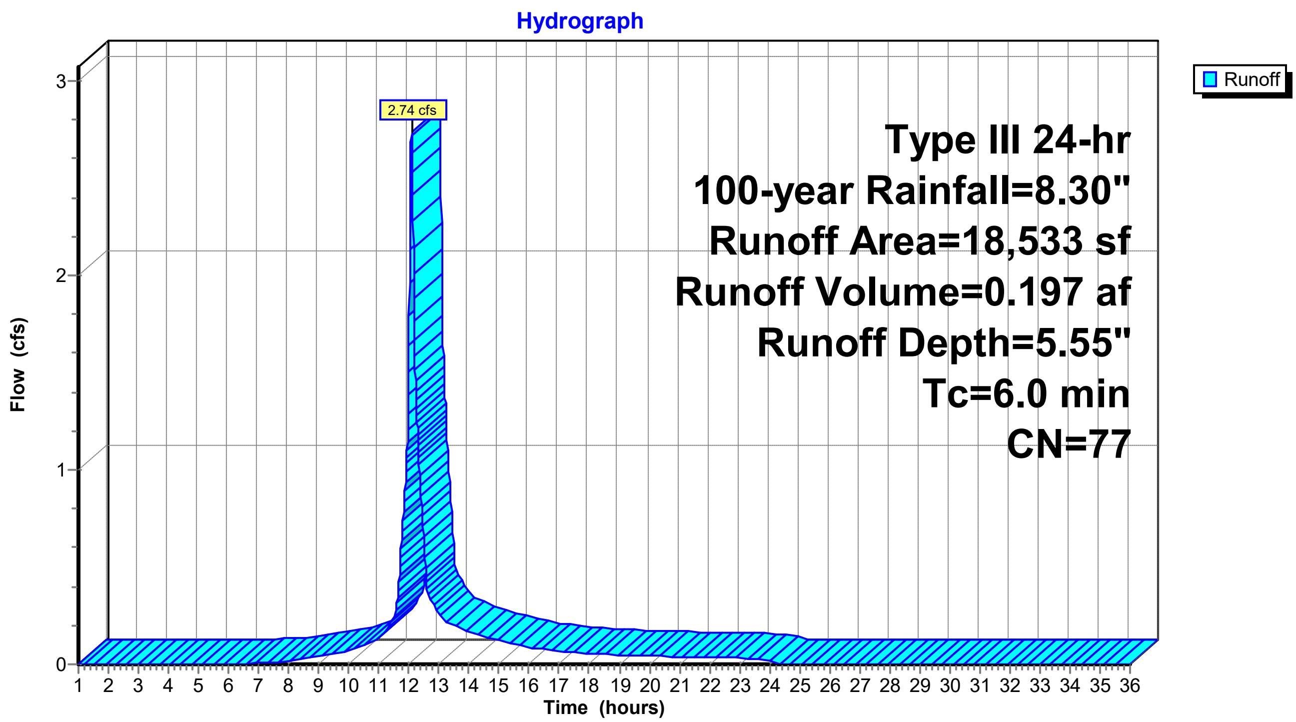
Runoff = 2.74 cfs @ 12.09 hrs, Volume= 0.197 af, Depth= 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	12,797	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,533	77	Weighted Average
	5,736		30.95% Pervious Area
	12,797		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

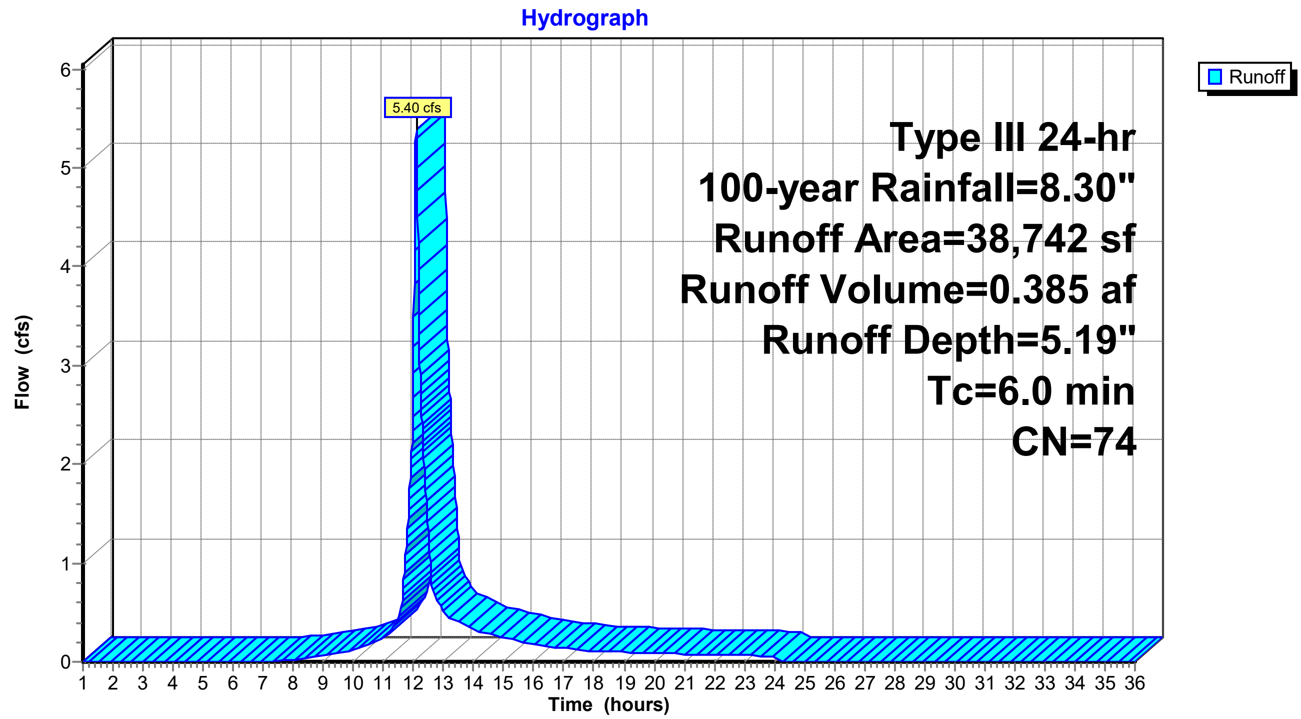
Runoff = 5.40 cfs @ 12.09 hrs, Volume= 0.385 af, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	5,533	98	Paved parking, HSG A
	4,499	30	Woods, Good, HSG A
*	9,300	30	Grass
*	19,410	98	Compacted Gravel
	38,742	74	Weighted Average
	13,799		35.62% Pervious Area
	24,943		64.38% Impervious Area

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

Subcatchment 11S: Sub 11

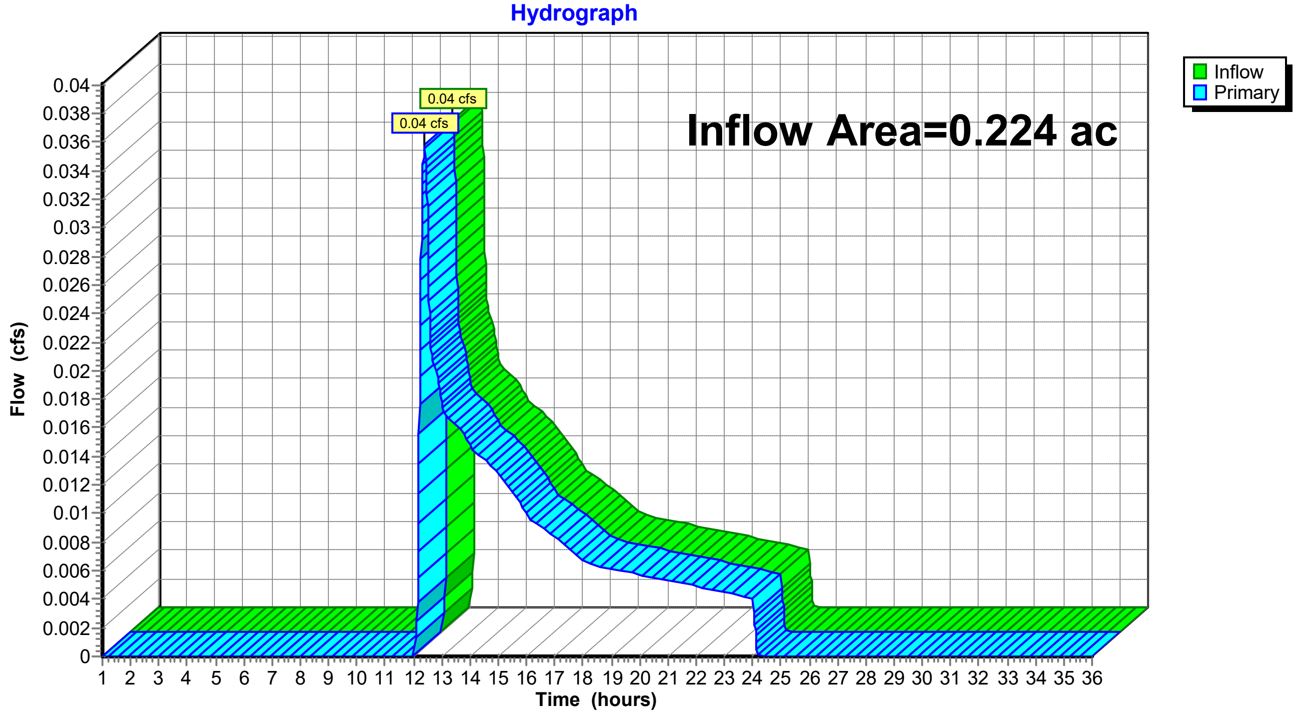


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.49" for 100-year event
Inflow = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af
Primary = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

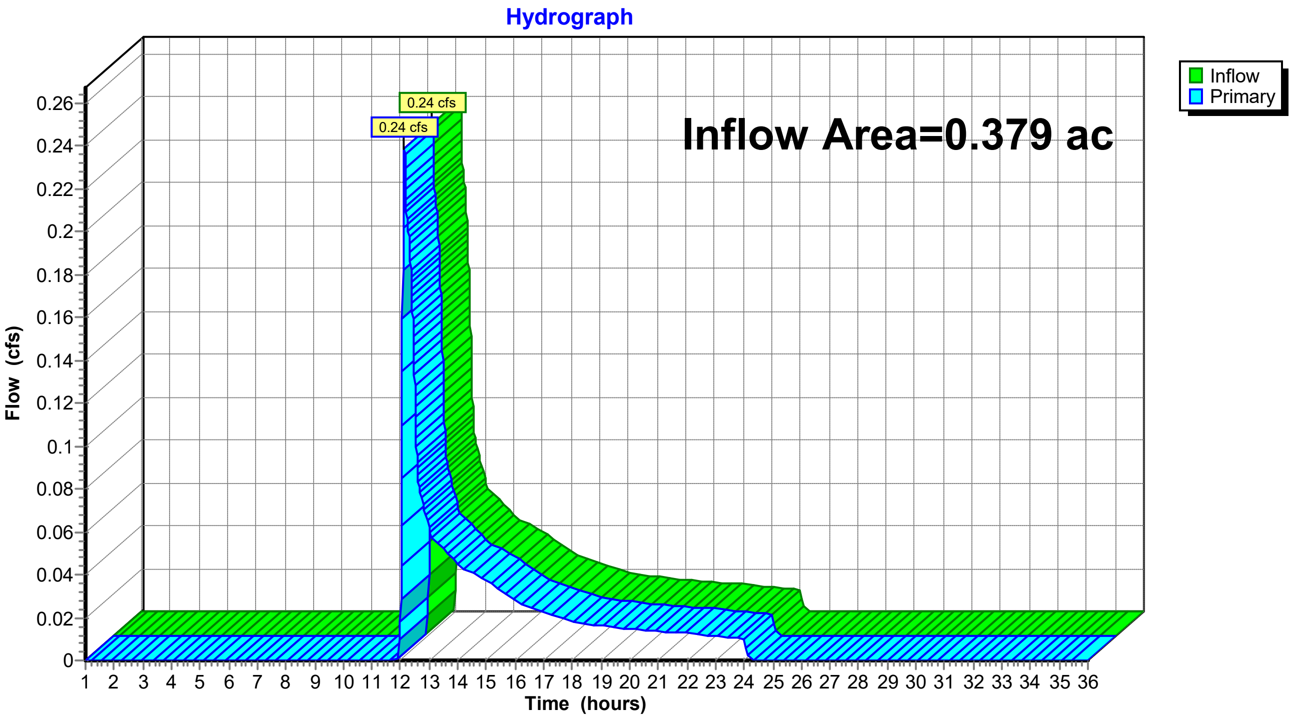


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.379 ac, 9.02% Impervious, Inflow Depth = 1.00" for 100-year event
Inflow = 0.24 cfs @ 12.13 hrs, Volume= 0.032 af
Primary = 0.24 cfs @ 12.13 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

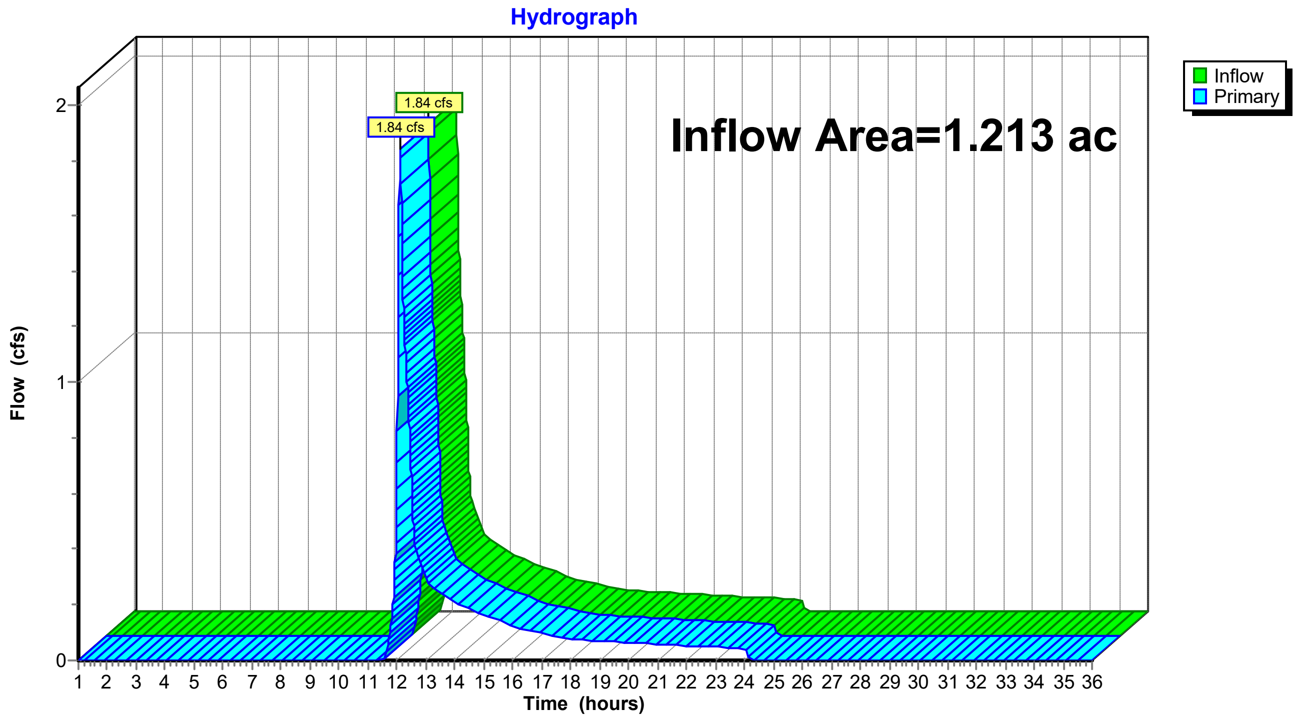


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area =	1.213 ac,	18.39% Impervious, Inflow Depth = 1.63"	for 100-year event
Inflow =	1.84 cfs @	12.11 hrs, Volume=	0.165 af
Primary =	1.84 cfs @	12.11 hrs, Volume=	0.165 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

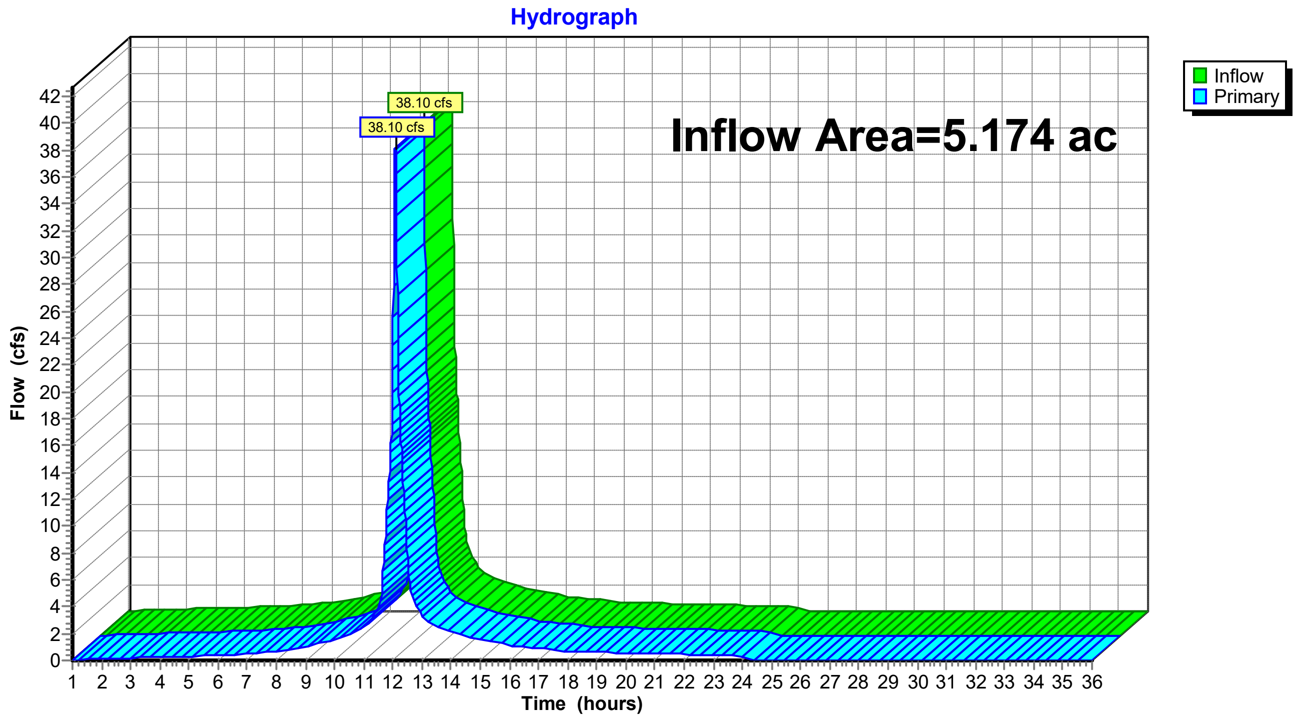


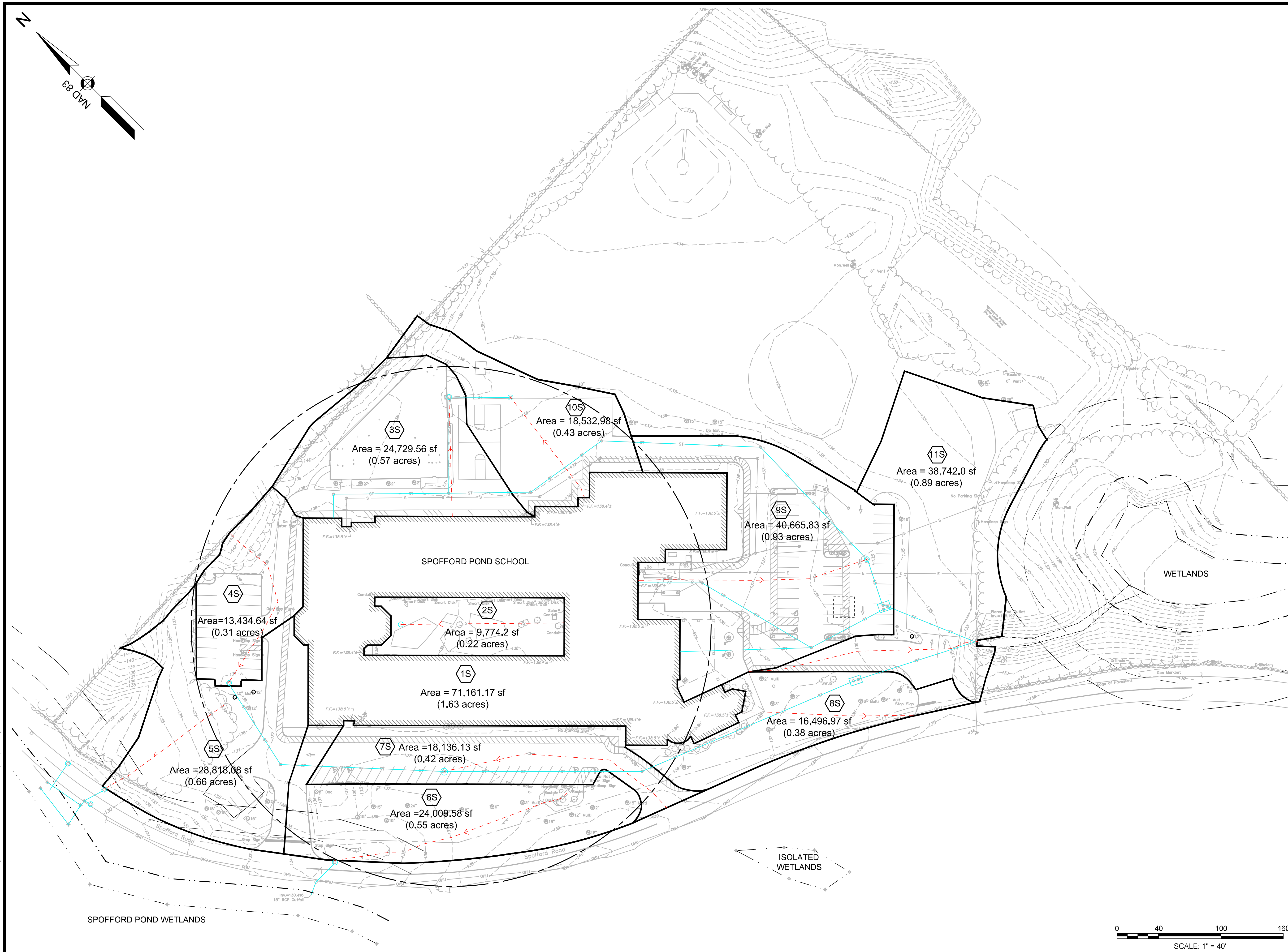
Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.174 ac, 85.66% Impervious, Inflow Depth > 6.90" for 100-year event
Inflow = 38.10 cfs @ 12.08 hrs, Volume= 2.977 af
Primary = 38.10 cfs @ 12.08 hrs, Volume= 2.977 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands





Project:

BOXFORD PUBLIC SCHOOLS SITE RENOVATION PROJECT

TOWN OF BOXFORD INCORPORATED 1685 MASSACHUSETTS

TOWN OF BOXFORD
BOXFORD, MA 01921

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PERMITTING
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Scale:	AS NOTED
Date:	FEBRUARY 3, 2021
Drawn By:	CTK
Reviewed By:	JIP
Approved By:	JRF

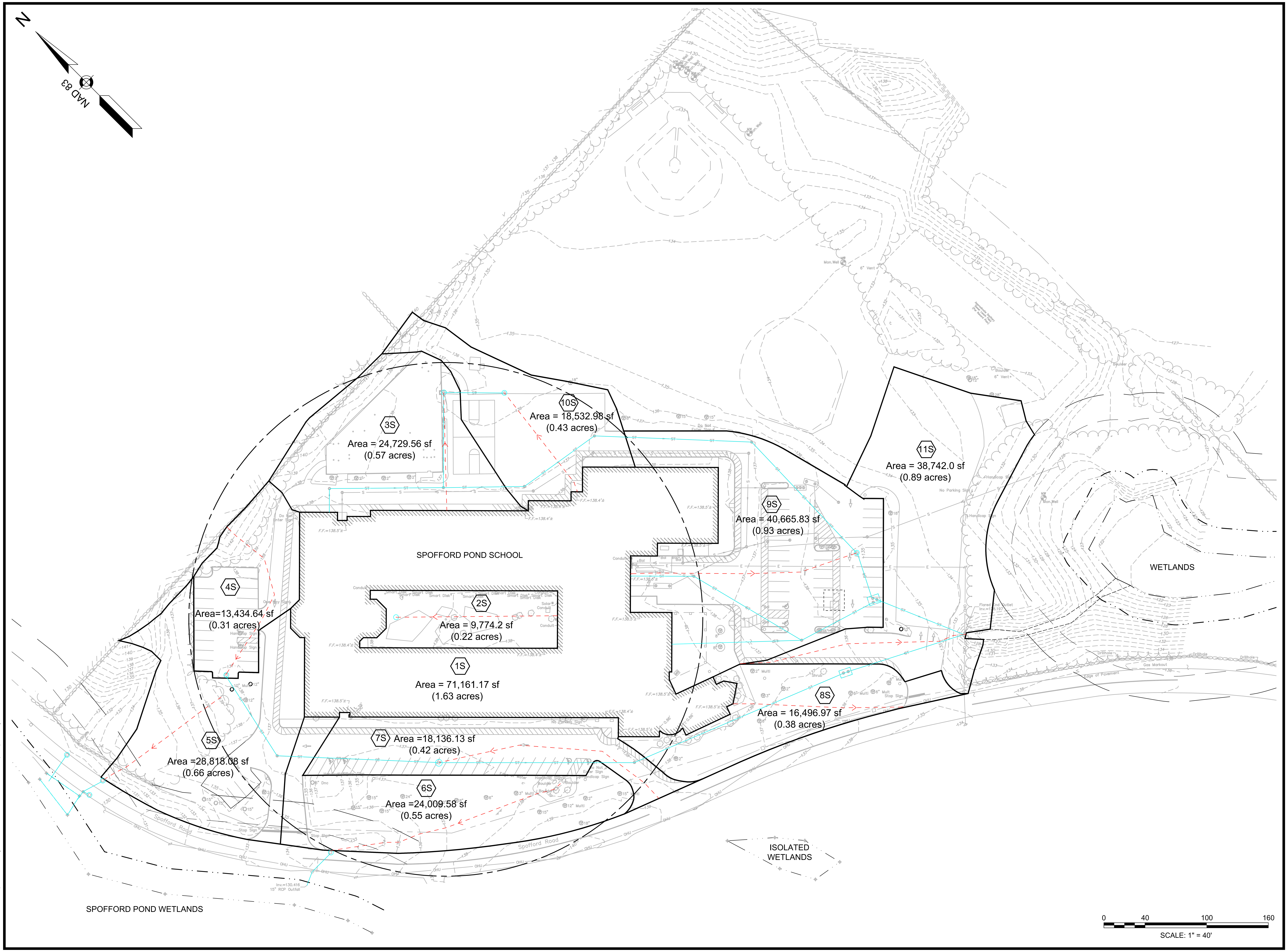
W&S Project No.: ENG20-0865
W&S File No.:

Drawing Title:

PRE-DEVELOPMENT PLAN SPOFFORD POND SCHOOL

Sheet Number:

FIG.1



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W&S File No.:

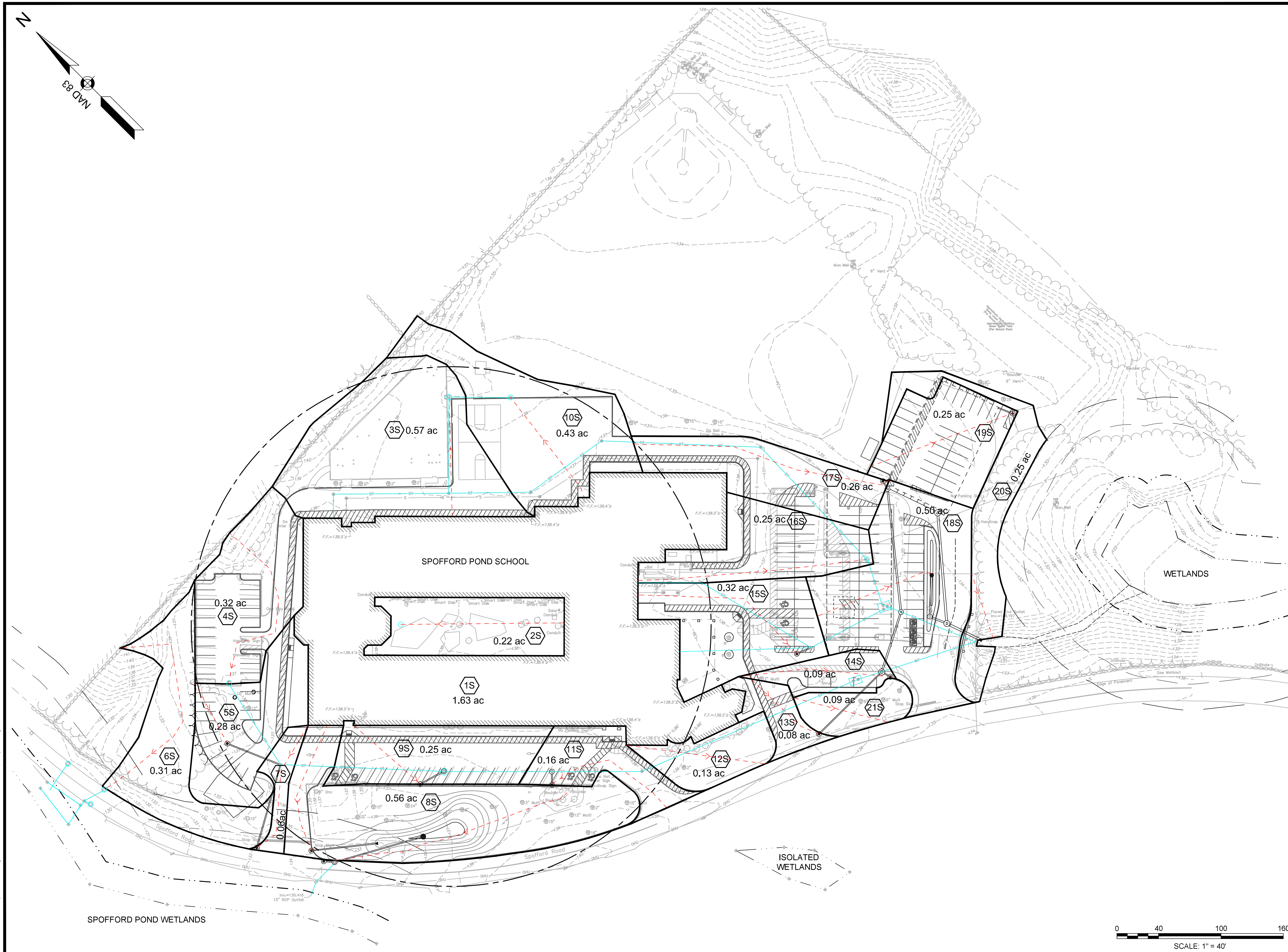
Drawing Title:

PRE-DEVELOPMENT PLAN SPOFFORD POND SCHOOL

Sheet Number:

FIG.1

Rev. 1.8 Date: 10/24/2019



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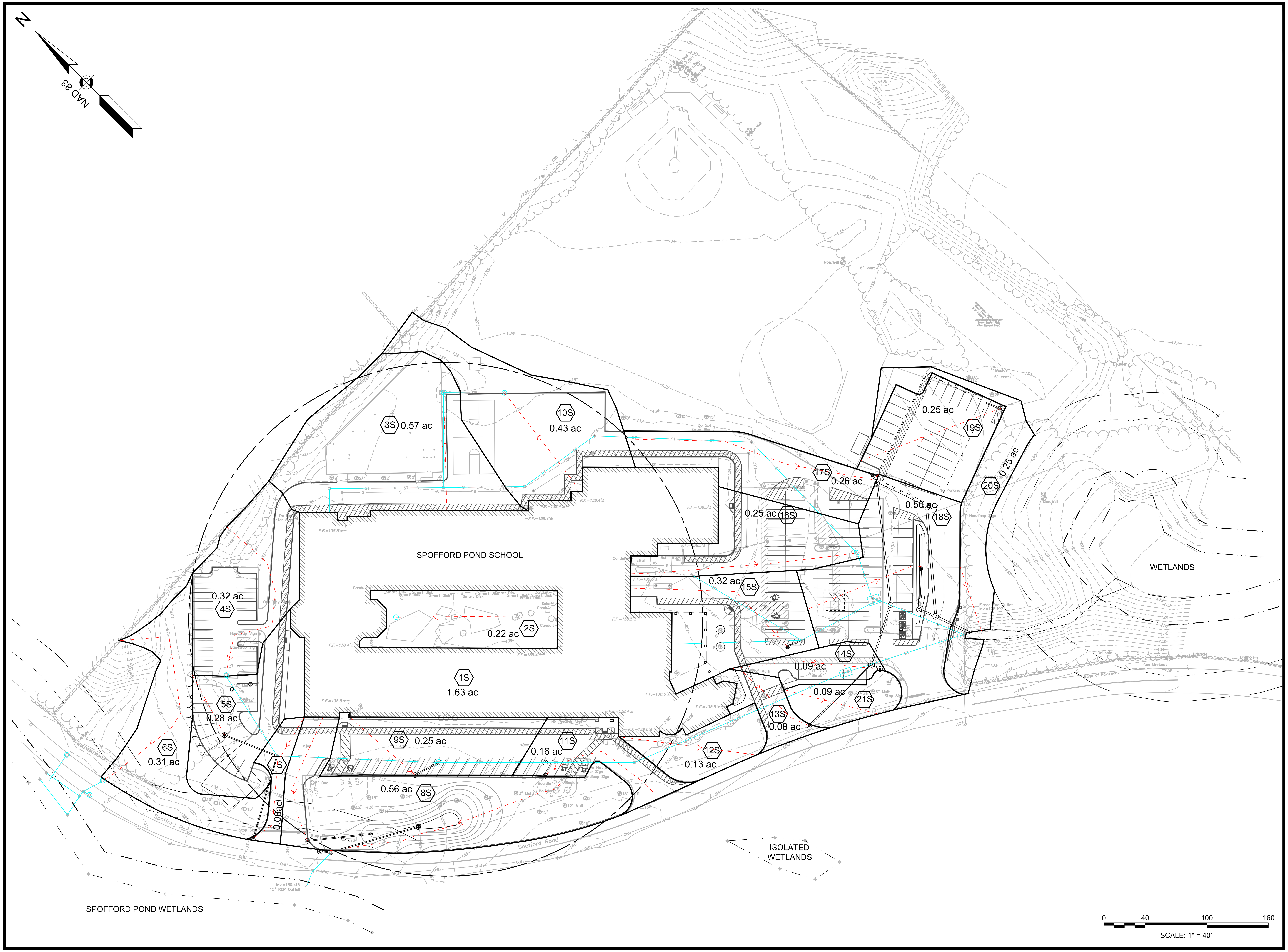
Date:	FEBRUARY 3, 2021
Drawn By:	CTK
Reviewed By:	JJP
Approved By:	JRF
W&S Project No.:	ENG20-0865
W&S File No.:	

Drawing Title:
POST-DEVELOPMENT PLAN SPOFFORD POND SCHOOL

Sheet Number:
FIG.2



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Scale: AS NOTED

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Approved By: JRF

W&S Project No.: ENG20-0865

W&S File No.:

Drawing Title:

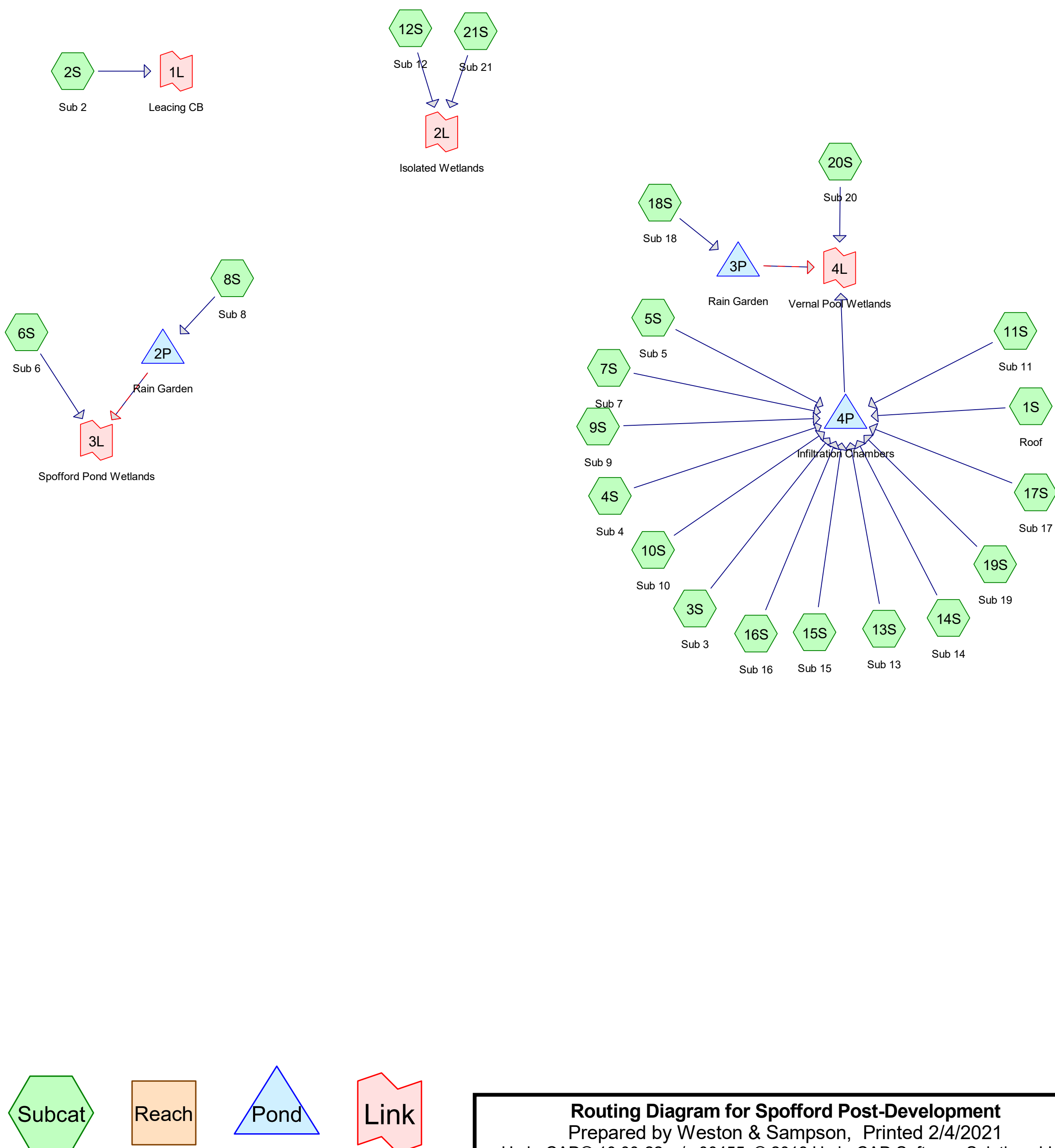
POST-DEVELOPMENT PLAN SPOFFORD POND SCHOOL

Sheet Number:

FIG.2

Spofford School
Boxford, MA
Stormwater Discharge Summary Table
3-Feb-21

		Peak Discharge (cfs)		Runoff Volume (af)	
Analysis Point	**24 Hr Storm**	**Pre-Development**	**Post-Development**	**Pre-Development**	**Post-Development**
1L	2yr	0.00	**0.00**	0.000	**0.000**
	10yr	0.00	**0.00**	0.000	**0.000**
	25yr	0.00	**0.00**	0.001	**0.001**
	50yr	0.01	**0.01**	0.004	**0.004**
	100yr	0.04	**0.04**	0.009	**0.009**
2L	2yr	0.00	**0.00**	0.000	**0.000**
	10yr	0.00	**0.00**	0.000	**0.000**
	25yr	0.00	**0.00**	0.001	**0.001**
	50yr	0.01	**0.01**	0.004	**0.004**
	100yr	0.03	**0.03**	0.009	**0.009**
3L	2yr	0.00	**0.00**	0.002	**0.000**
	10yr	0.11	**0.00**	0.027	**0.000**
	25yr	0.37	**0.02**	0.059	**0.012**
	50yr	1.03	**0.06**	0.109	**0.038**
	100yr	1.84	**0.15**	0.165	**0.068**
4L	2yr	11.55	**7.84**	0.896	**0.859**
	10yr	19.50	**13.97**	1.512	**1.479**
	25yr	25.23	**17.87**	1.952	**1.922**
	50yr	31.85	**20.69**	2.482	**2.459**
	100yr	38.10	**25.14**	2.977	**2.964**



Routing Diagram for Spofford Post-Development
Prepared by Weston & Sampson, Printed 2/4/2021
HydroCAD® 10.00-22 s/n 00455 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.684	30	Grass (2S, 3S, 4S, 5S, 6S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 18S, 19S, 20S, 21S)
3.101	98	Paved parking, HSG A (3S, 4S, 5S, 7S, 8S, 9S, 10S, 11S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S)
1.634	98	Roofs, HSG A (1S)
0.209	98	Turf (impervious) (3S)
0.300	30	Woods (3S, 6S, 20S)
0.062	30	Woods, Good, HSG A (4S, 5S, 10S)
6.990	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.797	HSG A	1S, 3S, 4S, 5S, 7S, 8S, 9S, 10S, 11S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.193	Other	2S, 3S, 4S, 5S, 6S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 18S, 19S, 20S, 21S
6.990		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.684	1.684	Grass	2S, 3S, 4S, 5S, 6S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 18S, 19S, 20S, 21S
3.101	0.000	0.000	0.000	0.000	3.101	Paved parking	3S, 4S, 5S, 7S, 8S, 9S, 10S, 11S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S
1.634	0.000	0.000	0.000	0.000	1.634	Roofs	1S
0.000	0.000	0.000	0.000	0.209	0.209	Turf (impervious)	3S
0.000	0.000	0.000	0.000	0.300	0.300	Woods	3S, 6S, 20S
0.062	0.000	0.000	0.000	0.000	0.062	Woods, Good	4S, 5S, 10S
4.797	**0.000**	**0.000**	**0.000**	**2.193**	**6.990**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	131.70	130.87	85.0	0.0098	0.130	12.0	0.0	0.0
2	3P	133.00	129.45	88.0	0.0403	0.130	18.0	0.0	0.0
3	4P	128.50	127.65	165.0	0.0052	0.013	24.0	0.0	0.0

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=4.91 cfs 0.390 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=80 Runoff=0.87 cfs 0.063 af

Subcatchment 4S: Sub 4 Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=72 Runoff=0.30 cfs 0.023 af

Subcatchment 5S: Sub 5 Runoff Area=12,232 sf 62.66% Impervious Runoff Depth=0.92"
Tc=6.0 min CN=73 Runoff=0.28 cfs 0.022 af

Subcatchment 6S: Sub 6 Runoff Area=13,636 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 7S: Sub 7 Runoff Area=2,471 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 8S: Sub 8 Runoff Area=24,444 sf 14.69% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=40 Runoff=0.00 cfs 0.000 af

Subcatchment 9S: Sub 9 Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=95 Runoff=0.71 cfs 0.053 af

Subcatchment 10S: Sub 10 Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=1.14"
Tc=6.0 min CN=77 Runoff=0.55 cfs 0.040 af

Subcatchment 11S: Sub 11 Runoff Area=6,808 sf 98.43% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.46 cfs 0.036 af

Subcatchment 12S: Sub 12 Runoff Area=5,470 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 13S: Sub 13 Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=90 Runoff=0.18 cfs 0.013 af

Subcatchment 14S: Sub 14 Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=95 Runoff=0.25 cfs 0.019 af

Subcatchment 15S: Sub 15 Runoff Area=13,783 sf 99.17% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.94 cfs 0.073 af

Subcatchment 16S: Sub 16 Runoff Area=11,011 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.76 cfs 0.060 af

Subcatchment 17S: Sub 17 Runoff Area=11,222 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.77 cfs 0.062 af

Subcatchment 18S: Sub 18 Runoff Area=21,593 sf 92.74% Impervious Runoff Depth=2.35"
Tc=6.0 min CN=93 Runoff=1.32 cfs 0.097 af

Subcatchment 19S: Sub 19 Runoff Area=10,851 sf 98.57% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.74 cfs 0.057 af

Subcatchment 20S: Sub 20 Runoff Area=10,690 sf 3.71% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment 21S: Sub 21 Runoff Area=3,953 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 2P: Rain Garden Peak Elev=131.00' Storage=1 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 3P: Rain Garden Peak Elev=133.77' Storage=271 cf Inflow=1.32 cfs 0.097 af
Primary=0.68 cfs 0.090 af Secondary=0.63 cfs 0.008 af Outflow=1.31 cfs 0.097 af

Pond 4P: Infiltration Chambers Peak Elev=129.79' Storage=11,822 cf Inflow=11.89 cfs 0.925 af
Discarded=0.41 cfs 0.071 af Primary=6.89 cfs 0.762 af Outflow=7.30 cfs 0.832 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2L: Isolated Wetlands Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 3L: Spofford Pond Wetlands Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Vernal Pool Wetlands Inflow=7.84 cfs 0.859 af
Primary=7.84 cfs 0.859 af

Total Runoff Area = 6.990 ac Runoff Volume = 1.022 af Average Runoff Depth = 1.76"
29.27% Pervious = 2.046 ac 70.73% Impervious = 4.944 ac

Summary for Subcatchment 1S: Roof

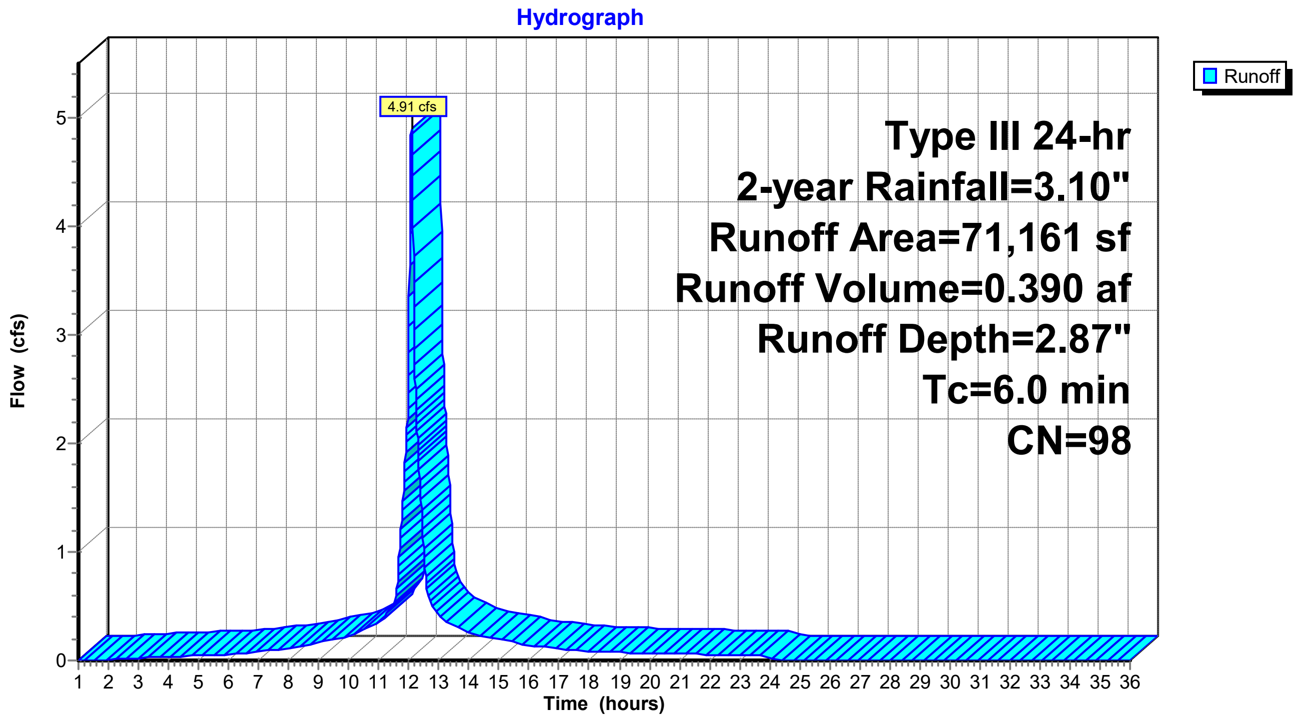
Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.390 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

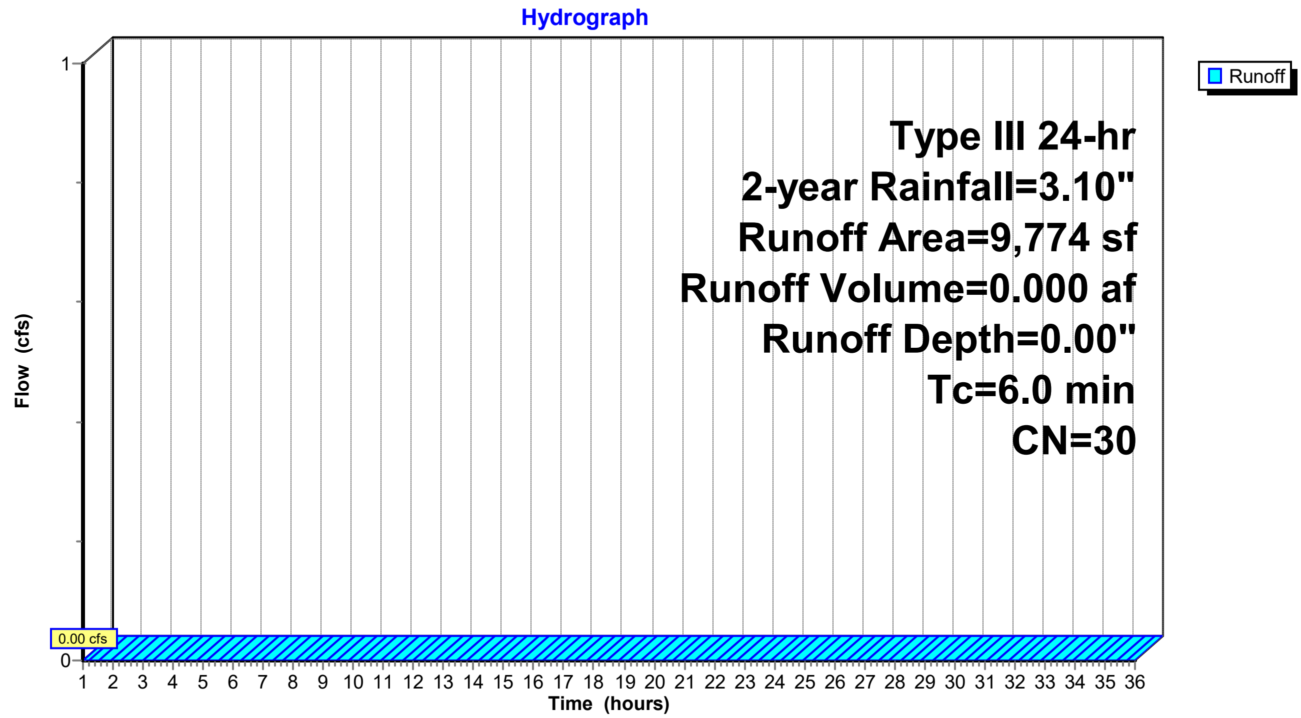
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

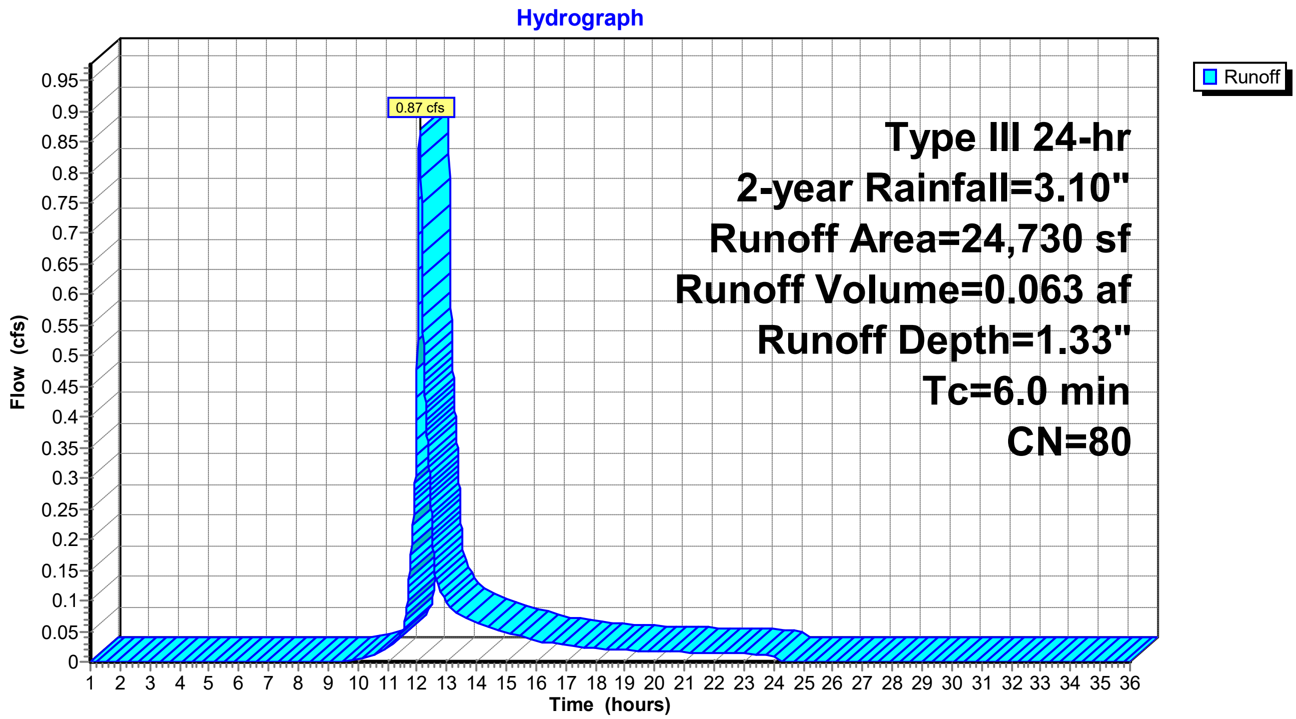
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

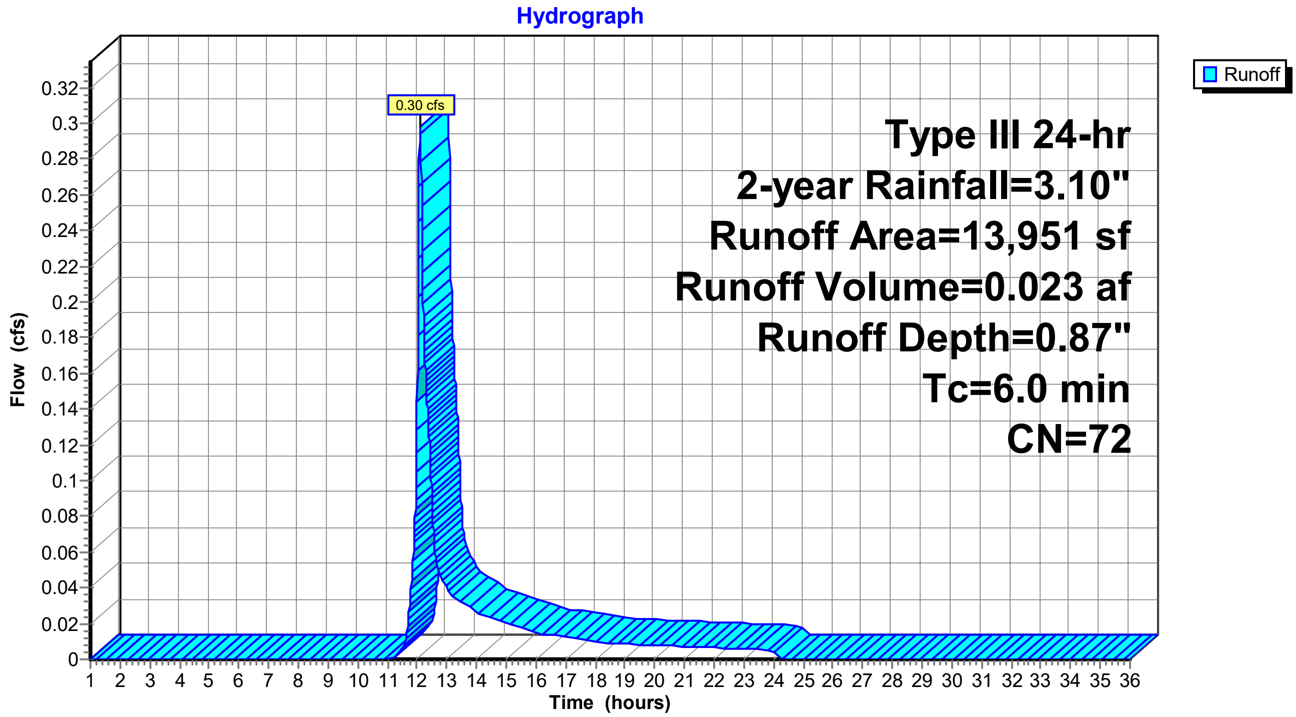
Runoff = 0.30 cfs @ 12.10 hrs, Volume= 0.023 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951	72	Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

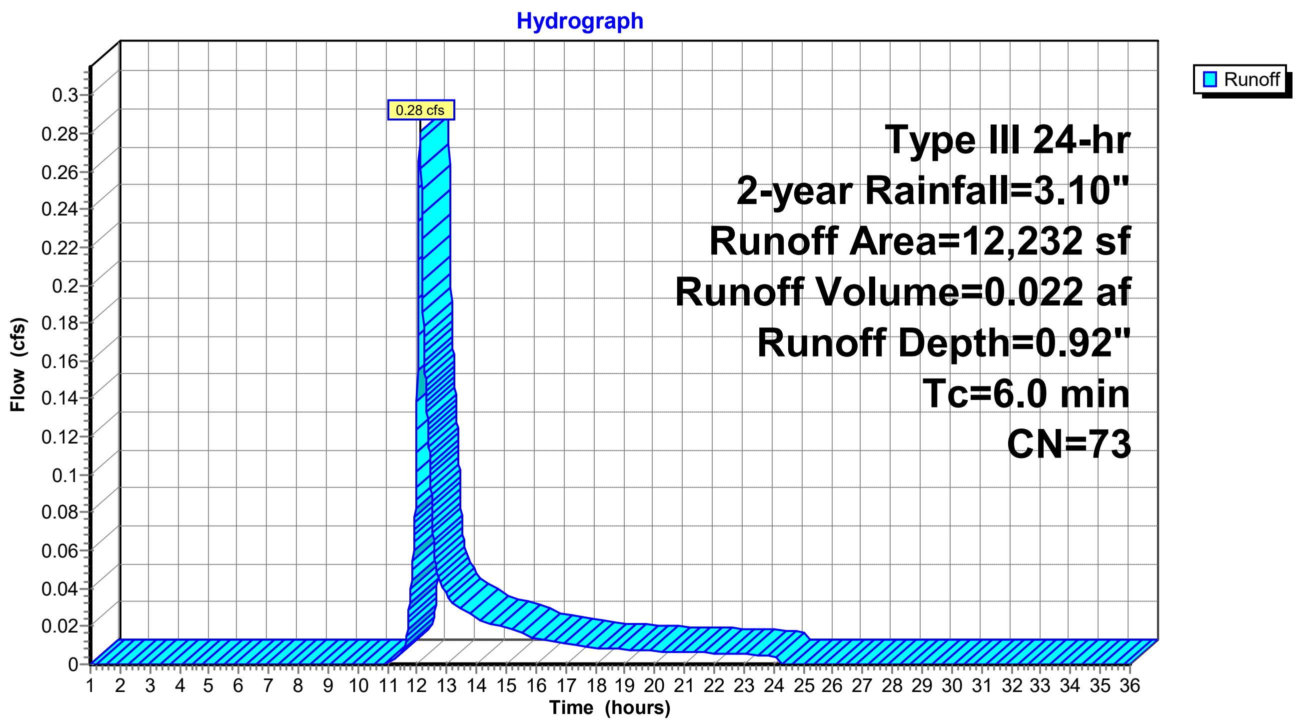
Runoff = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	7,665	98	Paved parking, HSG A
	201	30	Woods, Good, HSG A
*	4,366	30	Grass
	12,232	73	Weighted Average
	4,567		37.34% Pervious Area
	7,665		62.66% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

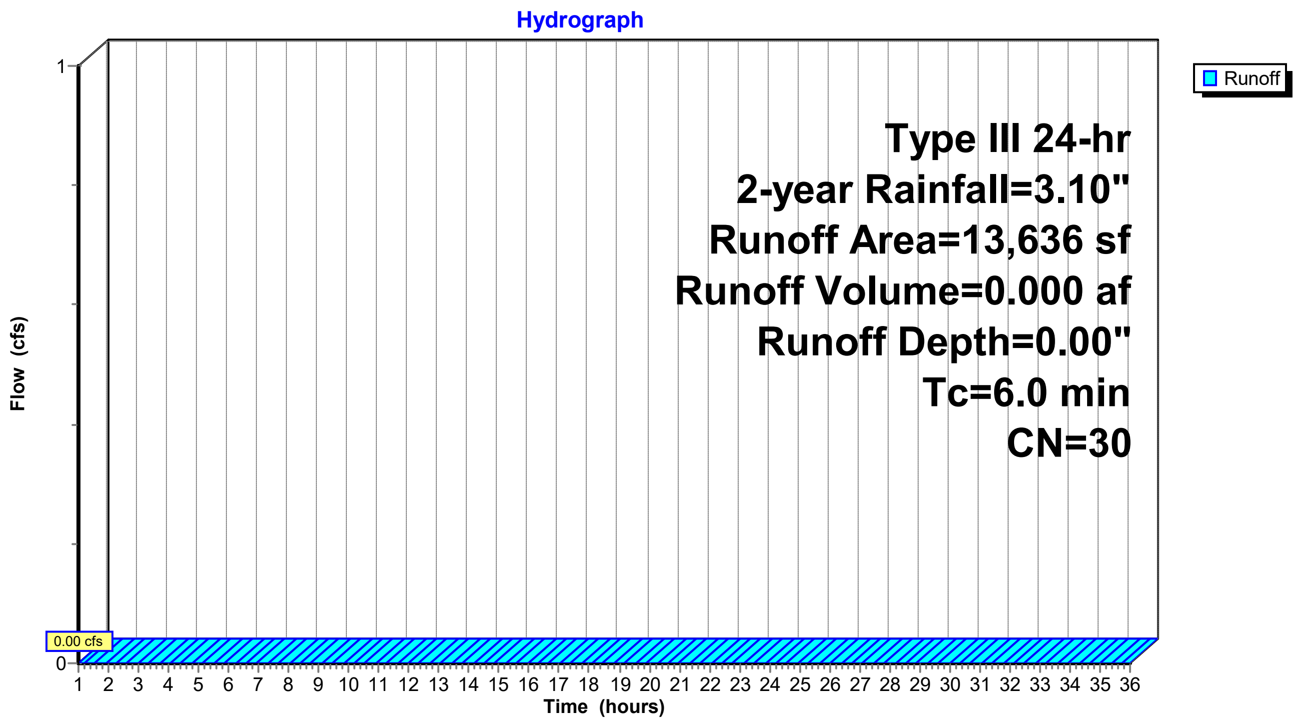
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	5,897	30	Grass
*	7,739	30	Woods
	13,636	30	Weighted Average
	13,636		100.00% Pervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

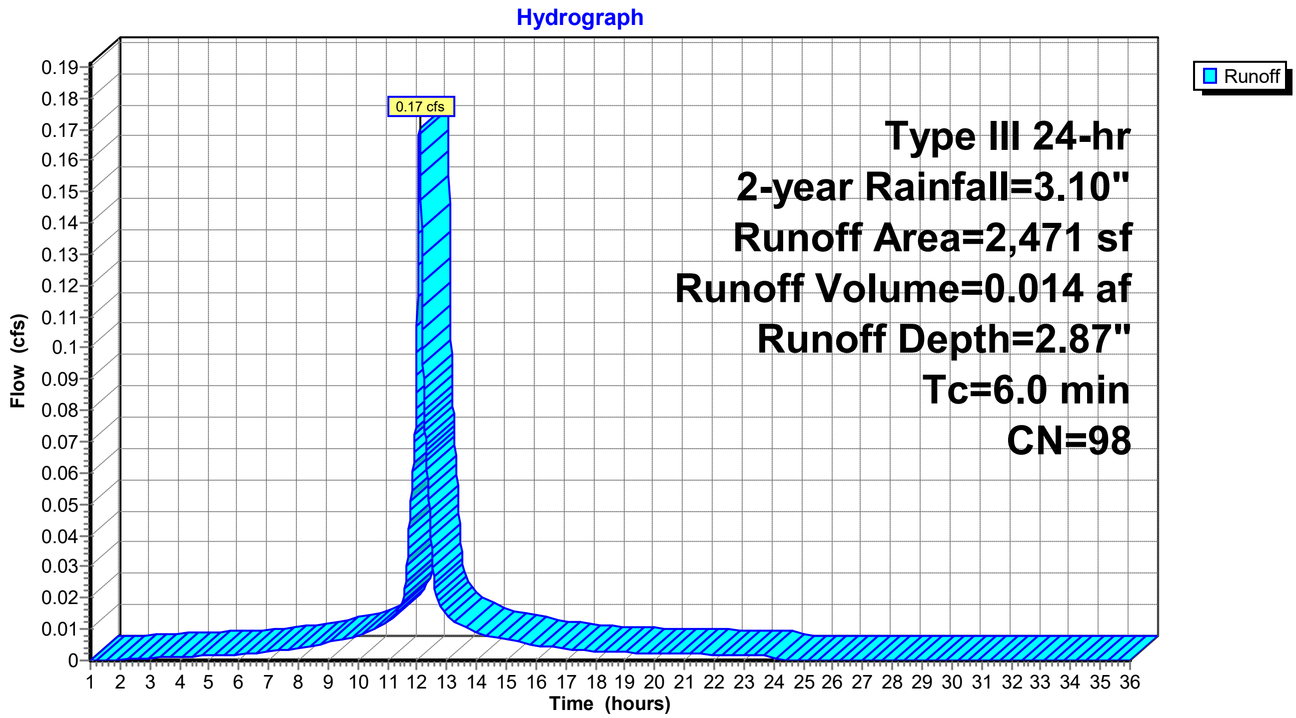
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

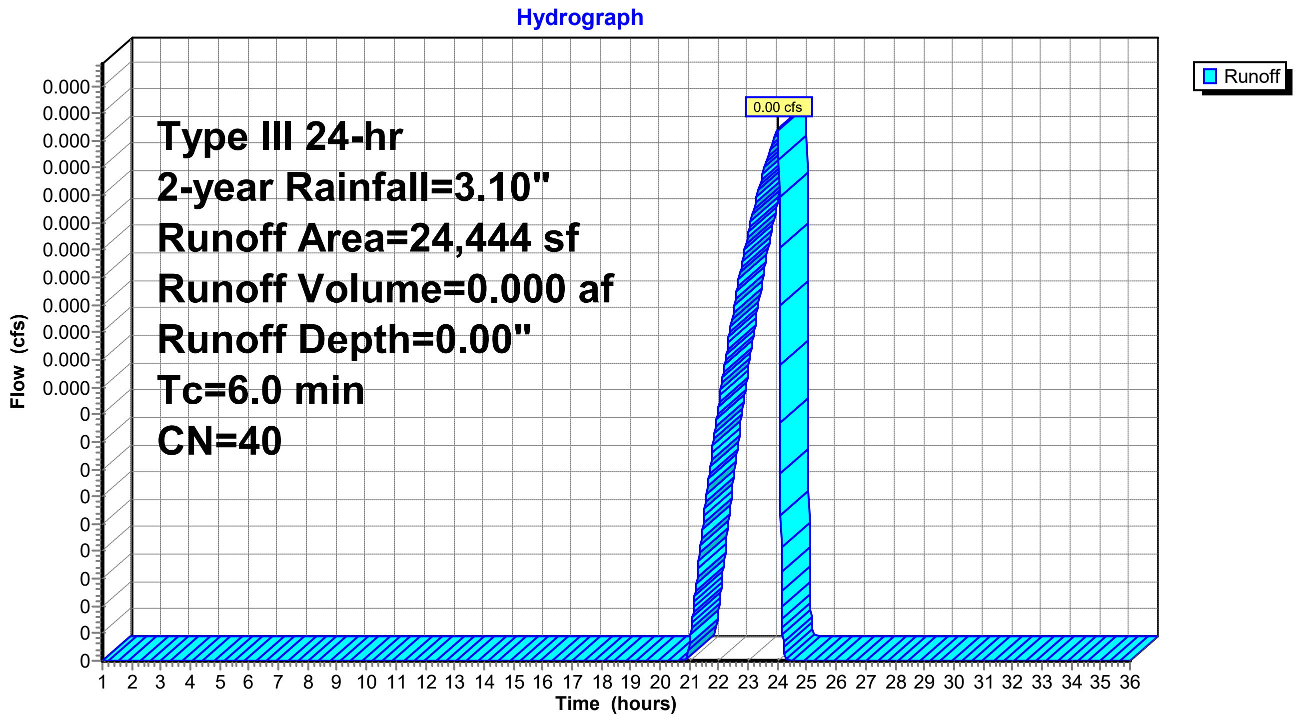
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	3,592	98	Paved parking, HSG A
*	20,852	30	Grass
	24,444	40	Weighted Average
	20,852		85.31% Pervious Area
	3,592		14.69% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

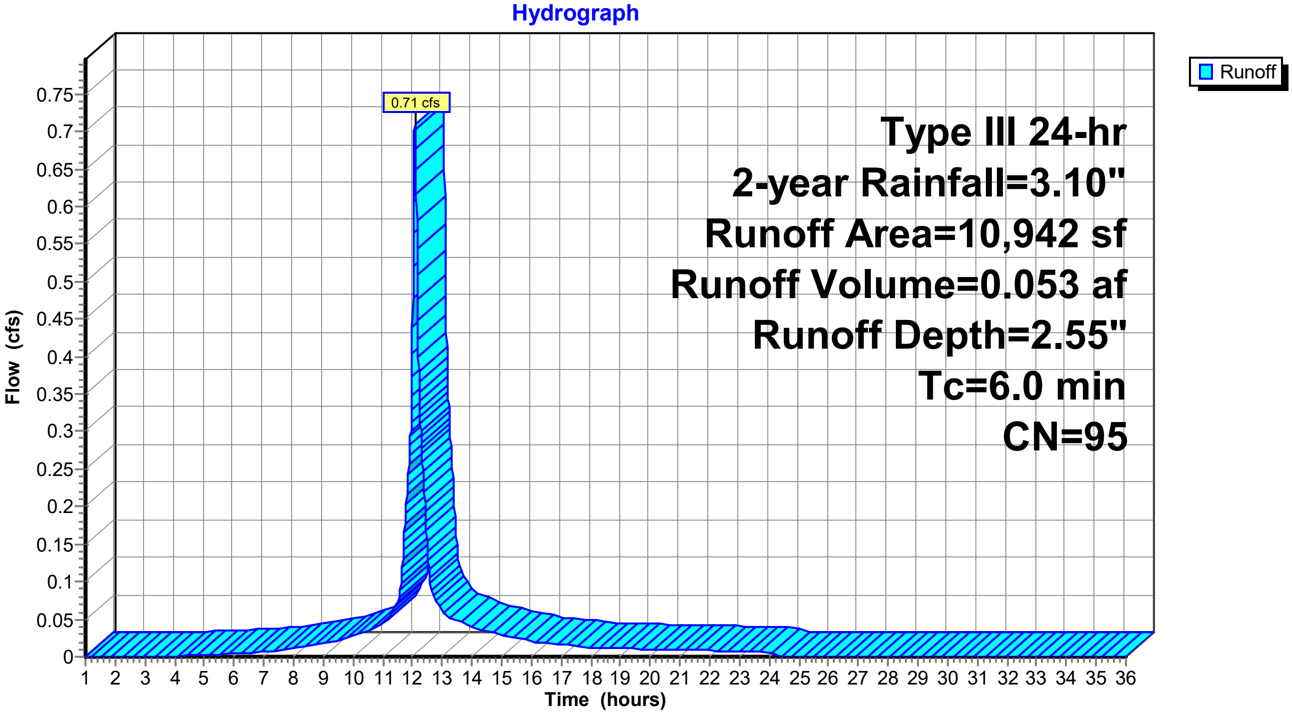
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942	95	Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

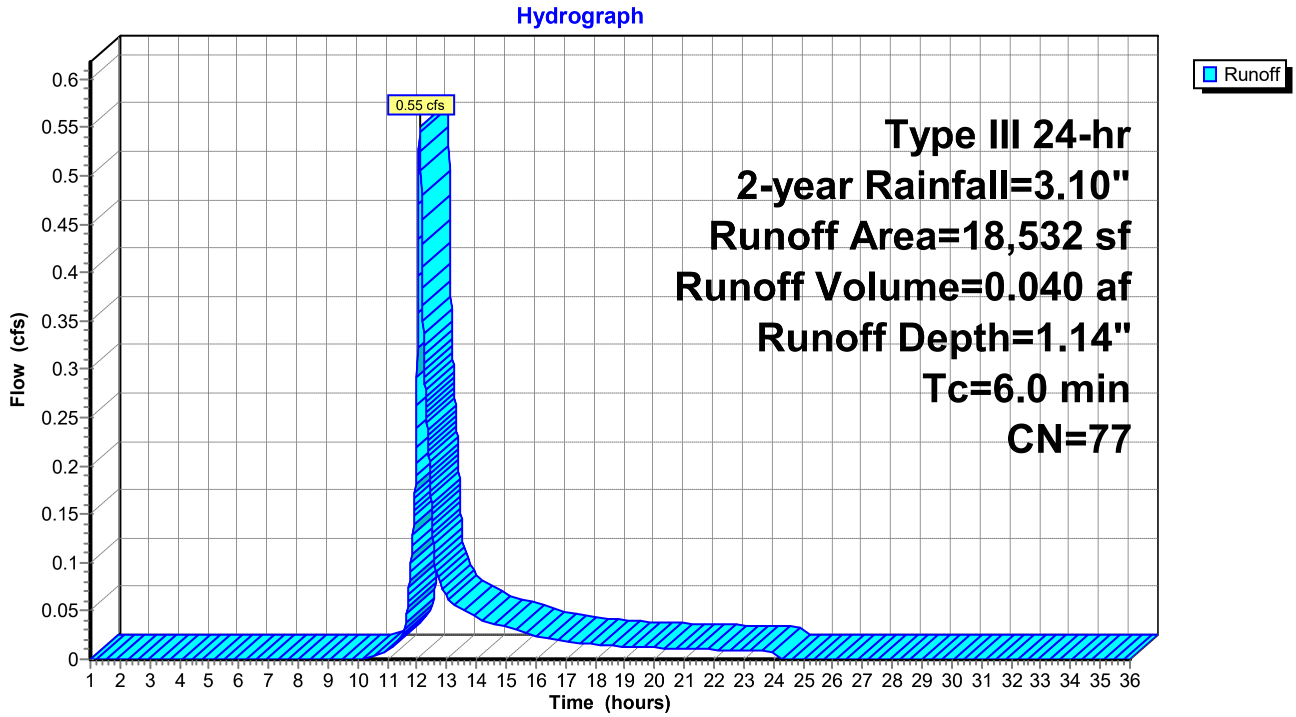
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532	77	Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

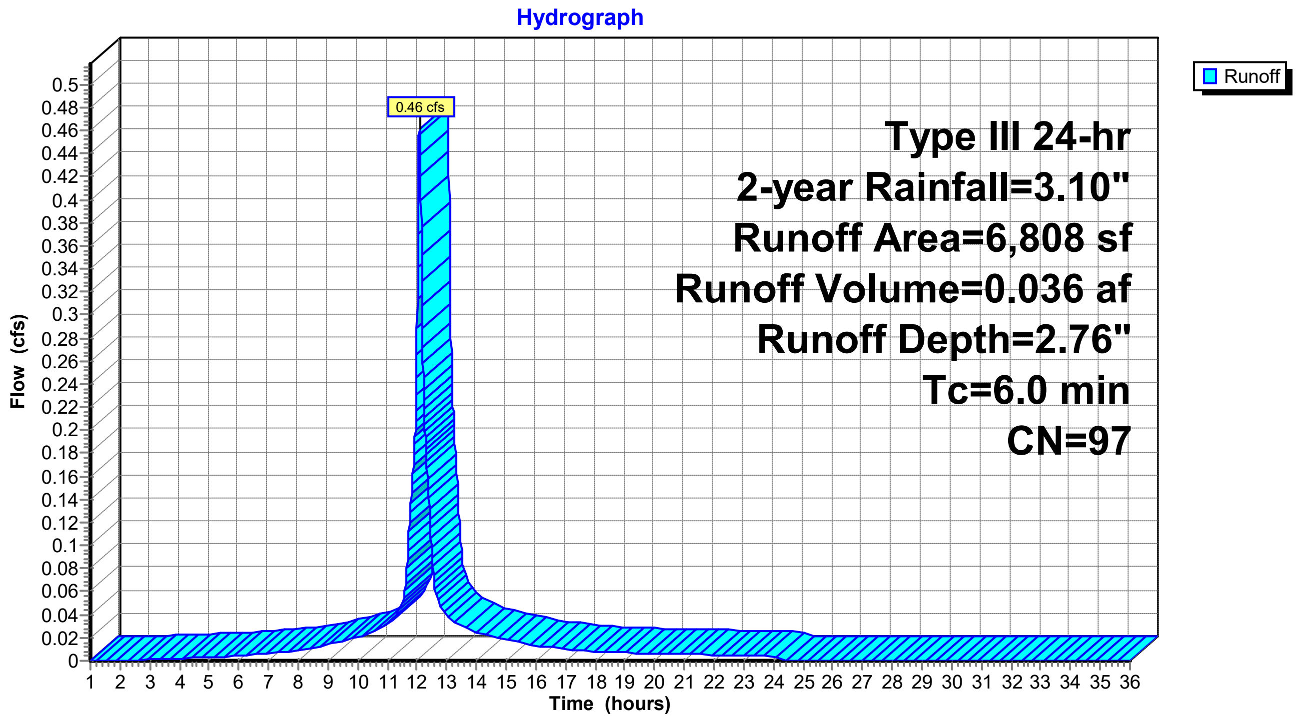
Runoff = 0.46 cfs @ 12.08 hrs, Volume= 0.036 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808	97	Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 11S: Sub 11



Summary for Subcatchment 12S: Sub 12

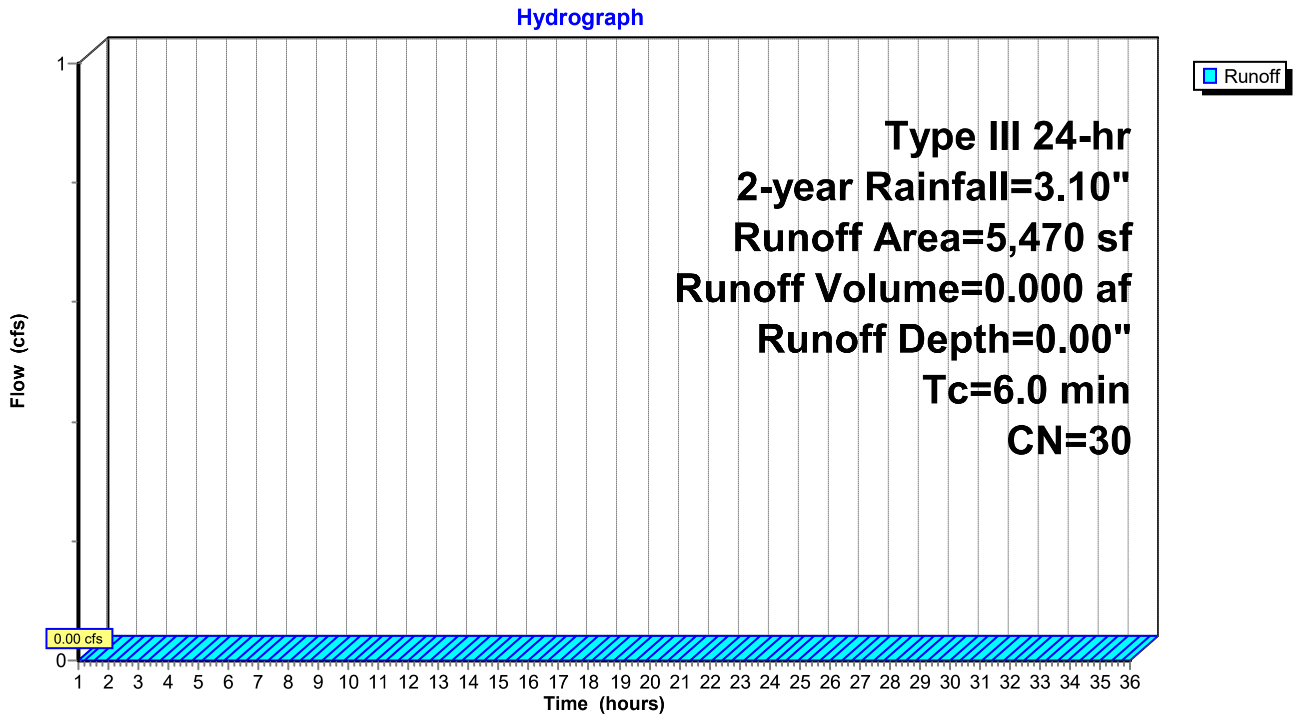
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	5,470	30	Grass
	5,470		100.00% Pervious Area

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

Subcatchment 12S: Sub 12



Summary for Subcatchment 13S: Sub 13

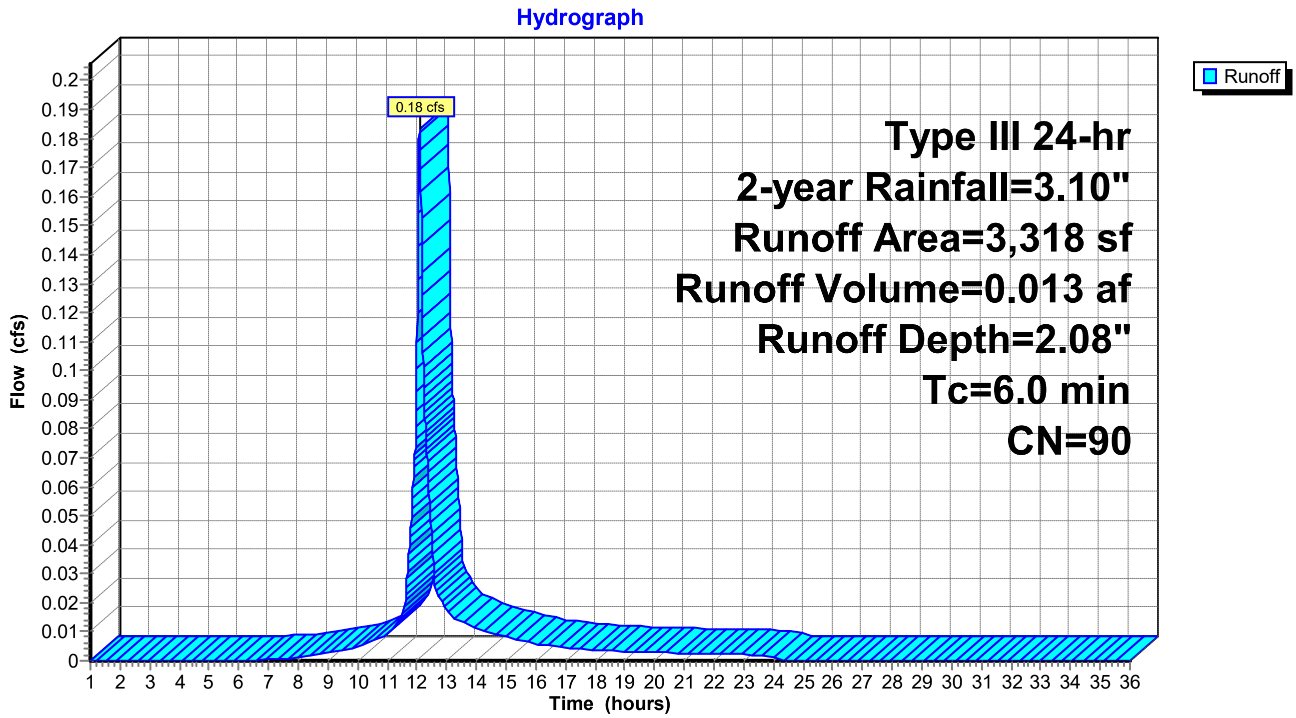
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318	90	Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 13S: Sub 13



Summary for Subcatchment 14S: Sub 14

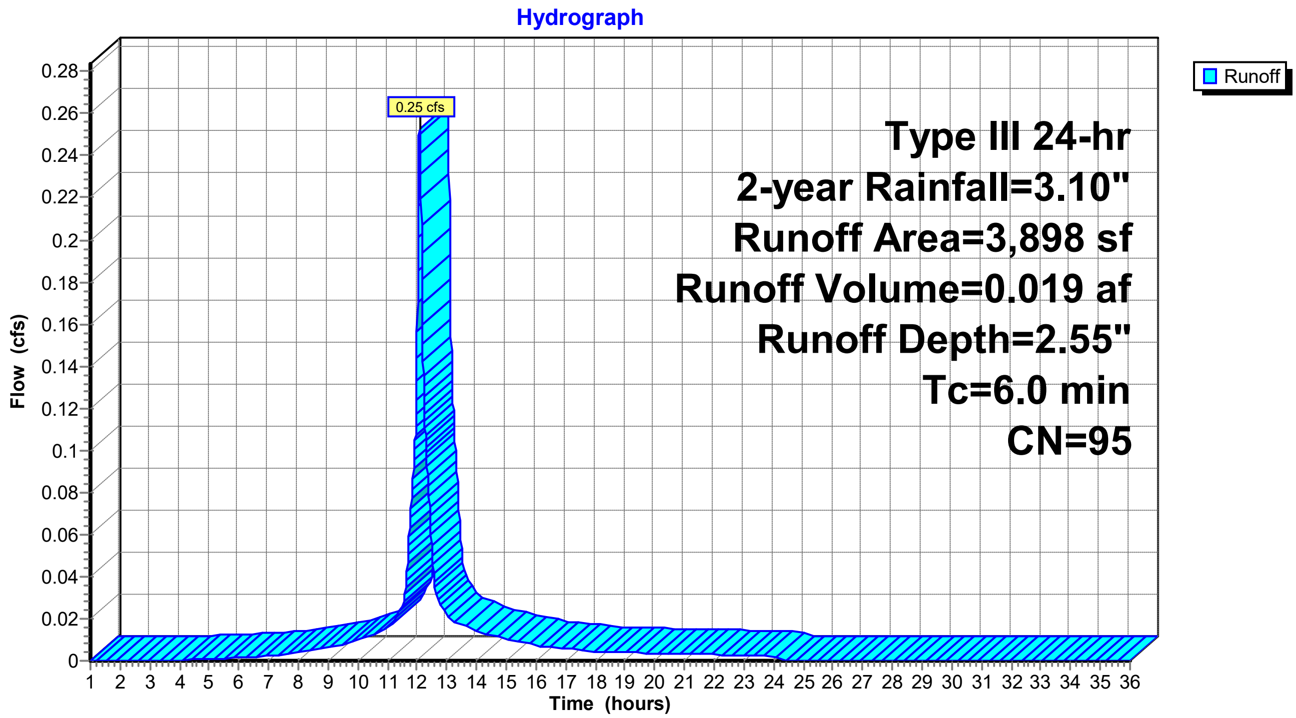
Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898	95	Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 14S: Sub 14



Summary for Subcatchment 15S: Sub 15

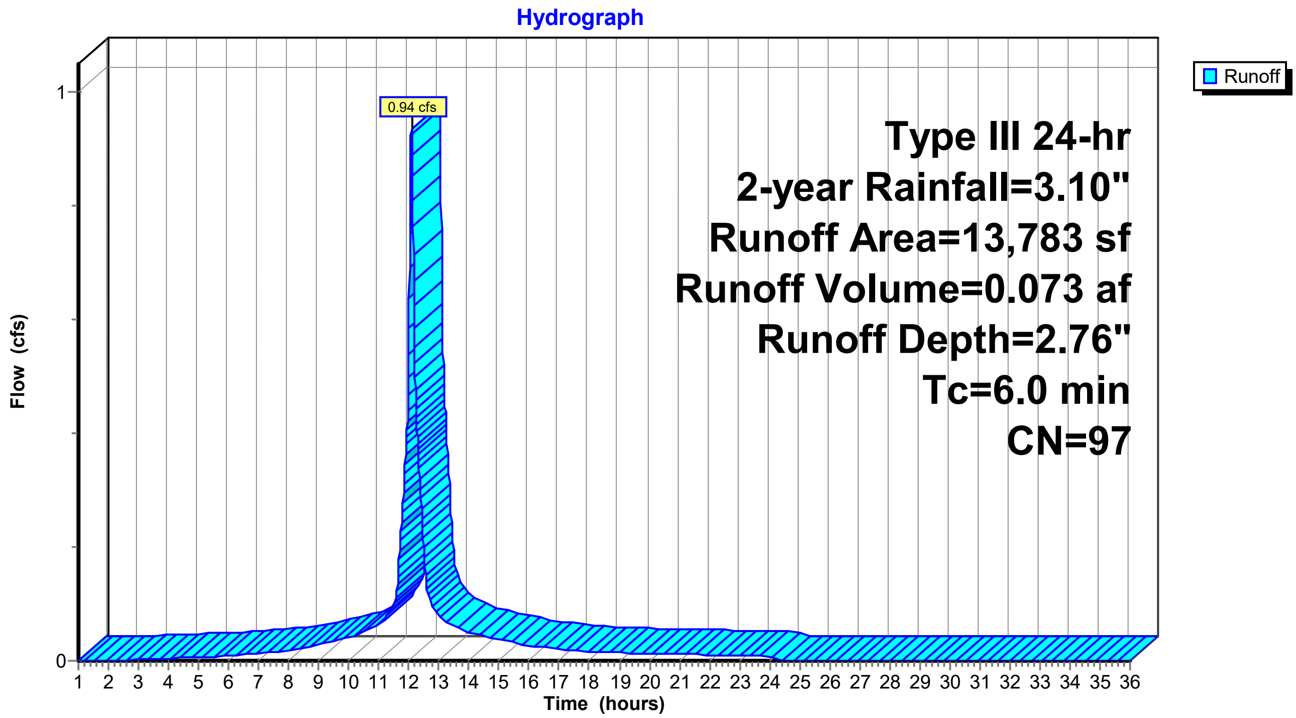
Runoff = 0.94 cfs @ 12.08 hrs, Volume= 0.073 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783	97	Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 15S: Sub 15



Summary for Subcatchment 16S: Sub 16

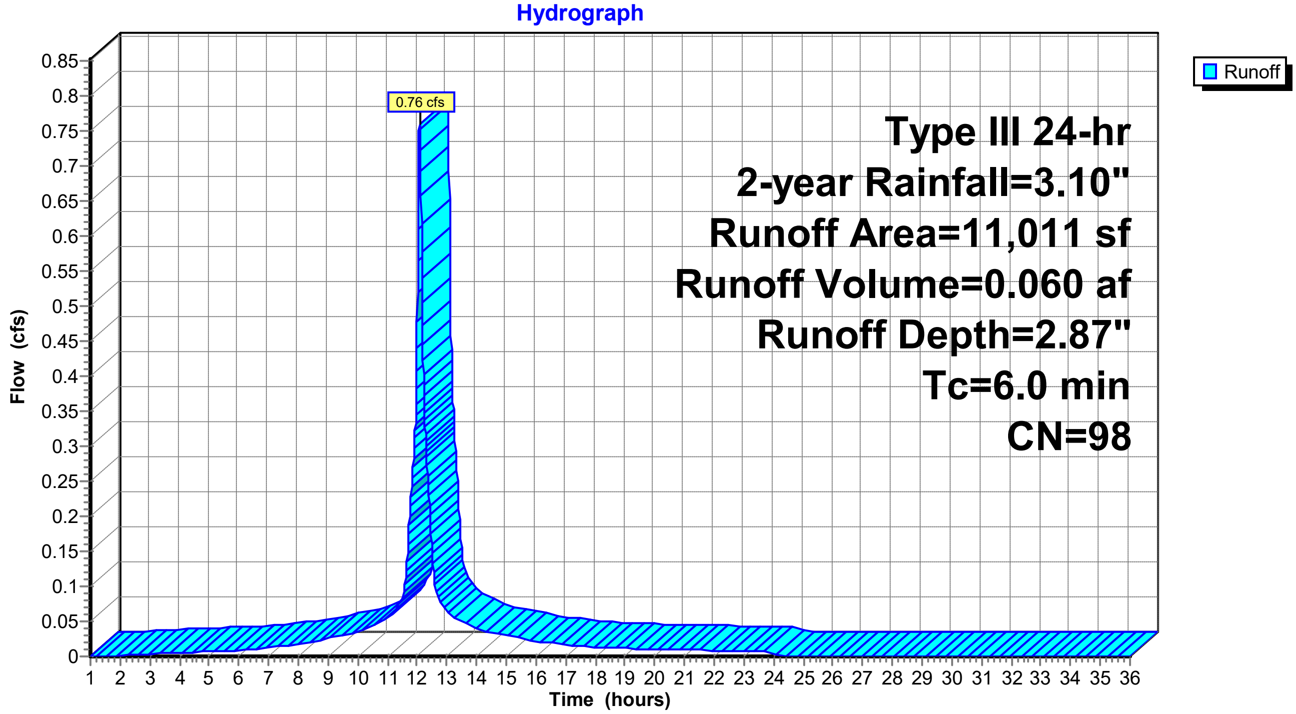
Runoff = 0.76 cfs @ 12.08 hrs, Volume= 0.060 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 16S: Sub 16



Summary for Subcatchment 17S: Sub 17

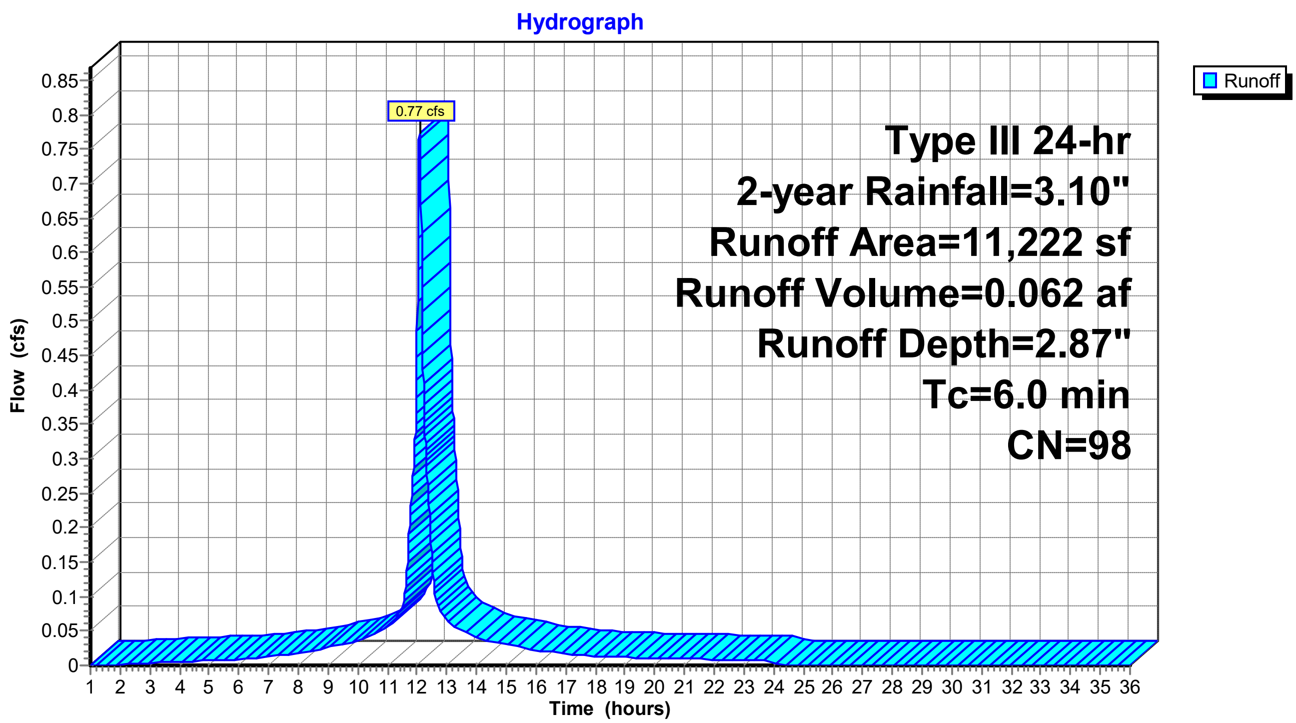
Runoff = 0.77 cfs @ 12.08 hrs, Volume= 0.062 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 17S: Sub 17



Summary for Subcatchment 18S: Sub 18

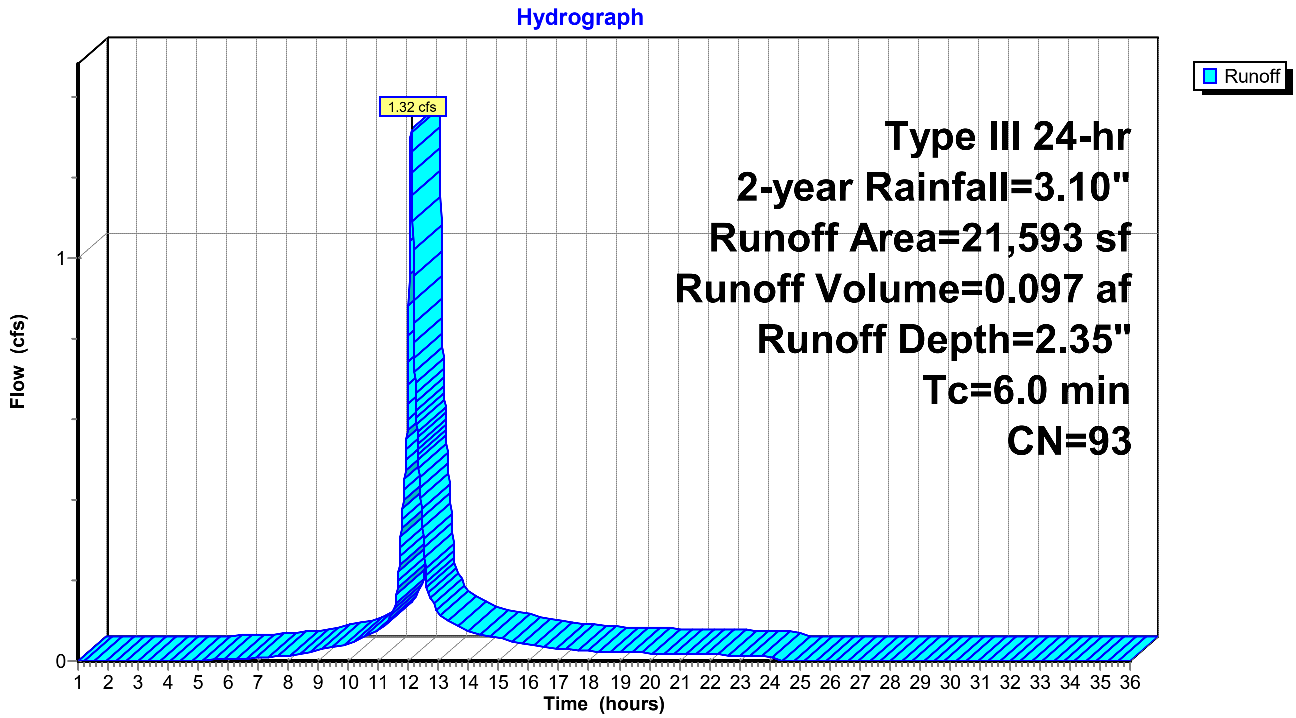
Runoff = 1.32 cfs @ 12.09 hrs, Volume= 0.097 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,568	30	Grass
	20,025	98	Paved parking, HSG A
	21,593	93	Weighted Average
	1,568		7.26% Pervious Area
	20,025		92.74% Impervious Area

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

Subcatchment 18S: Sub 18



Summary for Subcatchment 19S: Sub 19

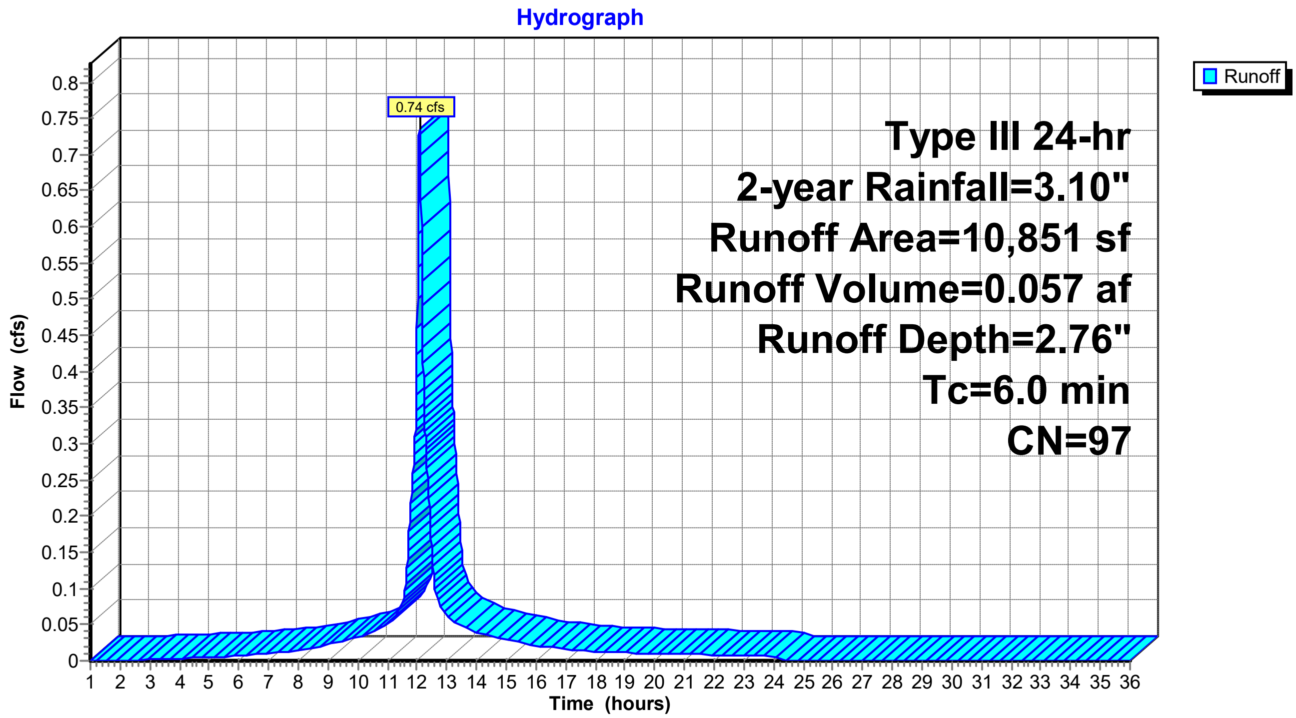
Runoff = 0.74 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851	97	Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 19S: Sub 19



Summary for Subcatchment 20S: Sub 20

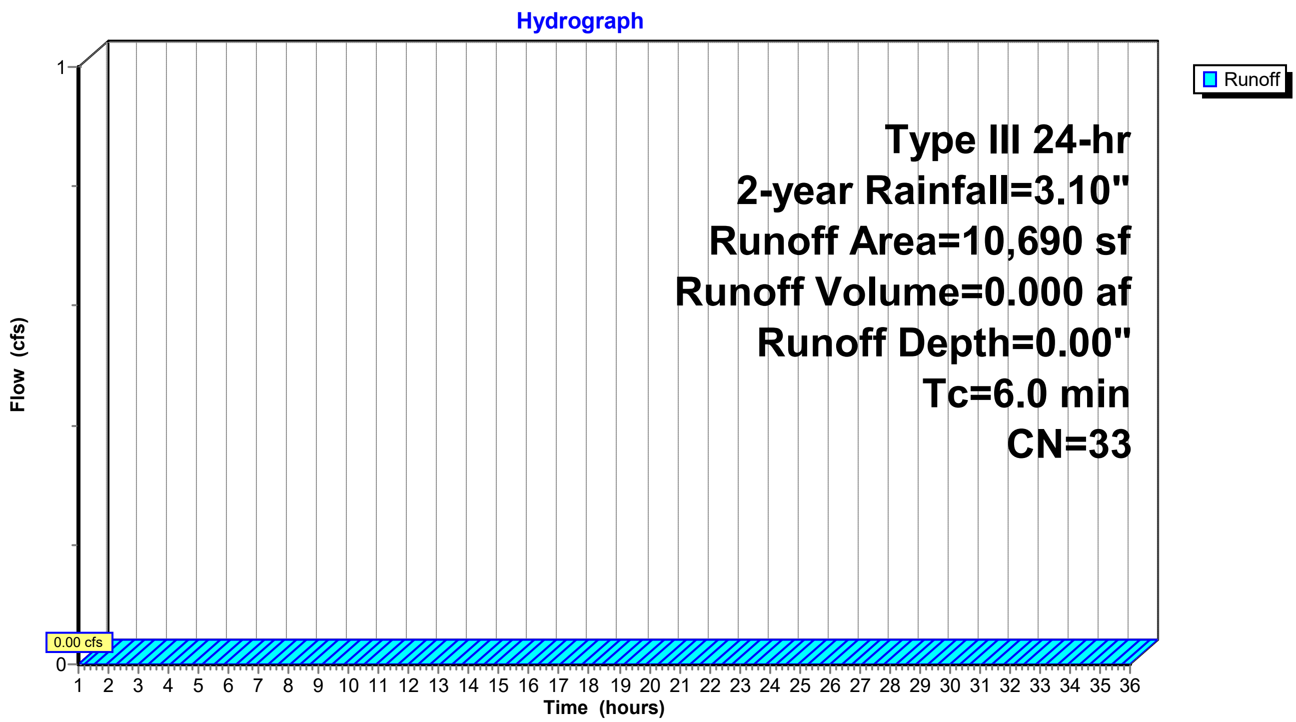
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	5,866	30	Grass
	397	98	Paved parking, HSG A
*	4,427	30	Woods
	10,690	33	Weighted Average
	10,293		96.29% Pervious Area
	397		3.71% Impervious Area

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

Subcatchment 20S: Sub 20



Summary for Subcatchment 21S: Sub 21

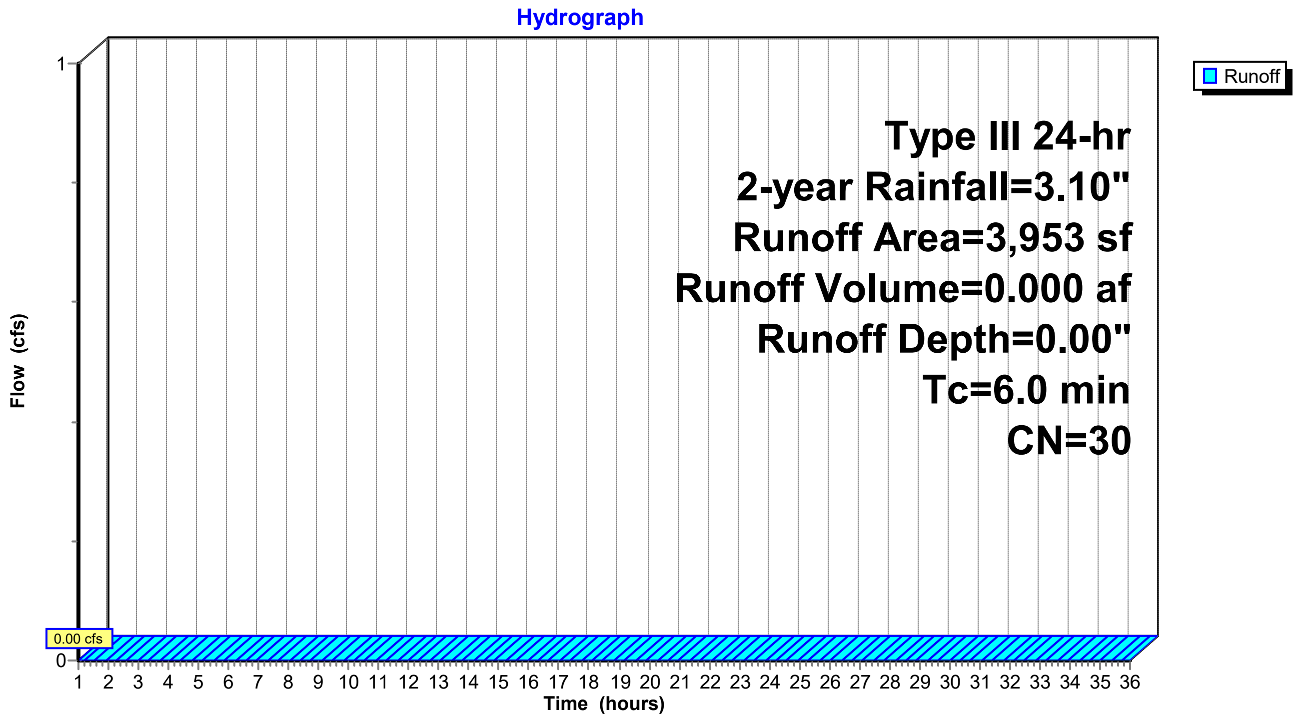
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	3,953	30	Grass
	3,953		100.00% Pervious Area

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

Subcatchment 21S: Sub 21



Summary for Pond 2P: Rain Garden

Inflow Area = 0.561 ac, 14.69% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 131.00' @ 24.34 hrs Surf.Area= 382 sf Storage= 1 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	5,119 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

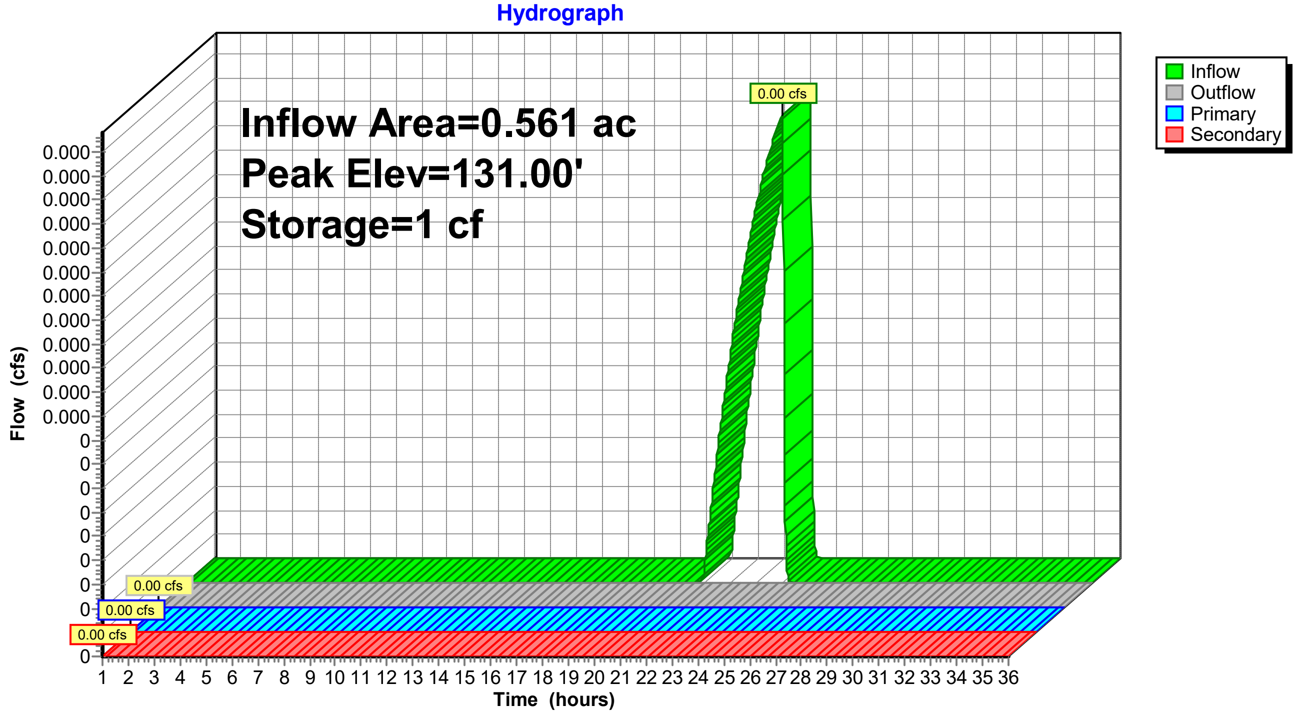
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
131.00	380	117.0	0	0	380
132.00	940	197.0	639	639	2,385
133.00	2,137	251.0	1,498	2,137	4,323
134.00	3,916	351.0	2,982	5,119	9,123

Device	Routing	Invert	Outlet Devices
#1	Secondary	132.95'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	131.70'	**12.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.70' / 130.87' S= 0.0098 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Rain Garden



Summary for Pond 3P: Rain Garden

Inflow Area = 0.496 ac, 92.74% Impervious, Inflow Depth = 2.35" for 2-year event
Inflow = 1.32 cfs @ 12.09 hrs, Volume= 0.097 af
Outflow = 1.31 cfs @ 12.10 hrs, Volume= 0.097 af, Atten= 1%, Lag= 0.8 min
Primary = 0.68 cfs @ 12.10 hrs, Volume= 0.090 af
Secondary = 0.63 cfs @ 12.10 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 133.77' @ 12.10 hrs Surf.Area= 574 sf Storage= 271 cf

Plug-Flow detention time= 11.6 min calculated for 0.097 af (100% of inflow)
Center-of-Mass det. time= 11.4 min (805.2 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	133.00'	1,491 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

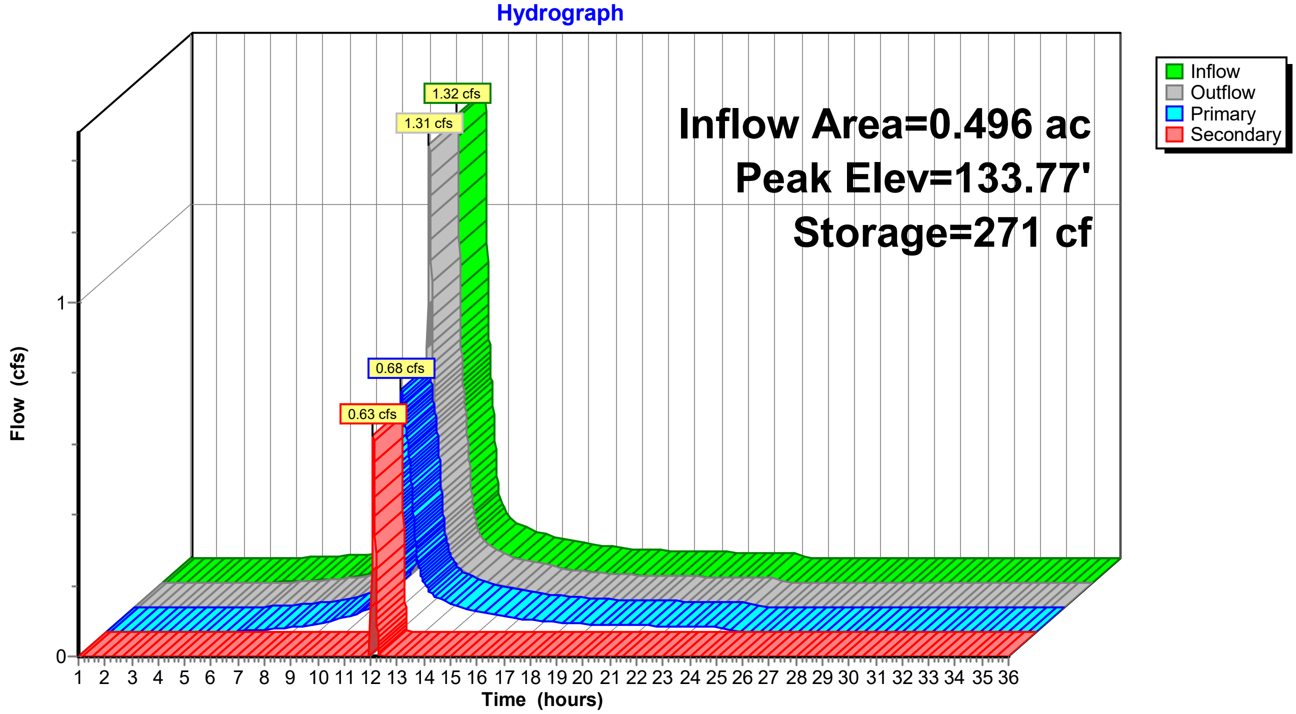
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.00	167	151.5	0	0	167
134.00	739	233.4	419	419	2,683
135.00	1,444	246.6	1,072	1,491	3,241

Device	Routing	Invert	Outlet Devices
#1	Secondary	133.69'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	133.00'	**18.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.00' / 129.45' S= 0.0403 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=0.68 cfs @ 12.10 hrs HW=133.77' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 0.68 cfs @ 1.08 fps)

Secondary OutFlow Max=0.62 cfs @ 12.10 hrs HW=133.77' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.62 cfs @ 0.95 fps)

Pond 3P: Rain Garden



Summary for Pond 4P: Infiltration Chambers

Inflow Area = 4.934 ac, 89.04% Impervious, Inflow Depth = 2.25" for 2-year event
Inflow = 11.89 cfs @ 12.09 hrs, Volume= 0.925 af
Outflow = 7.30 cfs @ 12.19 hrs, Volume= 0.832 af, Atten= 39%, Lag= 6.1 min
Discarded = 0.41 cfs @ 12.19 hrs, Volume= 0.071 af
Primary = 6.89 cfs @ 12.19 hrs, Volume= 0.762 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 129.79' @ 12.19 hrs Surf.Area= 7,446 sf Storage= 11,822 cf

Plug-Flow detention time= 130.8 min calculated for 0.832 af (90% of inflow)
Center-of-Mass det. time= 80.9 min (858.0 - 777.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	10,337 cf	**65.75'W x 113.25'L x 5.50'H Field A** 40,954 cf Overall - 15,112 cf Embedded = 25,842 cf x 40.0% Voids
#2A	128.25'	15,112 cf	**ADS_StormTech MC-3500 d +Cap** x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 9 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf
		25,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**24.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.65' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 4	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	128.65'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.41 cfs @ 12.19 hrs HW=129.79' (Free Discharge)
└─**4=Exfiltration** (Passes 0.41 cfs of 0.42 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.75 fps)

Primary OutFlow Max=6.89 cfs @ 12.19 hrs HW=129.79' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 6.89 cfs @ 4.57 fps)

Pond 4P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

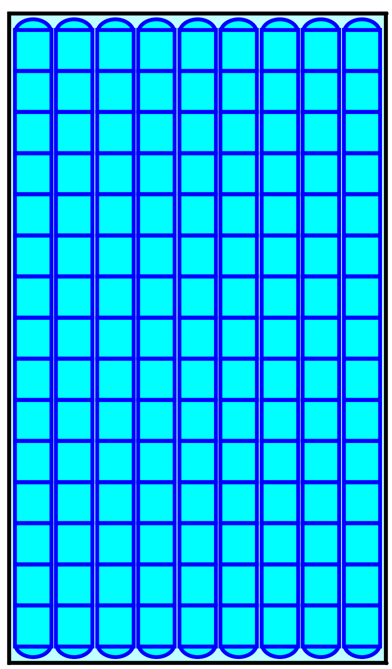
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

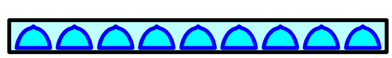
135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 15,111.7 cf Chamber Storage

40,954.0 cf Field - 15,111.7 cf Chambers = 25,842.3 cf Stone x 40.0% Voids = 10,336.9 cf Stone Storage

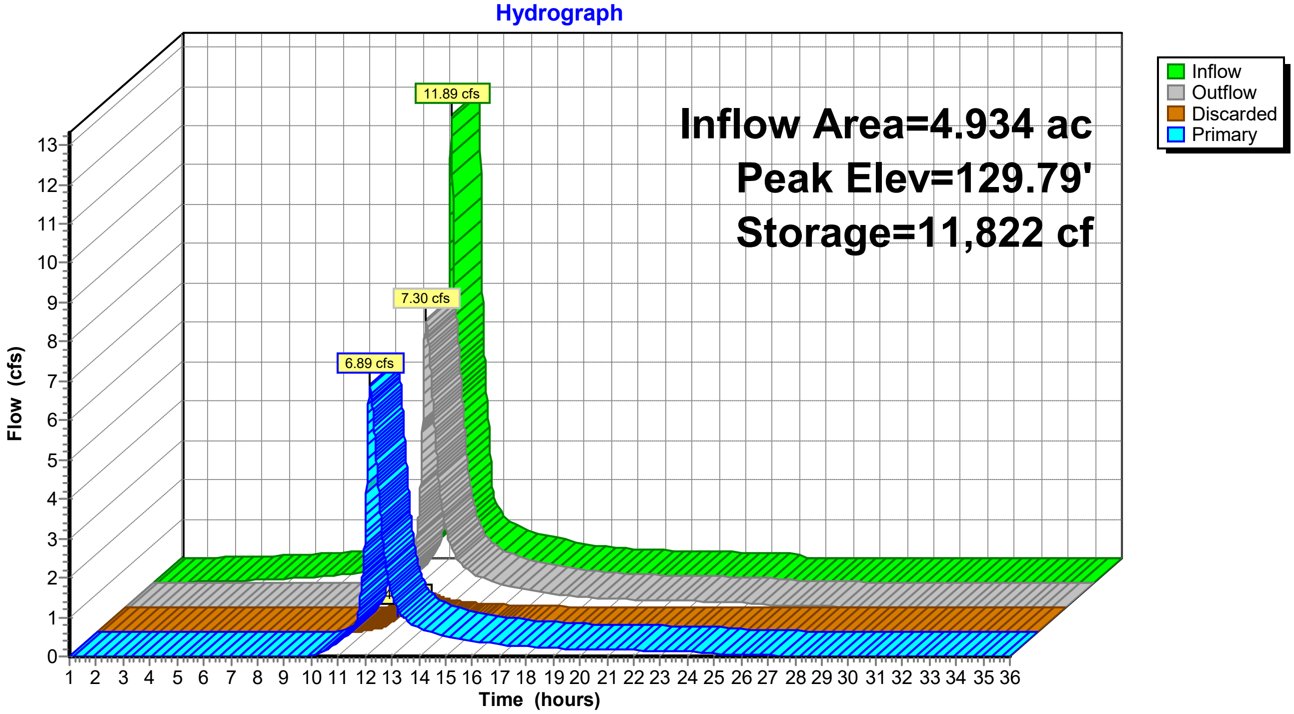
Chamber Storage + Stone Storage = 25,448.6 cf = 0.584 af
Overall Storage Efficiency = 62.1%
Overall System Size = 113.25' x 65.75' x 5.50'

135 Chambers
1,516.8 cy Field
957.1 cy Stone





Pond 4P: Infiltration Chambers

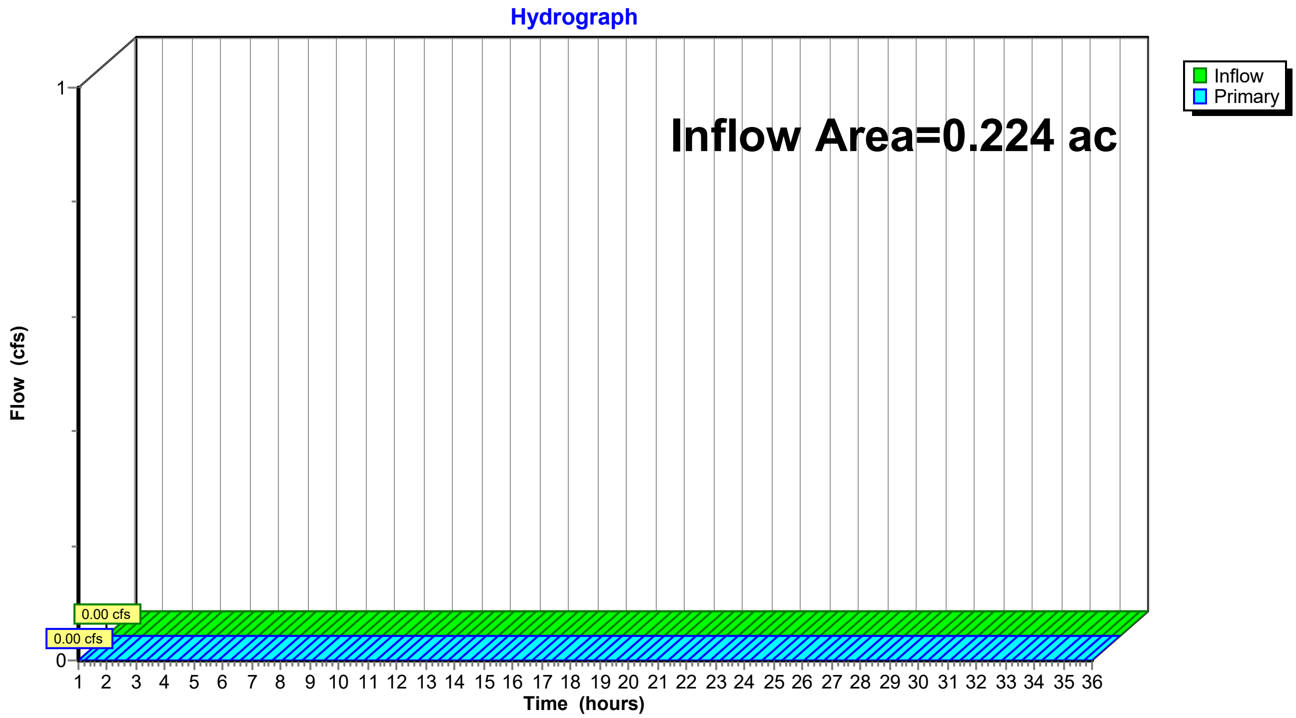


Summary for Link 1L: Leacing CB

Inflow Area =	0.224 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 2-year event	
Inflow =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	
Primary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

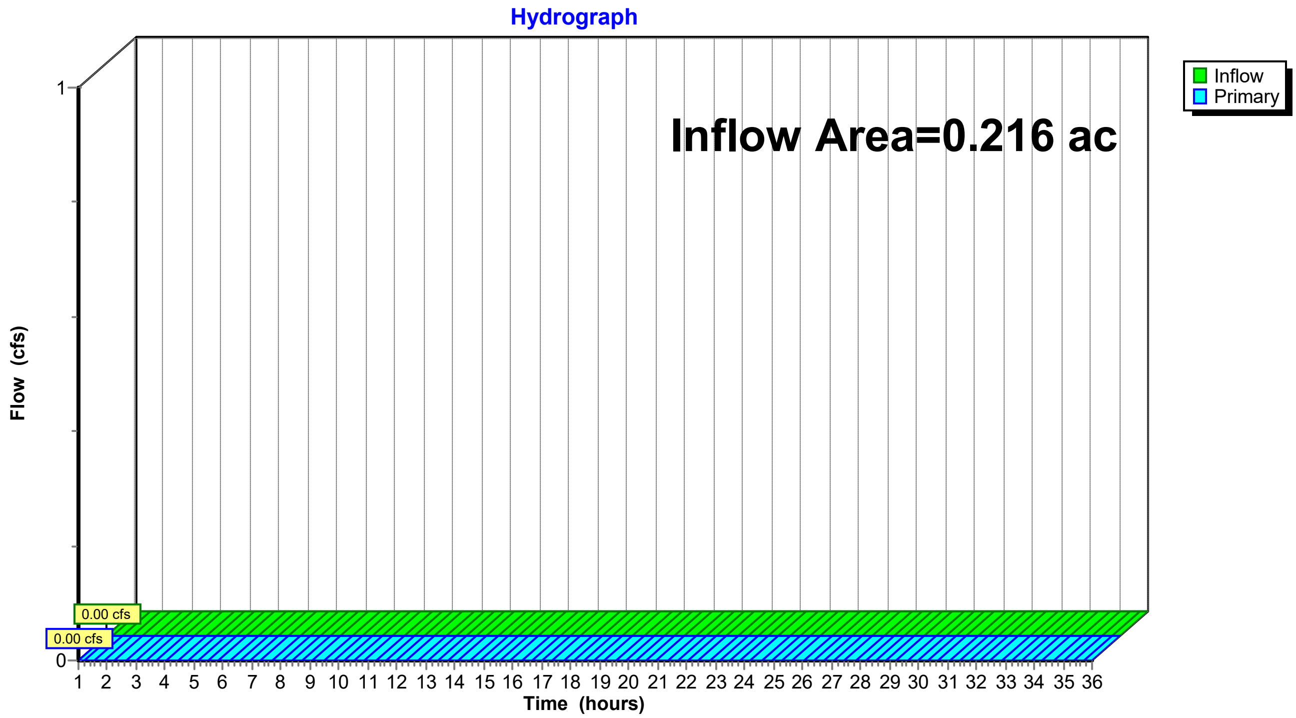


Summary for Link 2L: Isolated Wetlands

Inflow Area =	0.216 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 2-year event
Inflow =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af
Primary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

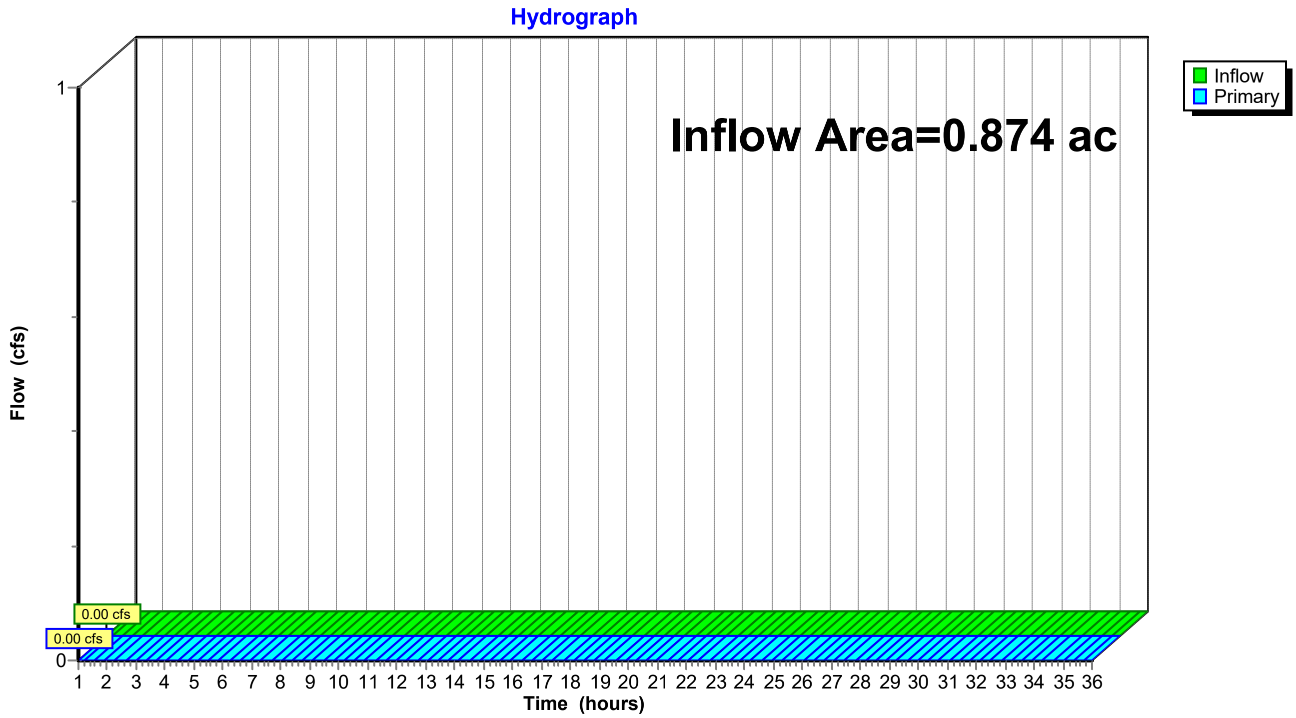


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 0.874 ac, 9.43% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

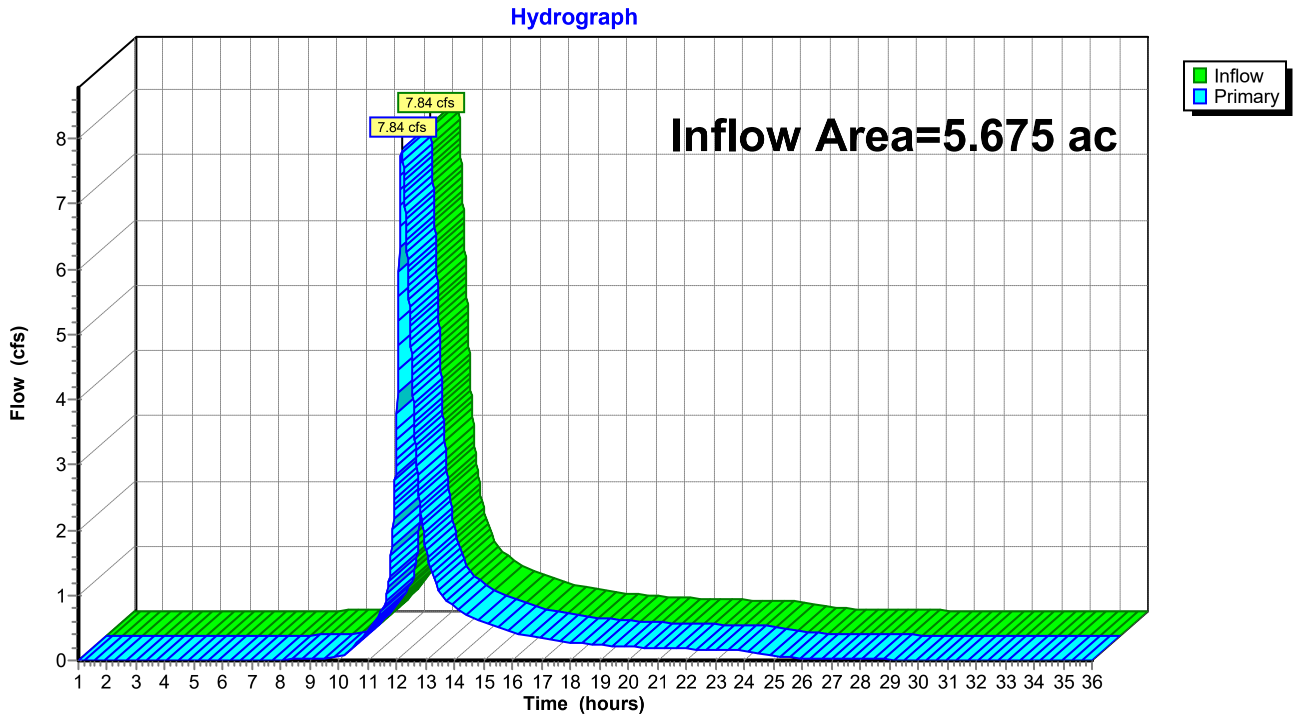


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.675 ac, 85.67% Impervious, Inflow Depth > 1.82" for 2-year event
Inflow = 7.84 cfs @ 12.16 hrs, Volume= 0.859 af
Primary = 7.84 cfs @ 12.16 hrs, Volume= 0.859 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>4.46"
Tc=6.0 min CN=98 Runoff=7.51 cfs 0.608 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=80 Runoff=1.75 cfs 0.125 af

Subcatchment 4S: Sub 4 Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=72 Runoff=0.73 cfs 0.053 af

Subcatchment 5S: Sub 5 Runoff Area=12,232 sf 62.66% Impervious Runoff Depth=2.05"
Tc=6.0 min CN=73 Runoff=0.67 cfs 0.048 af

Subcatchment 6S: Sub 6 Runoff Area=13,636 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 7S: Sub 7 Runoff Area=2,471 sf 100.00% Impervious Runoff Depth>4.46"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Subcatchment 8S: Sub 8 Runoff Area=24,444 sf 14.69% Impervious Runoff Depth=0.17"
Tc=6.0 min CN=40 Runoff=0.02 cfs 0.008 af

Subcatchment 9S: Sub 9 Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=95 Runoff=1.12 cfs 0.086 af

Subcatchment 10S: Sub 10 Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=77 Runoff=1.18 cfs 0.084 af

Subcatchment 11S: Sub 11 Runoff Area=6,808 sf 98.43% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=97 Runoff=0.71 cfs 0.057 af

Subcatchment 12S: Sub 12 Runoff Area=5,470 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 13S: Sub 13 Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=3.59"
Tc=6.0 min CN=90 Runoff=0.31 cfs 0.023 af

Subcatchment 14S: Sub 14 Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=95 Runoff=0.40 cfs 0.031 af

Subcatchment 15S: Sub 15 Runoff Area=13,783 sf 99.17% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=97 Runoff=1.44 cfs 0.115 af

Subcatchment 16S: Sub 16 Runoff Area=11,011 sf 100.00% Impervious Runoff Depth>4.46"
Tc=6.0 min CN=98 Runoff=1.16 cfs 0.094 af

Subcatchment 17S: Sub 17 Runoff Area=11,222 sf 100.00% Impervious Runoff Depth>4.46"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.096 af

Subcatchment 18S: Sub 18 Runoff Area=21,593 sf 92.74% Impervious Runoff Depth=3.90"
Tc=6.0 min CN=93 Runoff=2.14 cfs 0.161 af

Subcatchment 19S: Sub 19 Runoff Area=10,851 sf 98.57% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=97 Runoff=1.14 cfs 0.090 af

Subcatchment 20S: Sub 20 Runoff Area=10,690 sf 3.71% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment 21S: Sub 21 Runoff Area=3,953 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 2P: Rain Garden Peak Elev=131.65' Storage=353 cf Inflow=0.02 cfs 0.008 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 3P: Rain Garden Peak Elev=133.83' Storage=304 cf Inflow=2.14 cfs 0.161 af
Primary=0.78 cfs 0.136 af Secondary=1.35 cfs 0.025 af Outflow=2.12 cfs 0.161 af

Pond 4P: Infiltration Chambers Peak Elev=130.38' Storage=15,232 cf Inflow=19.55 cfs 1.529 af
Discarded=0.42 cfs 0.119 af Primary=12.37 cfs 1.317 af Outflow=12.79 cfs 1.436 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2L: Isolated Wetlands Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 3L: Spofford Pond Wetlands Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Vernal Pool Wetlands Inflow=13.97 cfs 1.479 af
Primary=13.97 cfs 1.479 af

Total Runoff Area = 6.990 ac Runoff Volume = 1.699 af Average Runoff Depth = 2.92"
29.27% Pervious = 2.046 ac 70.73% Impervious = 4.944 ac

Summary for Subcatchment 1S: Roof

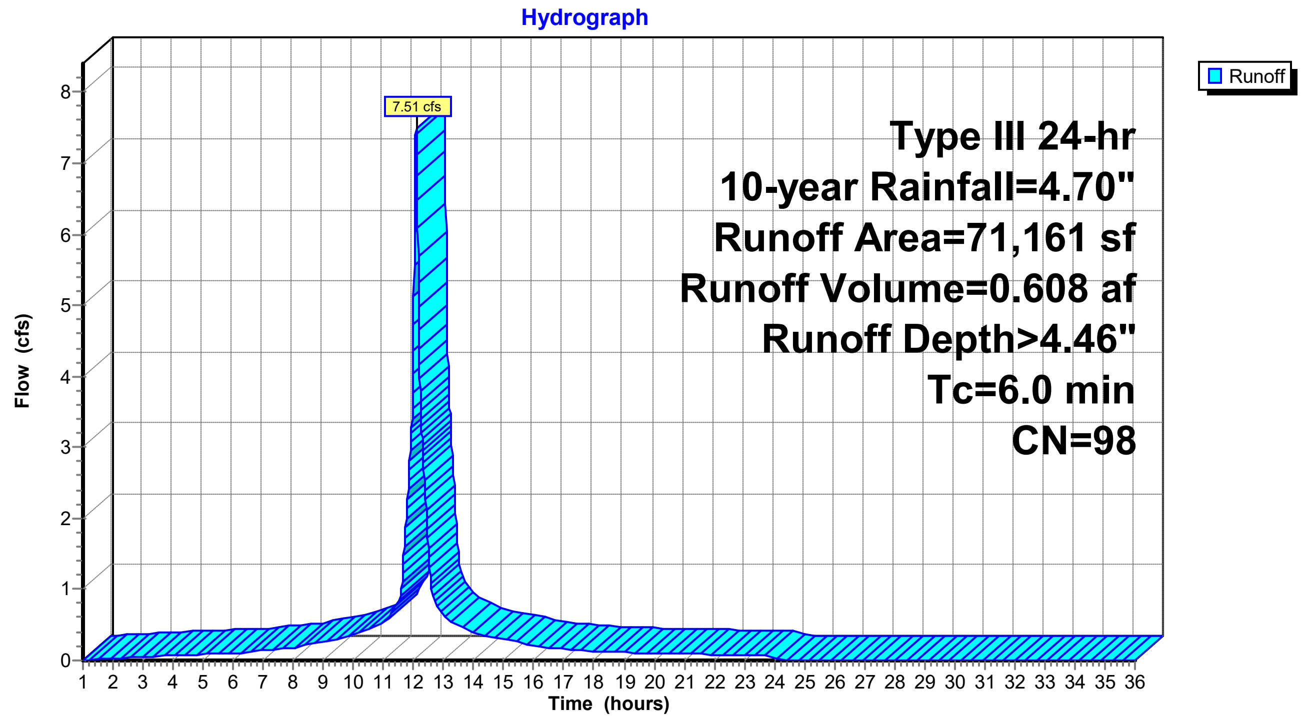
Runoff = 7.51 cfs @ 12.08 hrs, Volume= 0.608 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

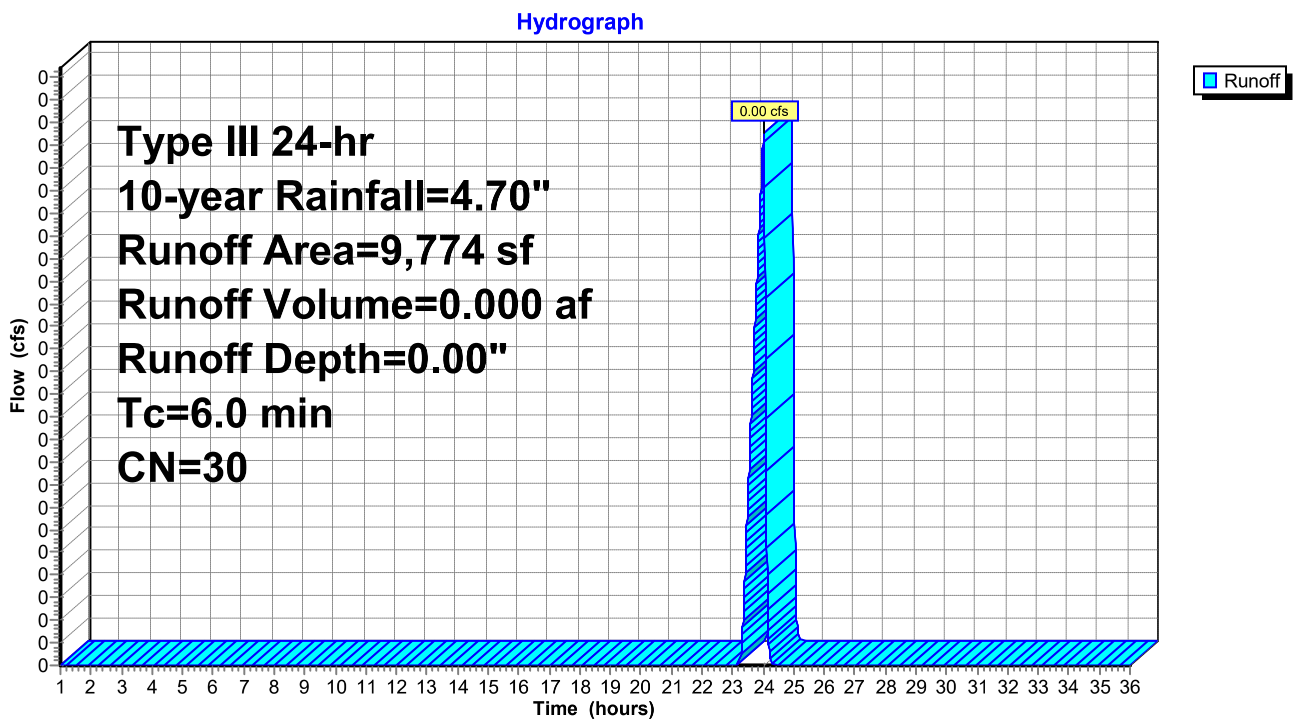
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

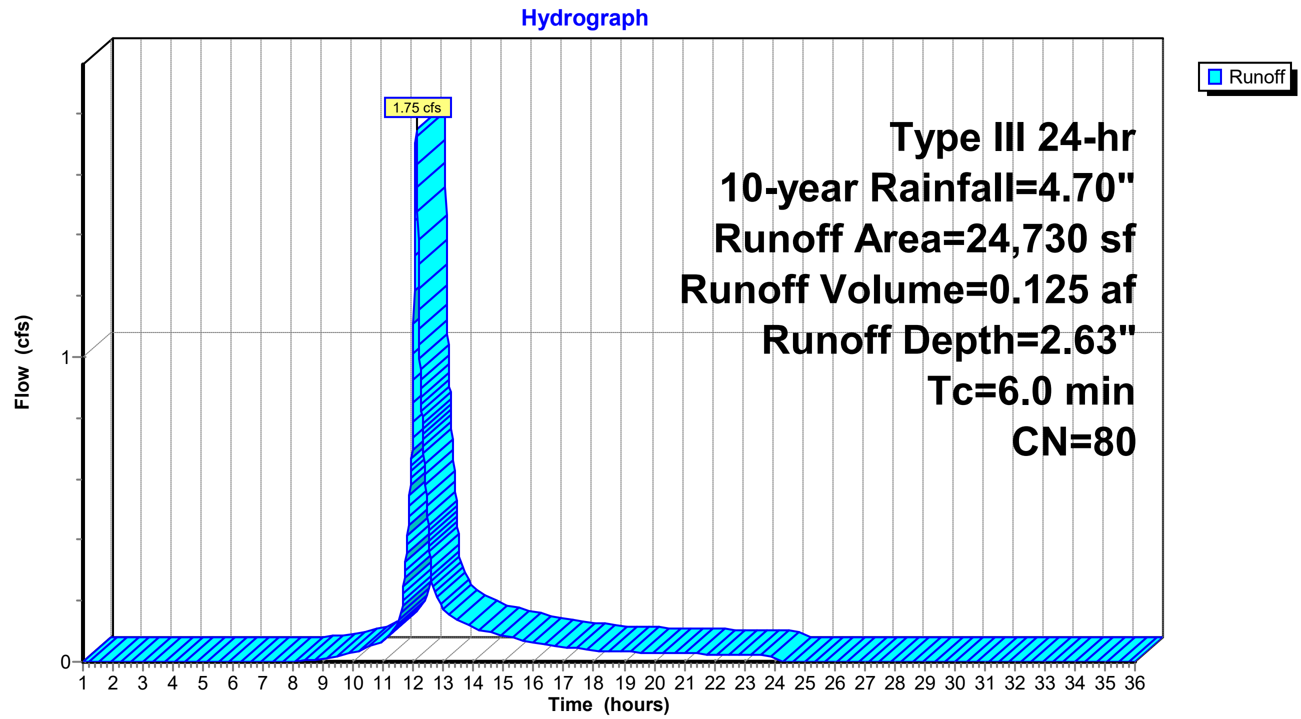
Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.125 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

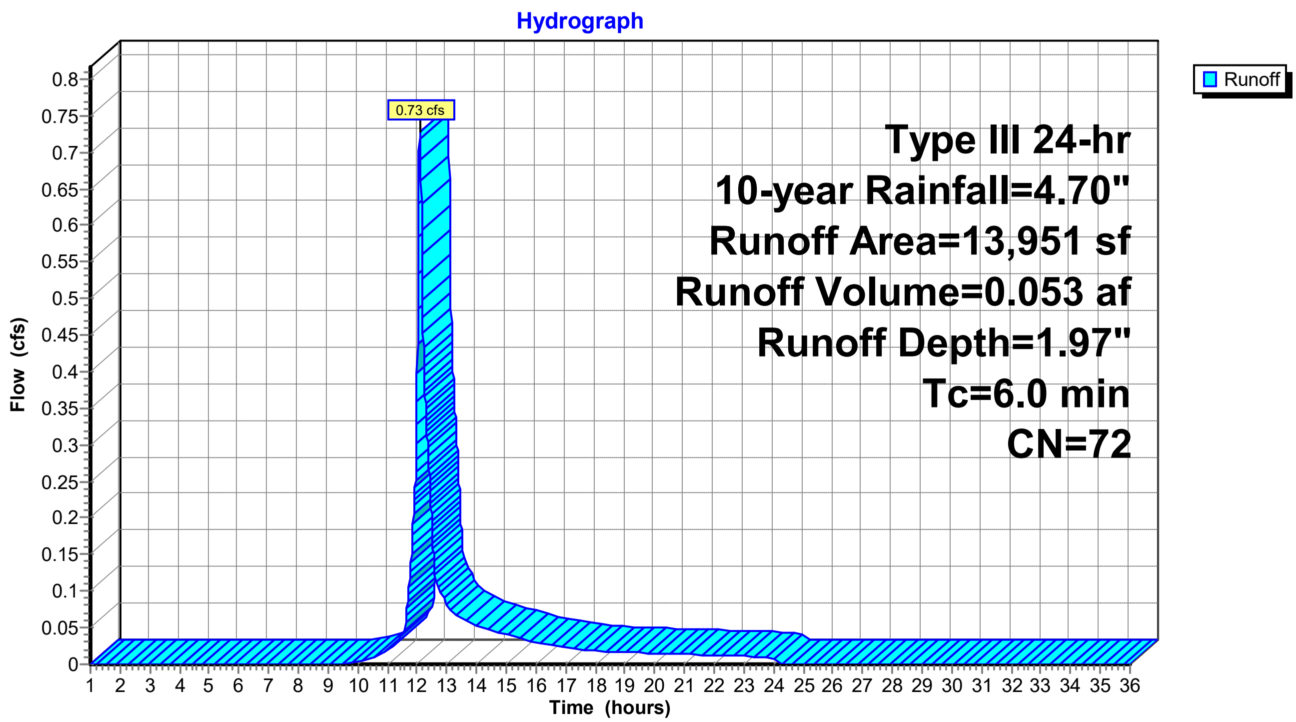
Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951	72	Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

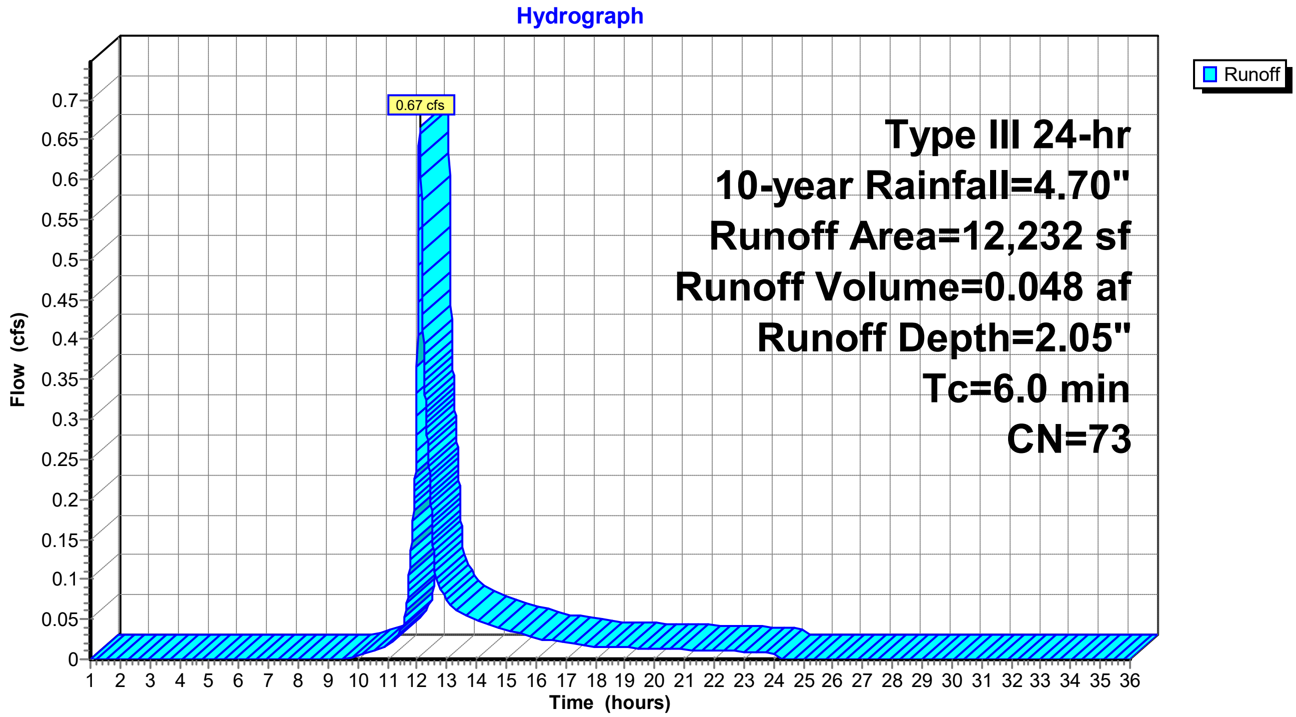
Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	7,665	98	Paved parking, HSG A
	201	30	Woods, Good, HSG A
*	4,366	30	Grass
	12,232	73	Weighted Average
	4,567		37.34% Pervious Area
	7,665		62.66% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

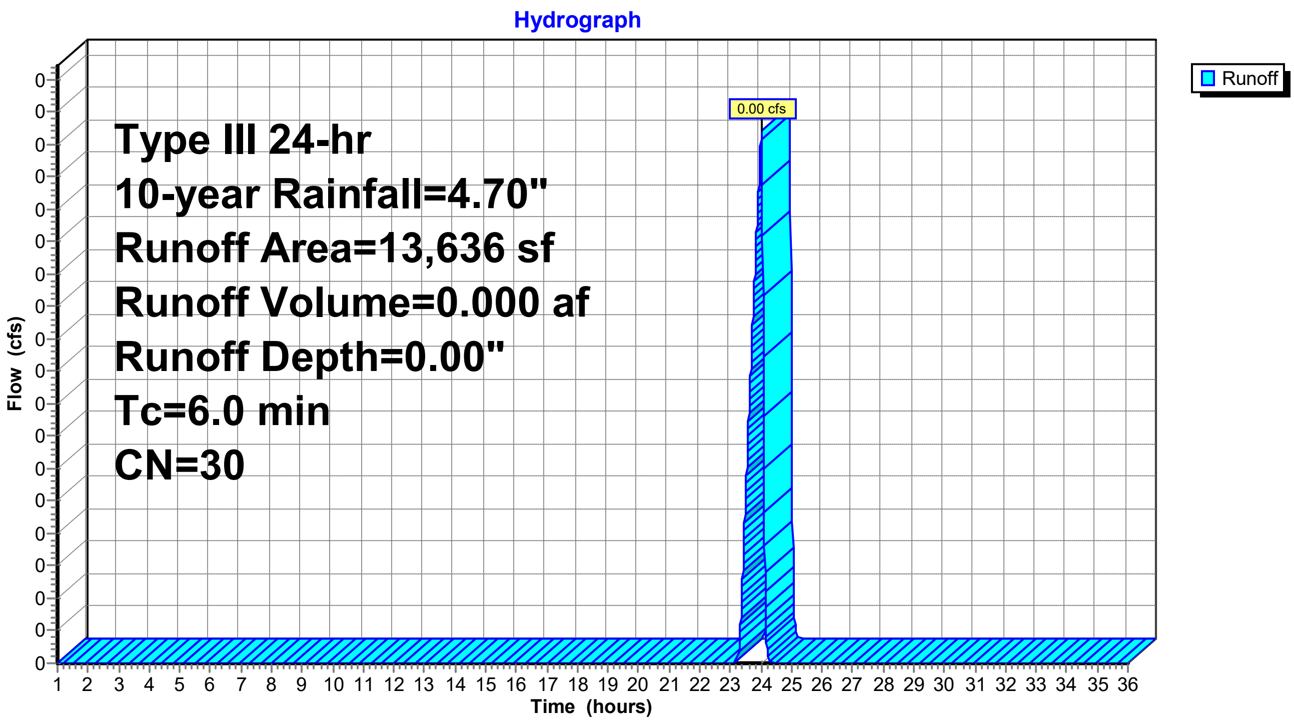
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	5,897	30	Grass
*	7,739	30	Woods
	13,636	30	Weighted Average
	13,636		100.00% Pervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

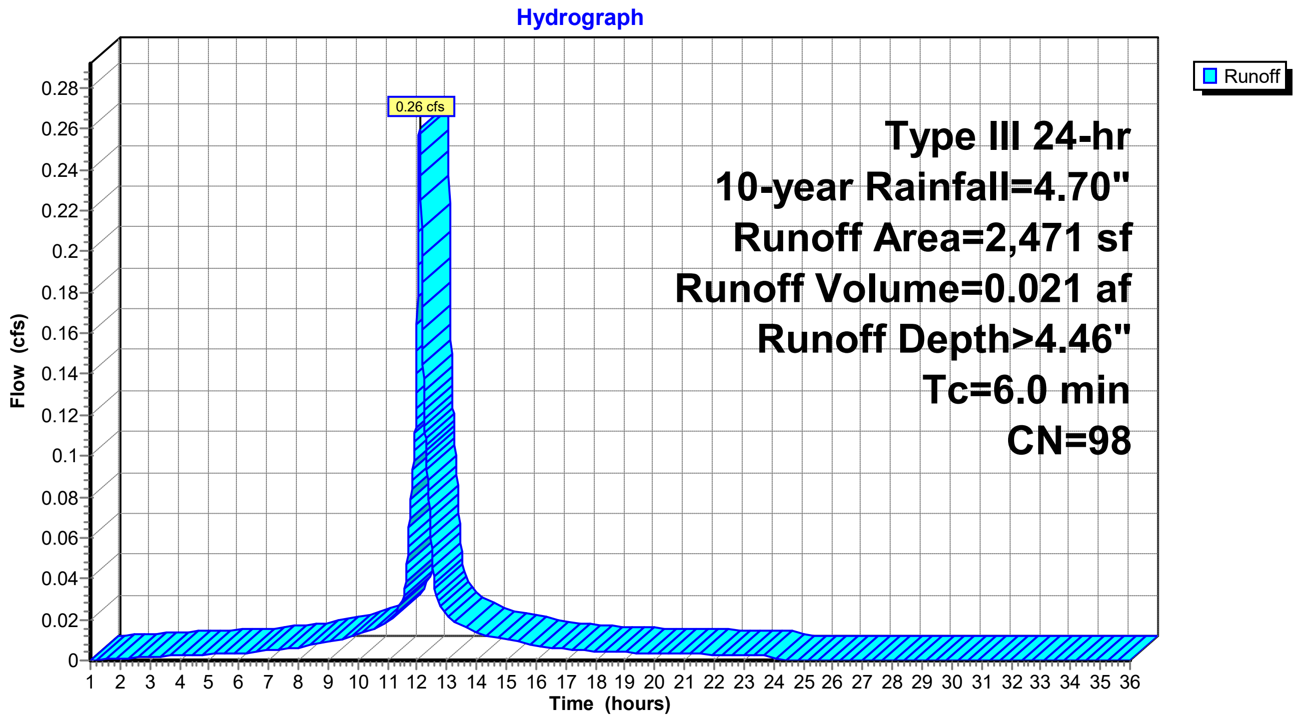
Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

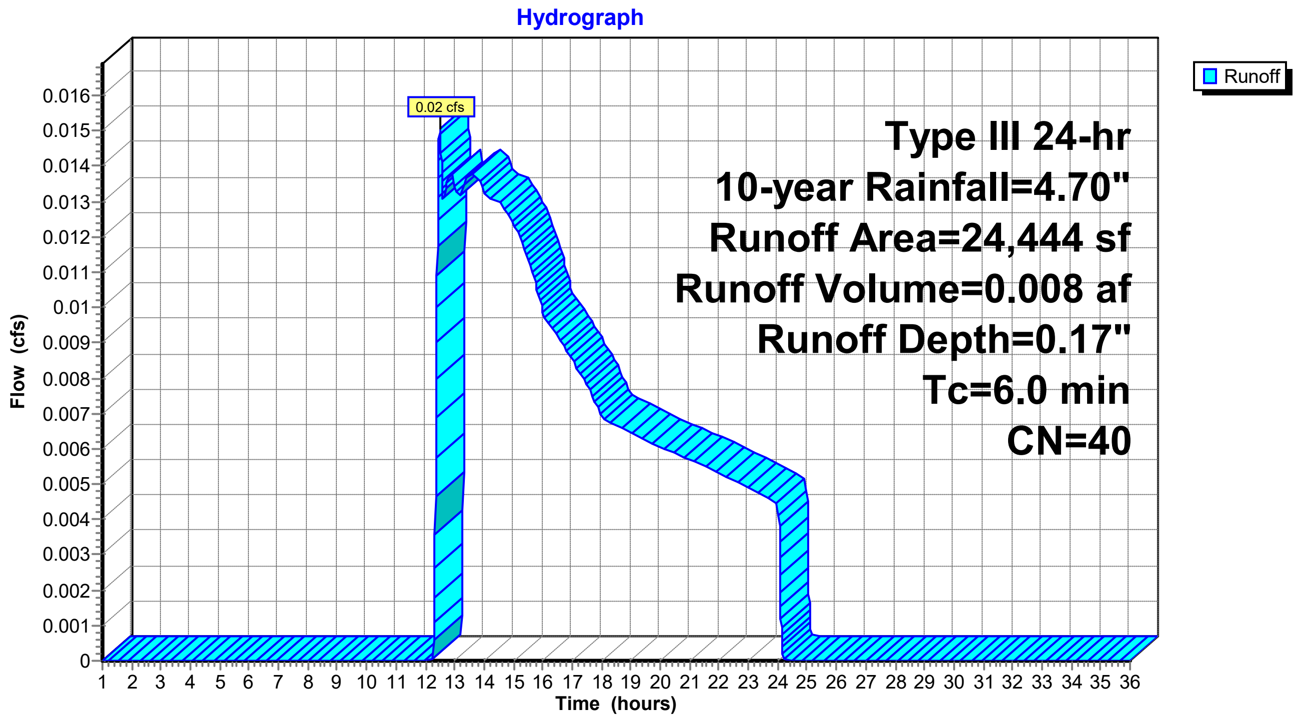
Runoff = 0.02 cfs @ 12.50 hrs, Volume= 0.008 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	3,592	98	Paved parking, HSG A
*	20,852	30	Grass
	24,444	40	Weighted Average
	20,852		85.31% Pervious Area
	3,592		14.69% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

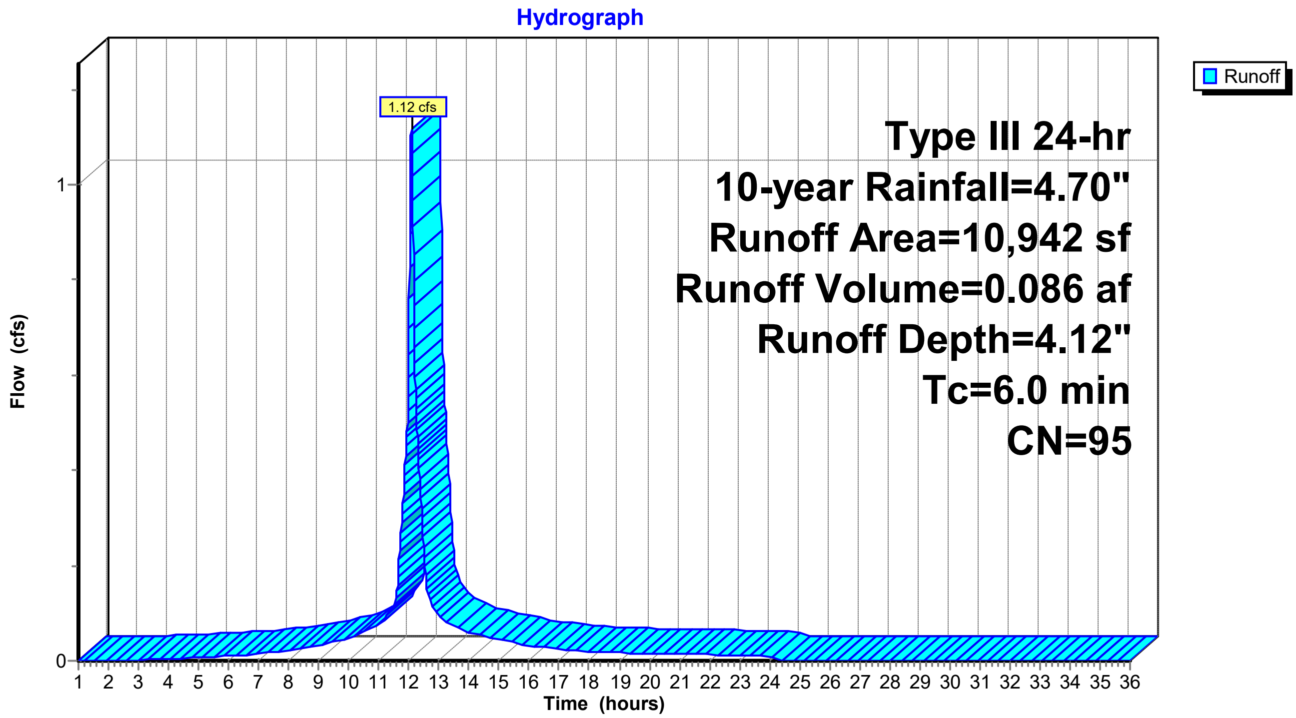
Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.086 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942	95	Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

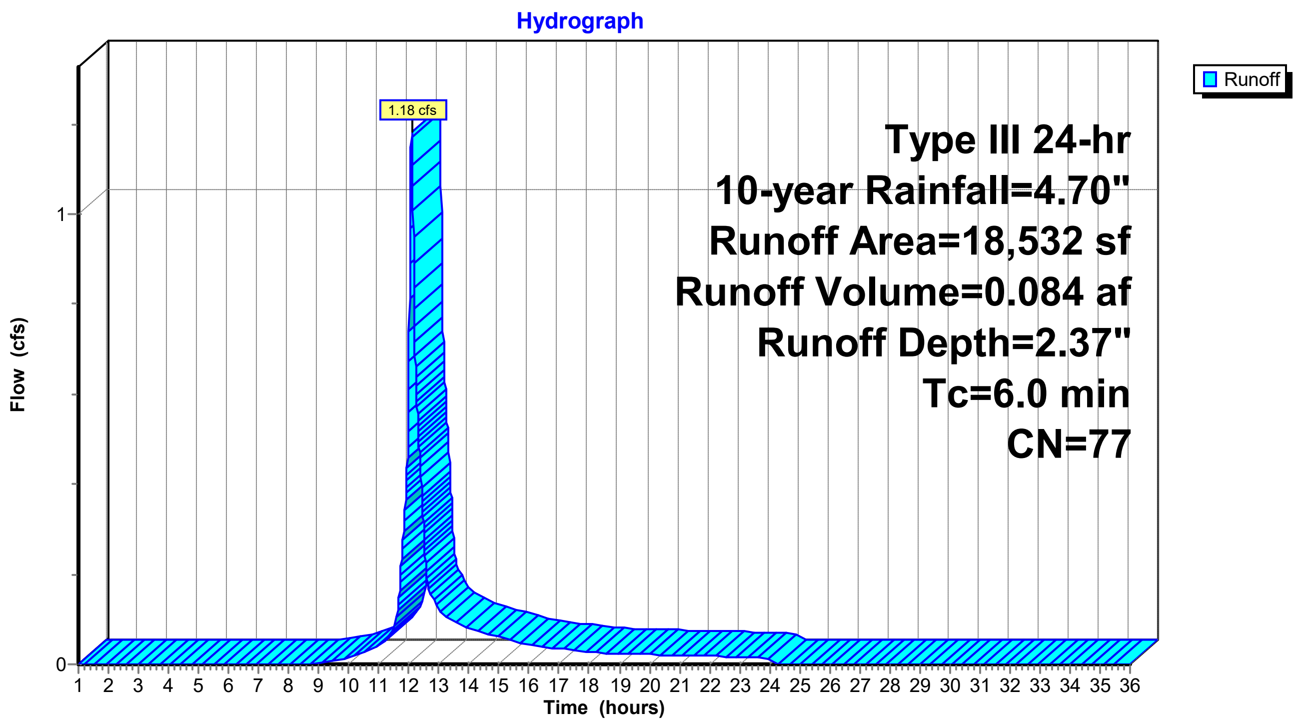
Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532	77	Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

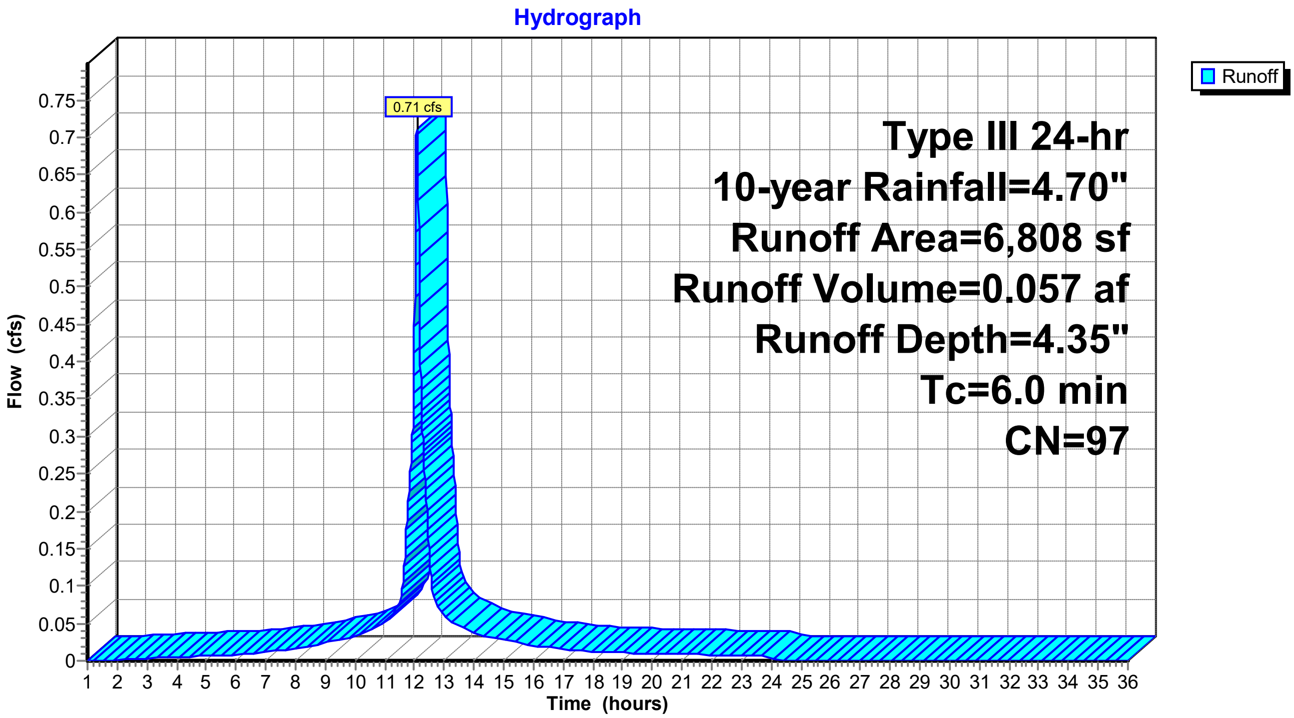
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808	97	Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 11S: Sub 11



Summary for Subcatchment 12S: Sub 12

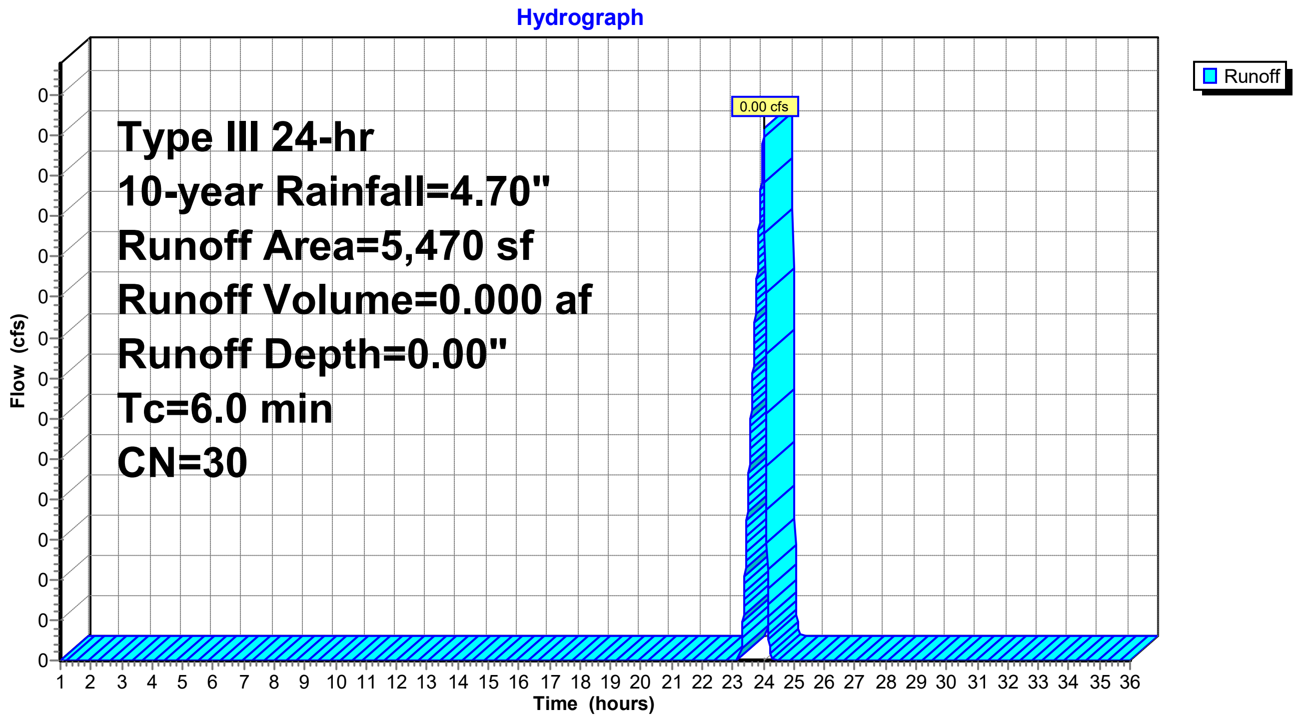
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	5,470	30	Grass
	5,470		100.00% Pervious Area

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

Subcatchment 12S: Sub 12



Summary for Subcatchment 13S: Sub 13

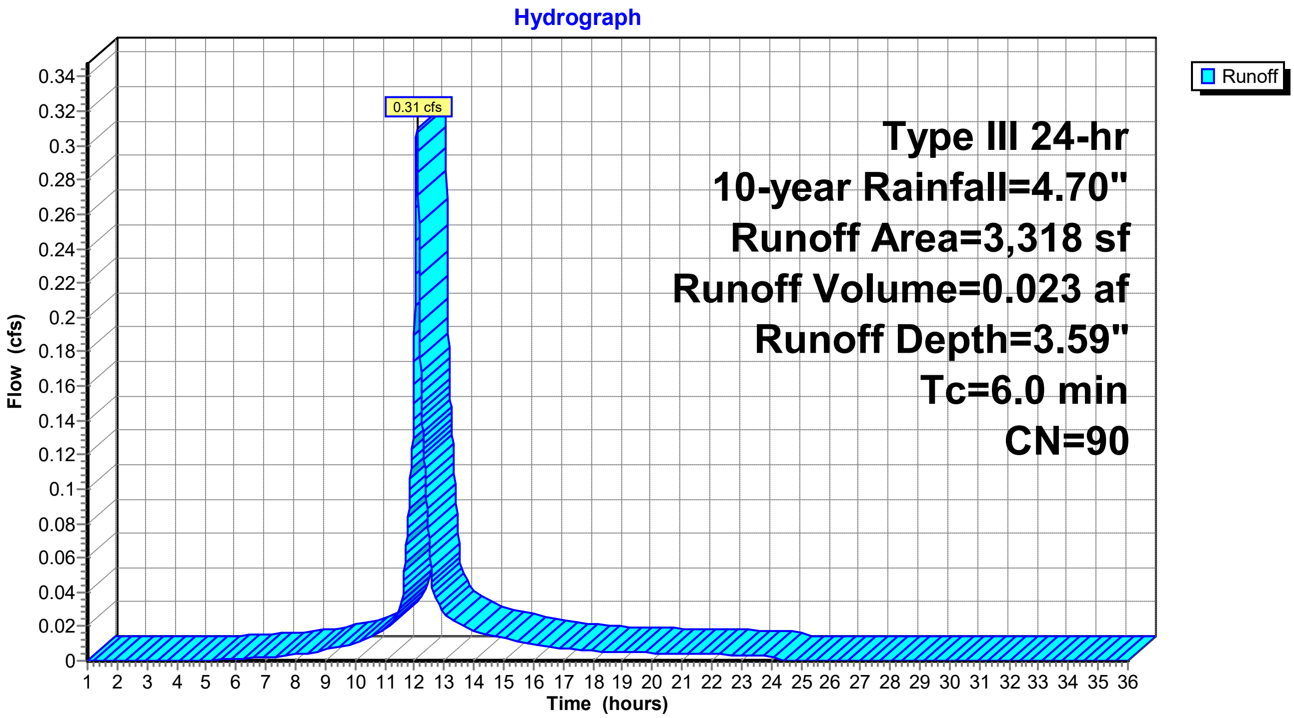
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318	90	Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 13S: Sub 13



Summary for Subcatchment 14S: Sub 14

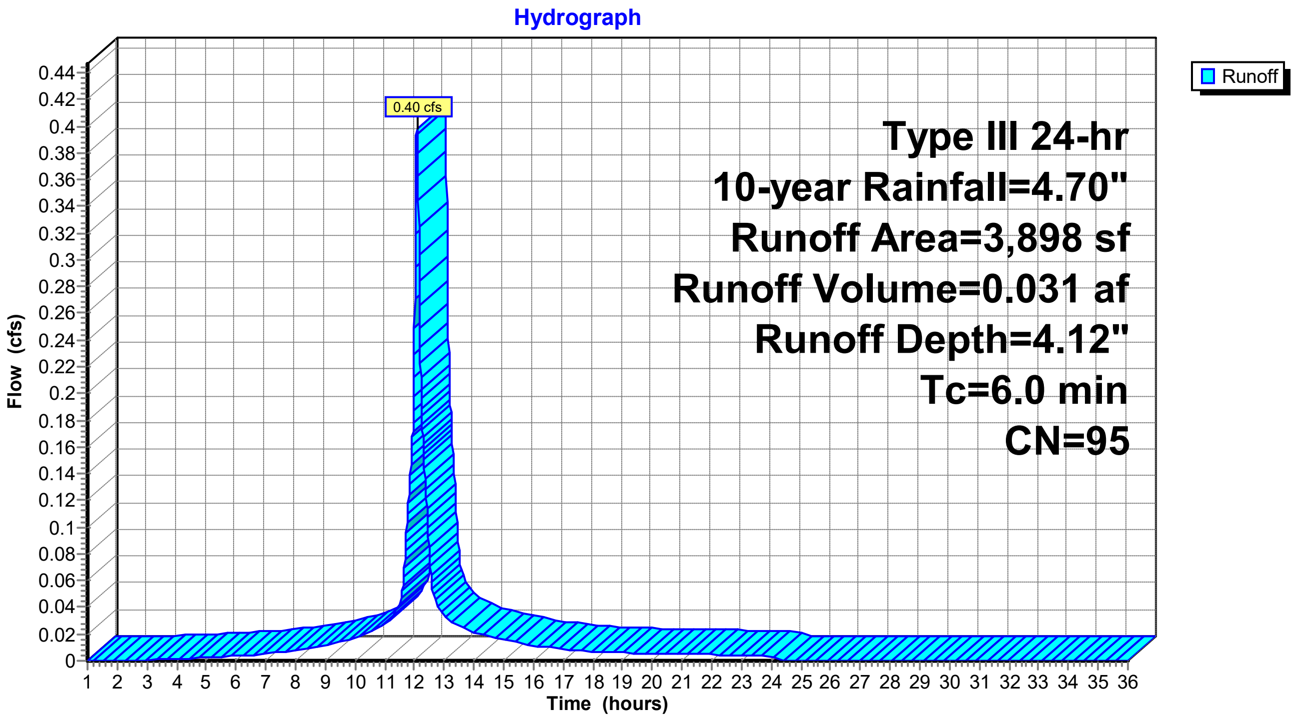
Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.031 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898	95	Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 14S: Sub 14



Summary for Subcatchment 15S: Sub 15

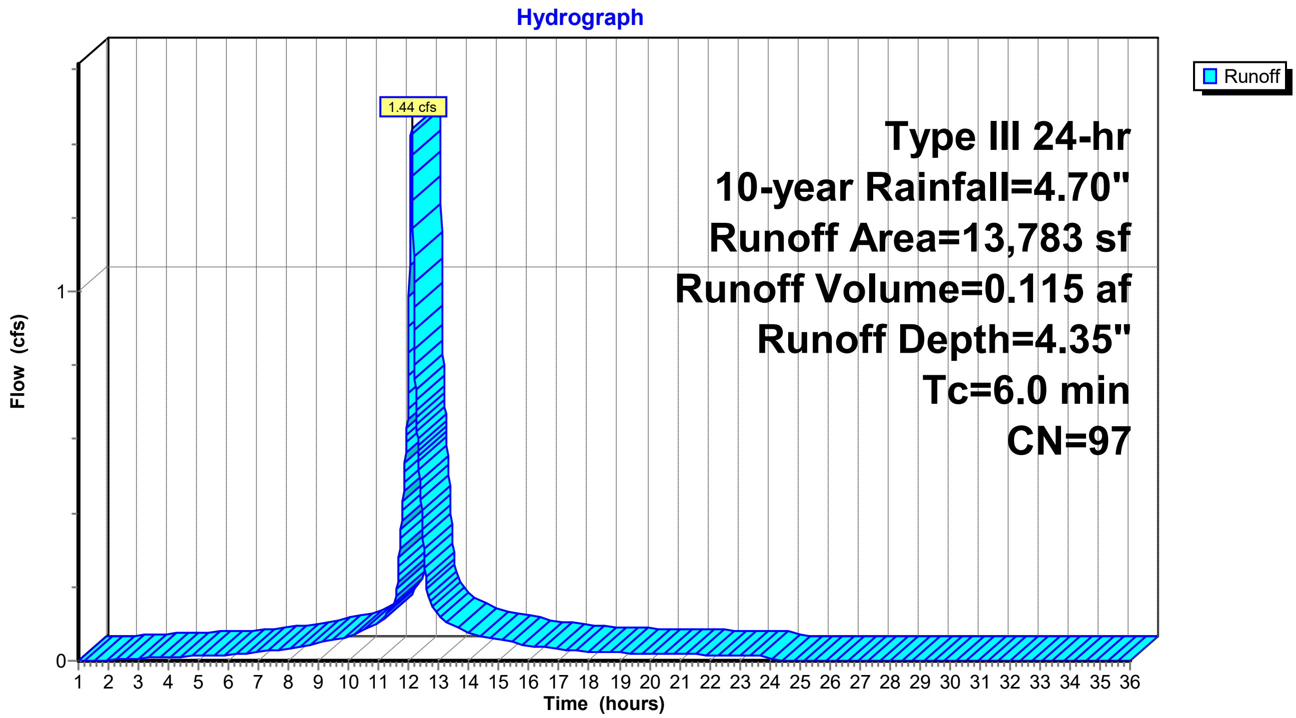
Runoff = 1.44 cfs @ 12.08 hrs, Volume= 0.115 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783	97	Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 15S: Sub 15



Summary for Subcatchment 16S: Sub 16

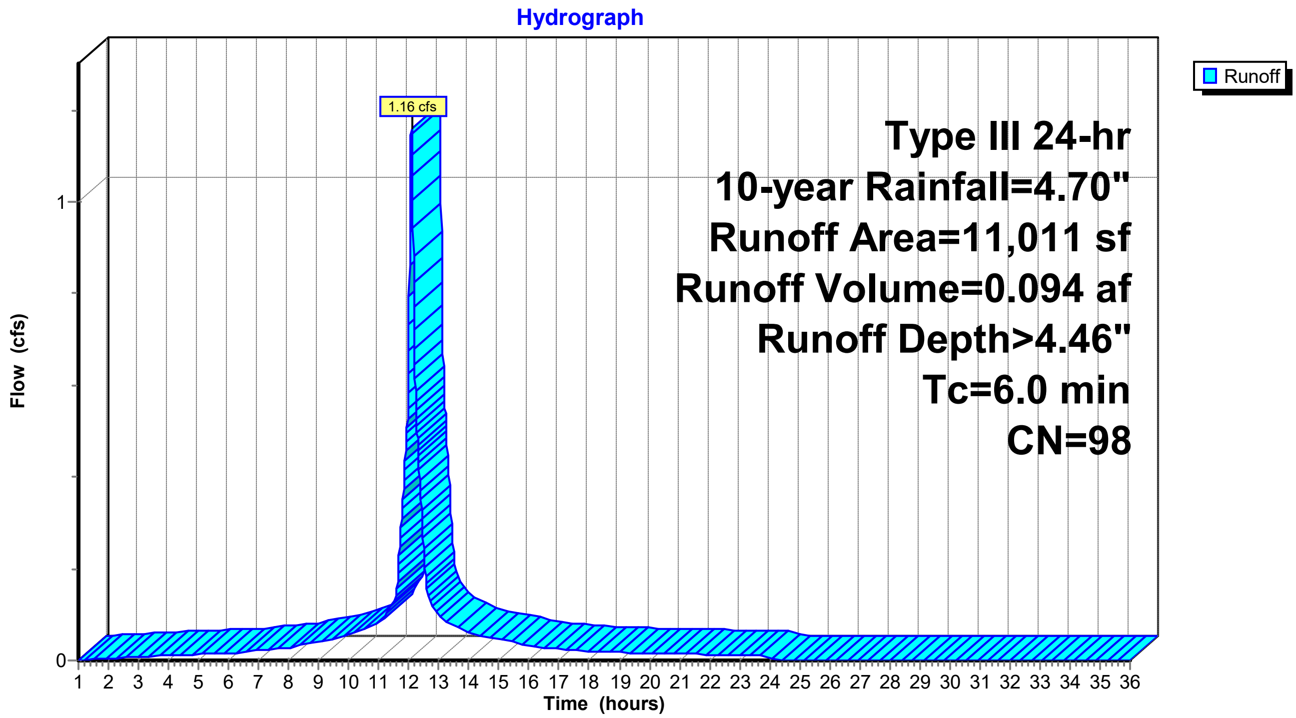
Runoff = 1.16 cfs @ 12.08 hrs, Volume= 0.094 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 16S: Sub 16



Summary for Subcatchment 17S: Sub 17

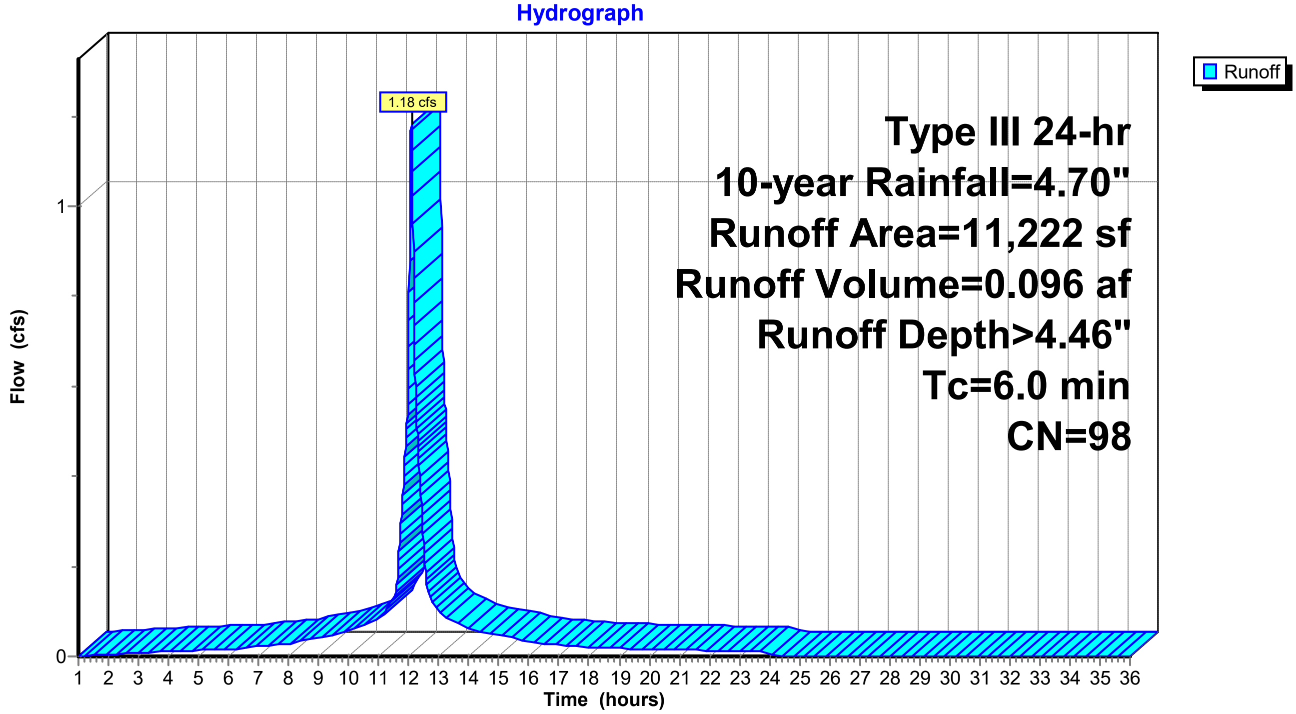
Runoff = 1.18 cfs @ 12.08 hrs, Volume= 0.096 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 17S: Sub 17



Summary for Subcatchment 18S: Sub 18

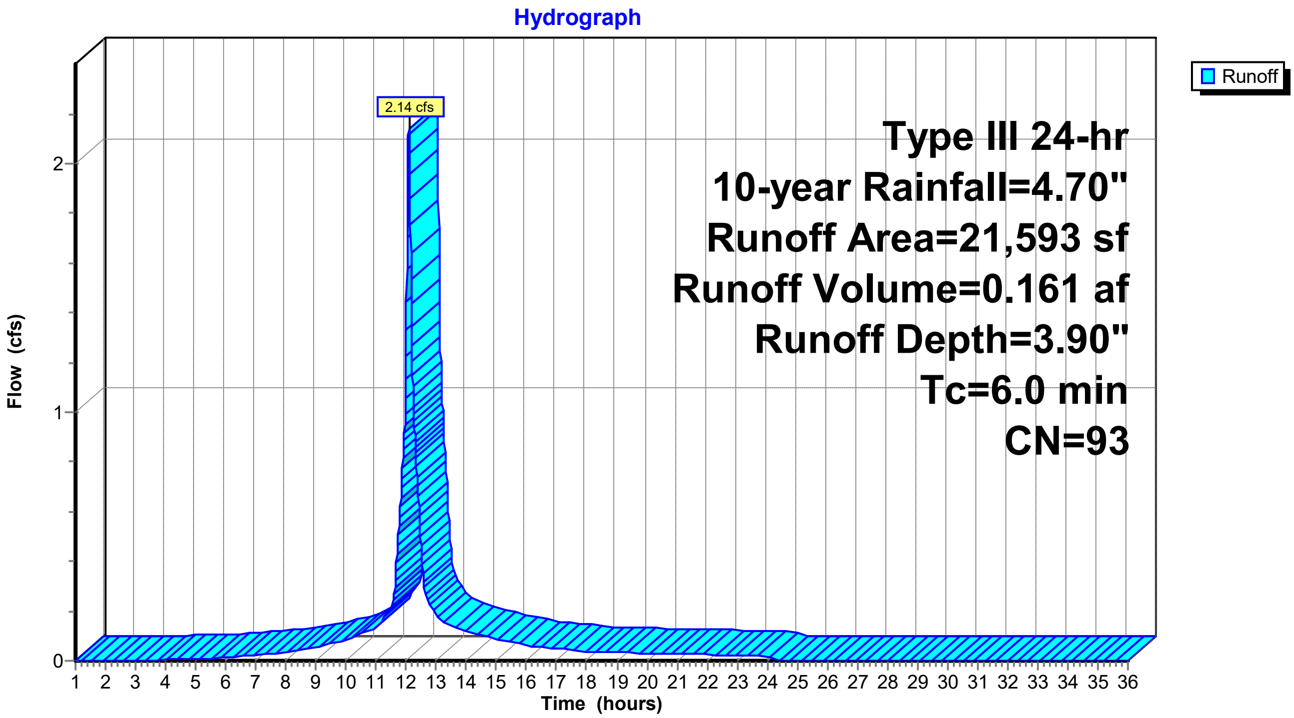
Runoff = 2.14 cfs @ 12.08 hrs, Volume= 0.161 af, Depth= 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	1,568	30	Grass
	20,025	98	Paved parking, HSG A
	21,593	93	Weighted Average
	1,568		7.26% Pervious Area
	20,025		92.74% Impervious Area

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

Subcatchment 18S: Sub 18



Summary for Subcatchment 19S: Sub 19

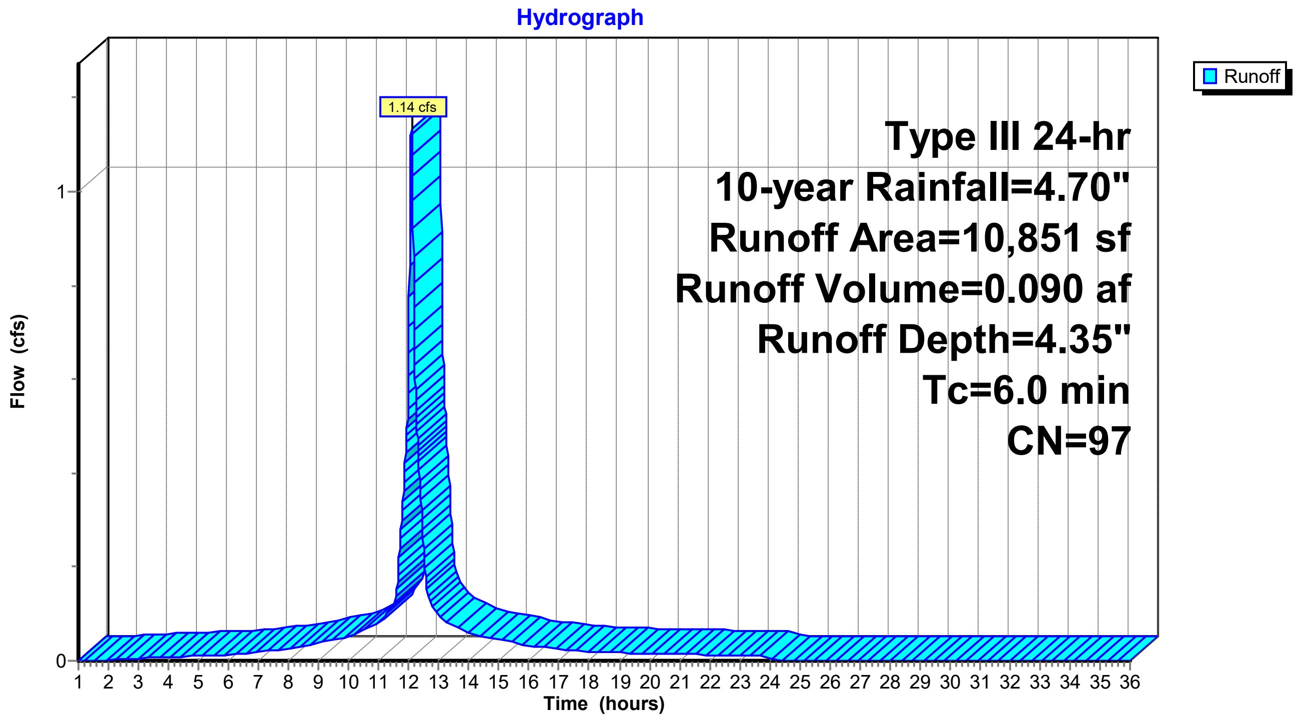
Runoff = 1.14 cfs @ 12.08 hrs, Volume= 0.090 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851	97	Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 19S: Sub 19



Summary for Subcatchment 20S: Sub 20

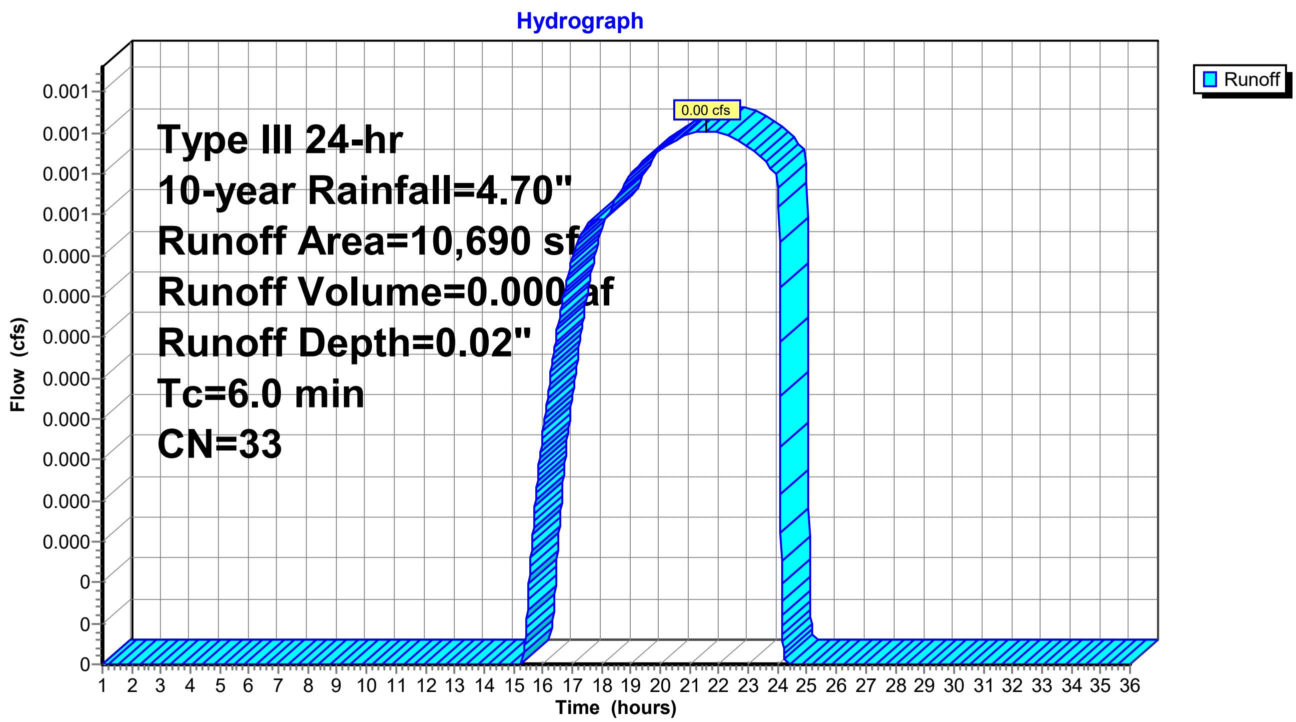
Runoff = 0.00 cfs @ 21.54 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	5,866	30	Grass
	397	98	Paved parking, HSG A
*	4,427	30	Woods
	10,690	33	Weighted Average
	10,293		96.29% Pervious Area
	397		3.71% Impervious Area

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

Subcatchment 20S: Sub 20



Summary for Subcatchment 21S: Sub 21

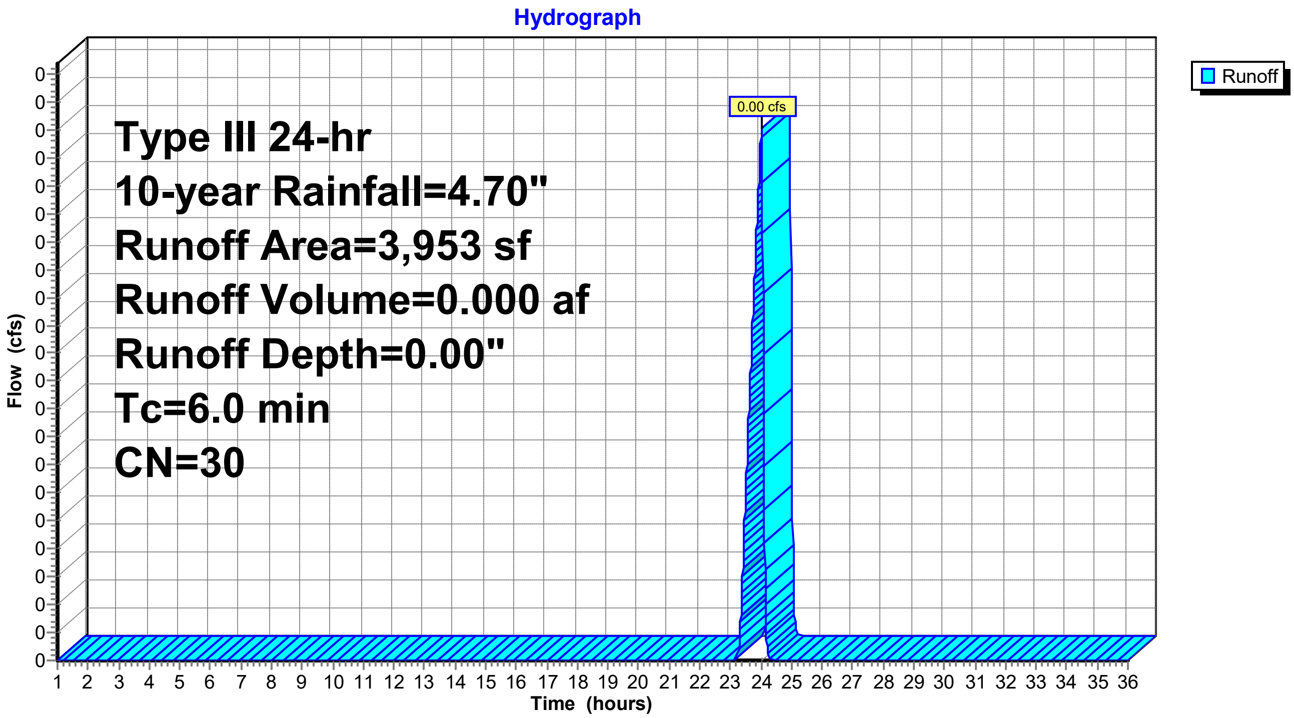
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	3,953	30	Grass
	3,953		100.00% Pervious Area

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

Subcatchment 21S: Sub 21



Summary for Pond 2P: Rain Garden

Inflow Area = 0.561 ac, 14.69% Impervious, Inflow Depth = 0.17" for 10-year event
Inflow = 0.02 cfs @ 12.50 hrs, Volume= 0.008 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 131.65' @ 24.34 hrs Surf.Area= 717 sf Storage= 353 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	5,119 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

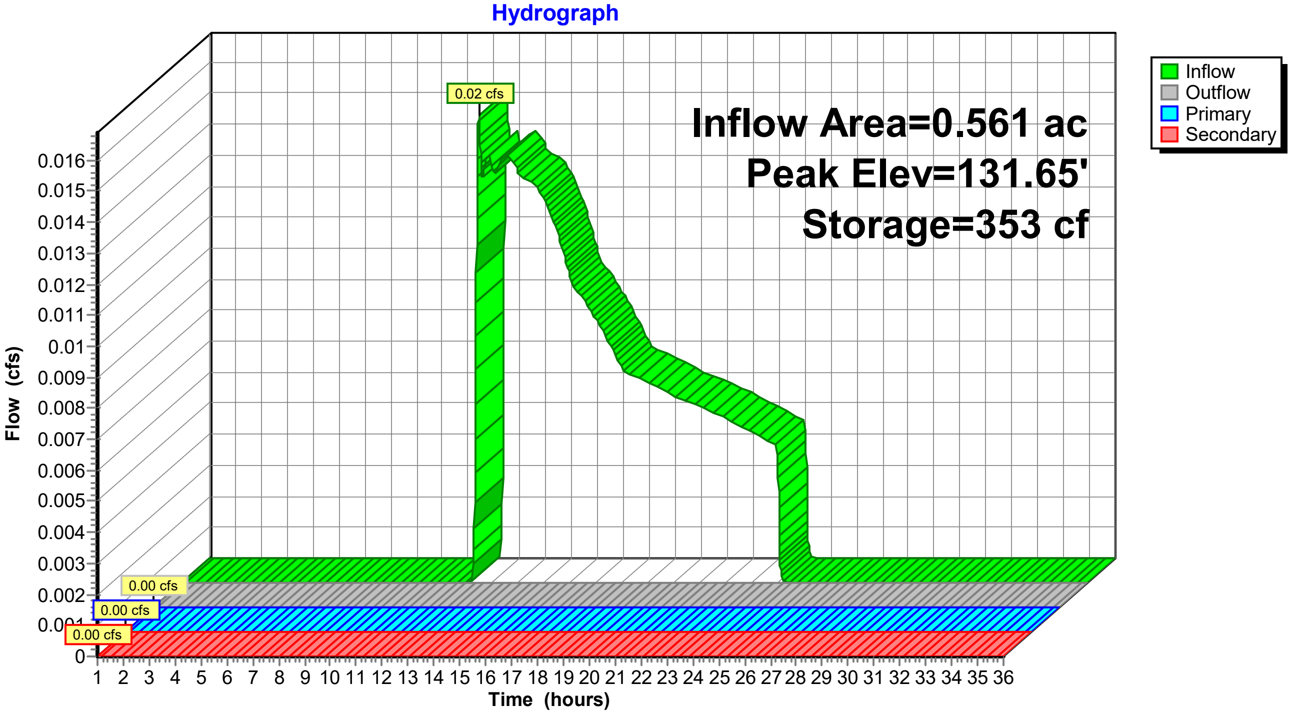
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
131.00	380	117.0	0	0	380
132.00	940	197.0	639	639	2,385
133.00	2,137	251.0	1,498	2,137	4,323
134.00	3,916	351.0	2,982	5,119	9,123

Device	Routing	Invert	Outlet Devices
#1	Secondary	132.95'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	131.70'	**12.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.70' / 130.87' S= 0.0098 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Rain Garden



Summary for Pond 3P: Rain Garden

Inflow Area = 0.496 ac, 92.74% Impervious, Inflow Depth = 3.90" for 10-year event
Inflow = 2.14 cfs @ 12.08 hrs, Volume= 0.161 af
Outflow = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af, Atten= 1%, Lag= 0.6 min
Primary = 0.78 cfs @ 12.10 hrs, Volume= 0.136 af
Secondary = 1.35 cfs @ 12.10 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 133.83' @ 12.10 hrs Surf.Area= 613 sf Storage= 304 cf

Plug-Flow detention time= 9.3 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 9.3 min (789.5 - 780.2)

Volume	Invert	Avail.Storage	Storage Description
#1	133.00'	1,491 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

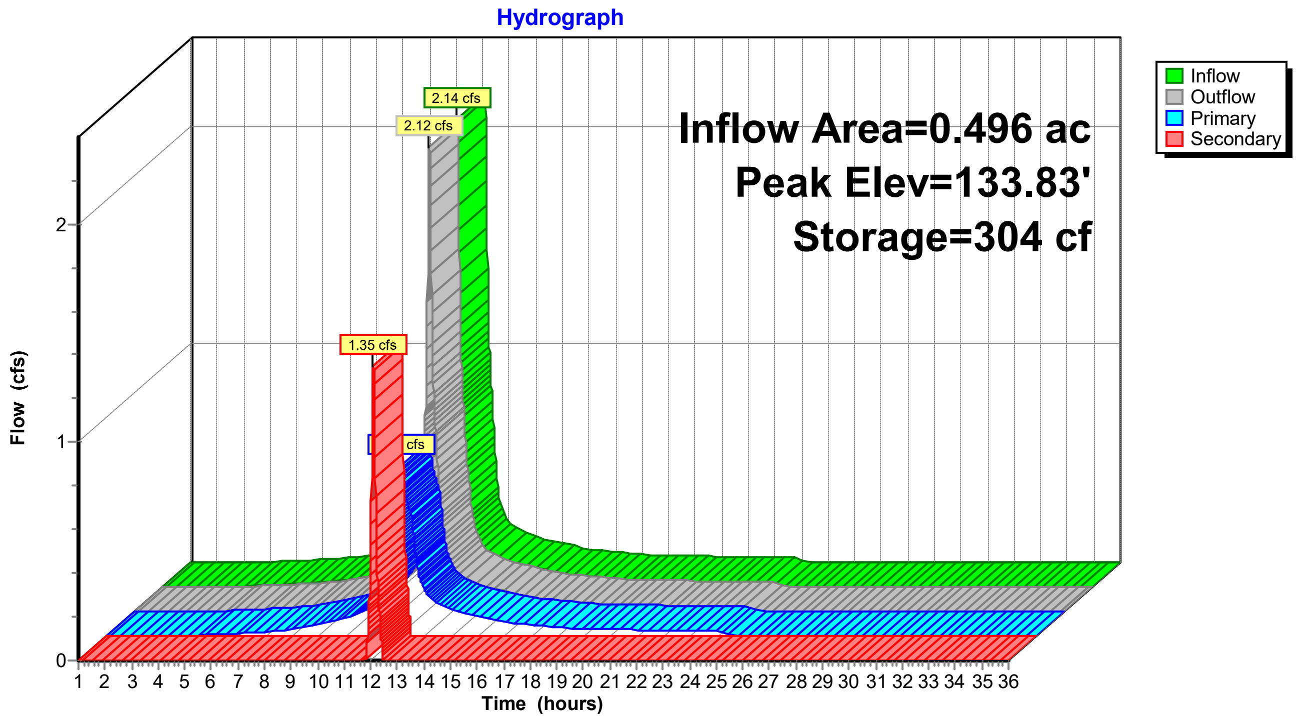
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.00	167	151.5	0	0	167
134.00	739	233.4	419	419	2,683
135.00	1,444	246.6	1,072	1,491	3,241

Device	Routing	Invert	Outlet Devices
#1	Secondary	133.69'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	133.00'	**18.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.00' / 129.45' S= 0.0403 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=0.78 cfs @ 12.10 hrs HW=133.83' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 0.78 cfs @ 1.12 fps)

Secondary OutFlow Max=1.34 cfs @ 12.10 hrs HW=133.83' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 1.34 cfs @ 1.22 fps)

Pond 3P: Rain Garden



Summary for Pond 4P: Infiltration Chambers

Inflow Area = 4.934 ac, 89.04% Impervious, Inflow Depth > 3.72" for 10-year event
Inflow = 19.55 cfs @ 12.08 hrs, Volume= 1.529 af
Outflow = 12.79 cfs @ 12.17 hrs, Volume= 1.436 af, Atten= 35%, Lag= 5.4 min
Discarded = 0.42 cfs @ 12.17 hrs, Volume= 0.119 af
Primary = 12.37 cfs @ 12.17 hrs, Volume= 1.317 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 130.38' @ 12.17 hrs Surf.Area= 7,446 sf Storage= 15,232 cf

Plug-Flow detention time= 97.0 min calculated for 1.436 af (94% of inflow)
Center-of-Mass det. time= 63.0 min (832.7 - 769.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	10,337 cf	**65.75'W x 113.25'L x 5.50'H Field A** 40,954 cf Overall - 15,112 cf Embedded = 25,842 cf x 40.0% Voids
#2A	128.25'	15,112 cf	**ADS_StormTech MC-3500 d +Cap** x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 9 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf
		25,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**24.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.65' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 4	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	128.65'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.42 cfs @ 12.17 hrs HW=130.38' (Free Discharge)
└─**4=Exfiltration** (Controls 0.42 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Passes 0.42 cfs of 0.53 cfs potential flow)

Primary OutFlow Max=12.36 cfs @ 12.17 hrs HW=130.38' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 12.36 cfs @ 5.21 fps)

Pond 4P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

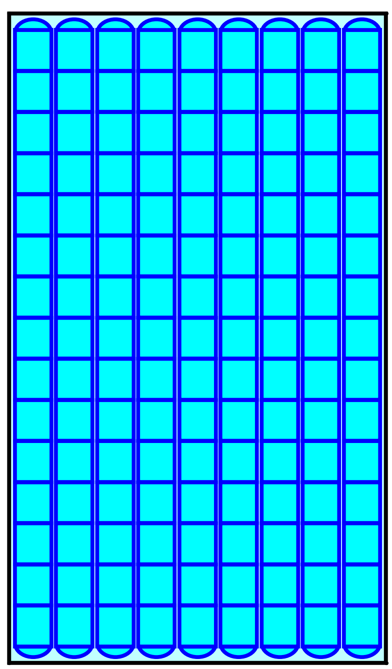
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

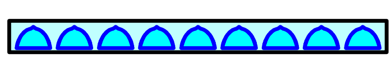
135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 15,111.7 cf Chamber Storage

40,954.0 cf Field - 15,111.7 cf Chambers = 25,842.3 cf Stone x 40.0% Voids = 10,336.9 cf Stone Storage

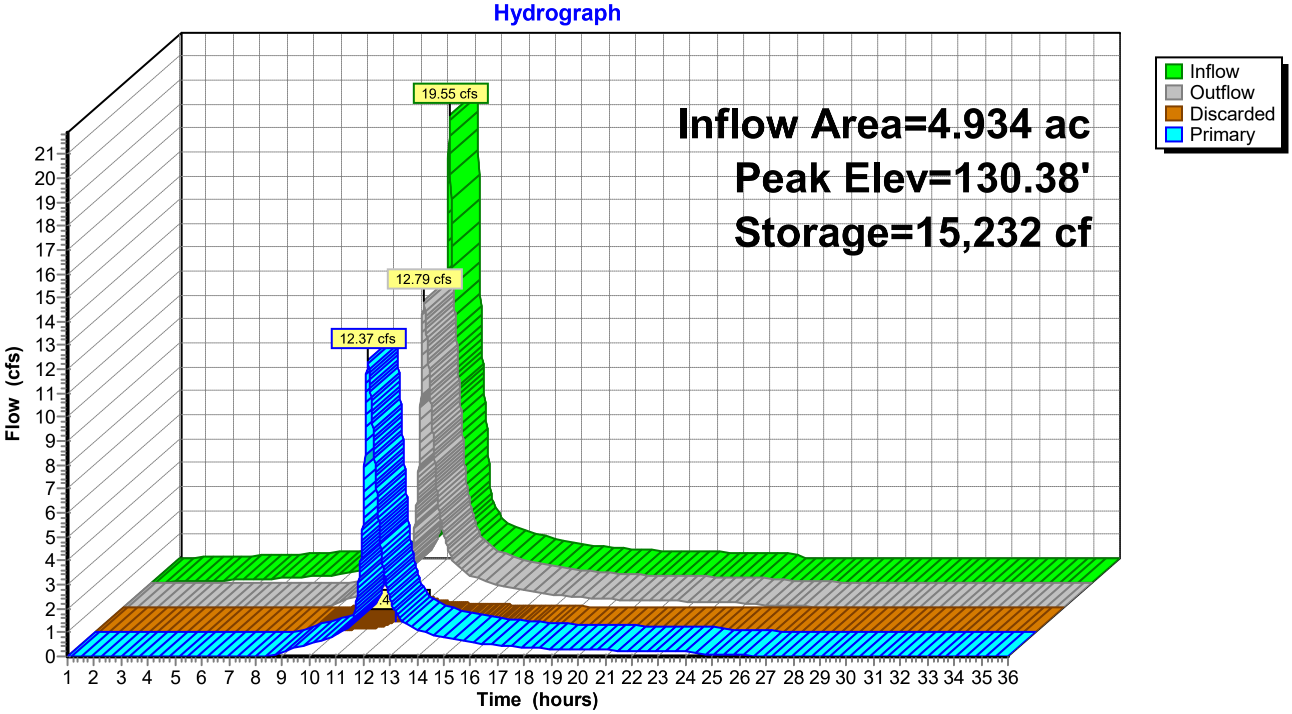
Chamber Storage + Stone Storage = 25,448.6 cf = 0.584 af
Overall Storage Efficiency = 62.1%
Overall System Size = 113.25' x 65.75' x 5.50'

135 Chambers
1,516.8 cy Field
957.1 cy Stone





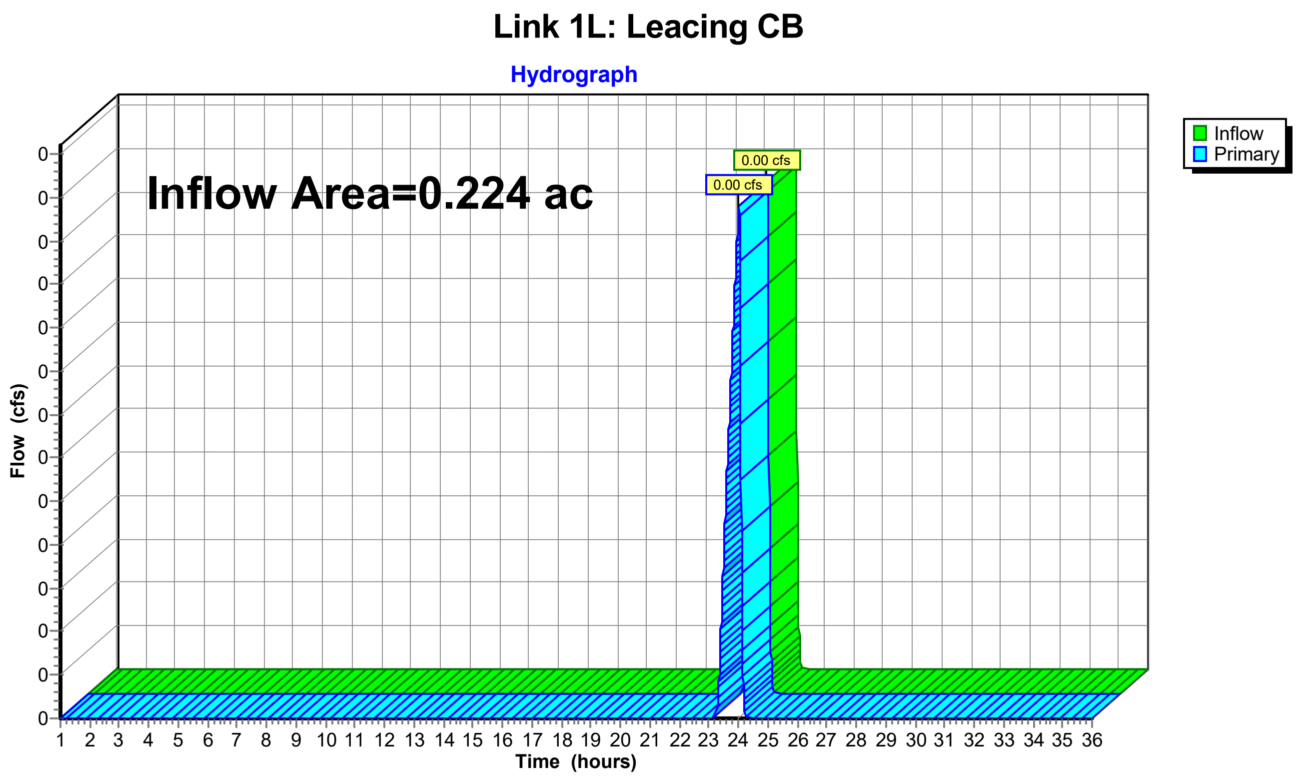
Pond 4P: Infiltration Chambers



Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

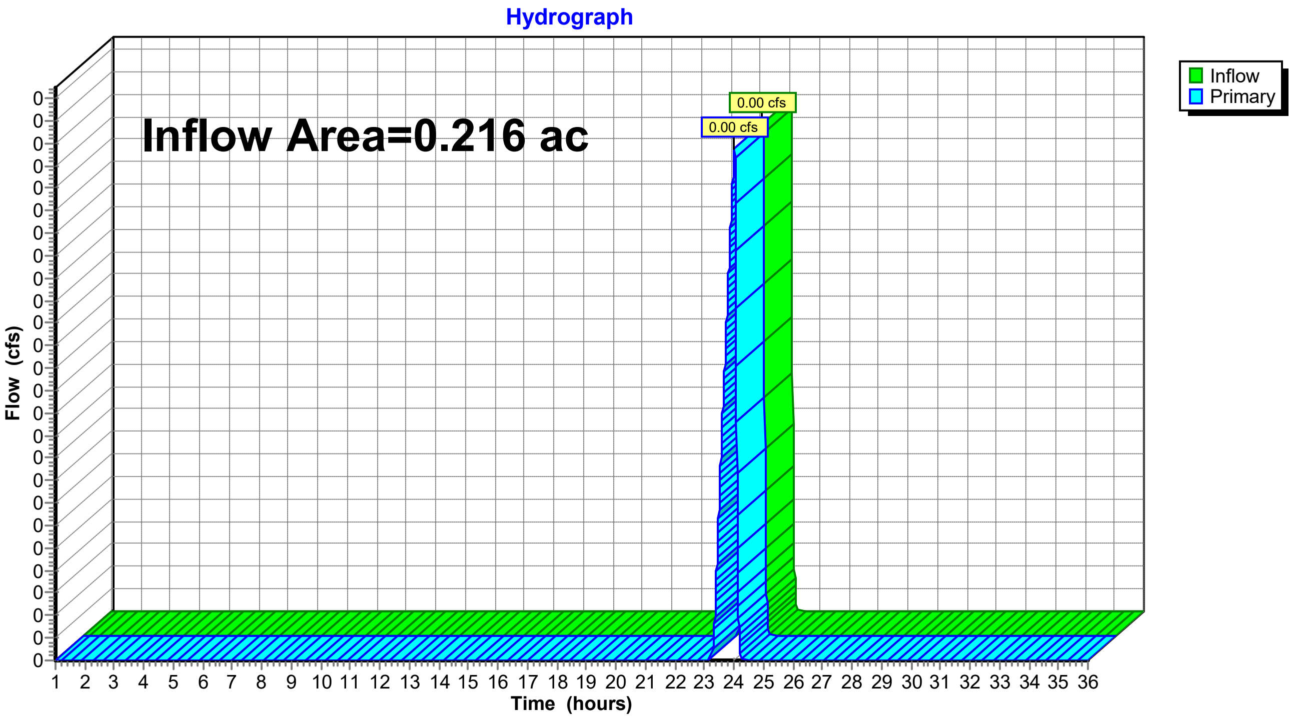


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.216 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

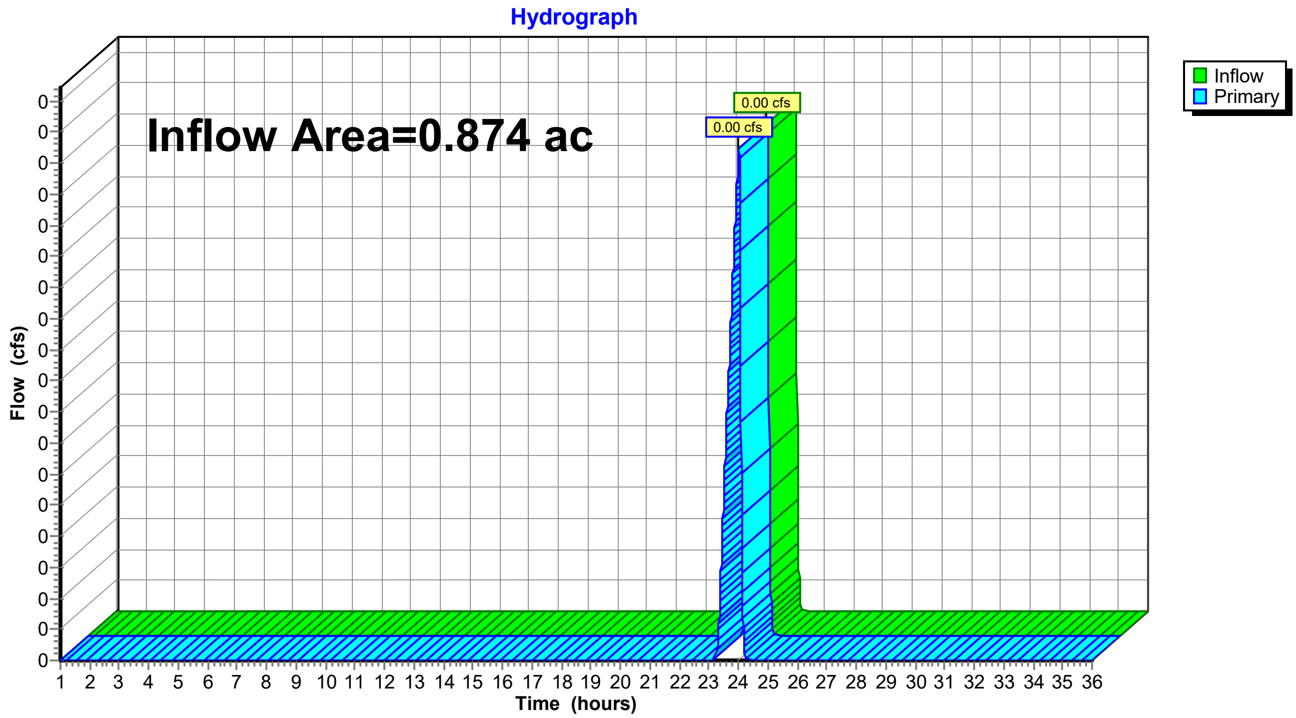


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 0.874 ac, 9.43% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

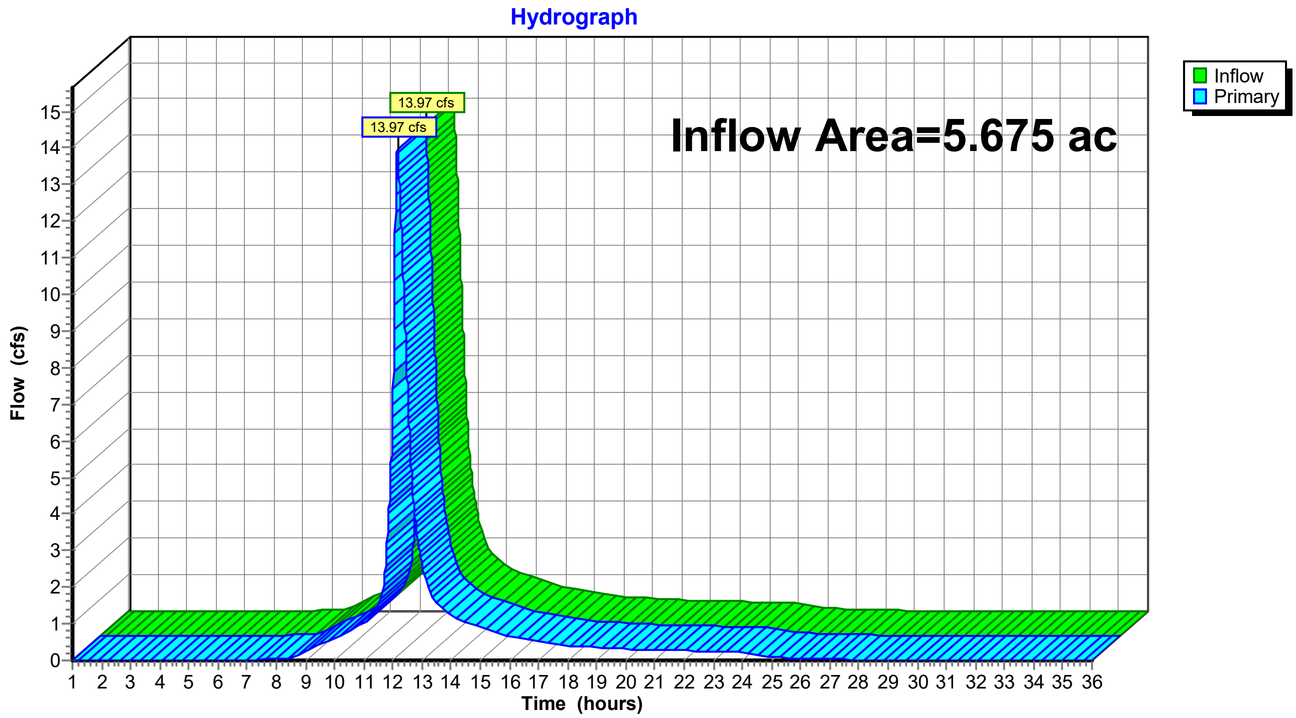


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.675 ac, 85.67% Impervious, Inflow Depth > 3.13" for 10-year event
Inflow = 13.97 cfs @ 12.16 hrs, Volume= 1.479 af
Primary = 13.97 cfs @ 12.16 hrs, Volume= 1.479 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=9.28 cfs 0.757 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=3.60"
Tc=6.0 min CN=80 Runoff=2.39 cfs 0.170 af

Subcatchment 4S: Sub 4 Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=72 Runoff=1.06 cfs 0.076 af

Subcatchment 5S: Sub 5 Runoff Area=12,232 sf 62.66% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=73 Runoff=0.96 cfs 0.068 af

Subcatchment 6S: Sub 6 Runoff Area=13,636 sf 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 7S: Sub 7 Runoff Area=2,471 sf 100.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment 8S: Sub 8 Runoff Area=24,444 sf 14.69% Impervious Runoff Depth=0.44"
Tc=6.0 min CN=40 Runoff=0.10 cfs 0.021 af

Subcatchment 9S: Sub 9 Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=95 Runoff=1.40 cfs 0.109 af

Subcatchment 10S: Sub 10 Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=3.31"
Tc=6.0 min CN=77 Runoff=1.65 cfs 0.117 af

Subcatchment 11S: Sub 11 Runoff Area=6,808 sf 98.43% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=0.88 cfs 0.071 af

Subcatchment 12S: Sub 12 Runoff Area=5,470 sf 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 13S: Sub 13 Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=4.65"
Tc=6.0 min CN=90 Runoff=0.40 cfs 0.030 af

Subcatchment 14S: Sub 14 Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=95 Runoff=0.50 cfs 0.039 af

Subcatchment 15S: Sub 15 Runoff Area=13,783 sf 99.17% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=1.79 cfs 0.144 af

Subcatchment 16S: Sub 16 Runoff Area=11,011 sf 100.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=1.44 cfs 0.117 af

Subcatchment 17S: Sub 17 Runoff Area=11,222 sf 100.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=1.46 cfs 0.119 af

Subcatchment 18S: Sub 18 Runoff Area=21,593 sf 92.74% Impervious Runoff Depth=4.99"
Tc=6.0 min CN=93 Runoff=2.70 cfs 0.206 af

Subcatchment 19S: Sub 19 Runoff Area=10,851 sf 98.57% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=1.41 cfs 0.113 af

Subcatchment 20S: Sub 20 Runoff Area=10,690 sf 3.71% Impervious Runoff Depth=0.14"
Tc=6.0 min CN=33 Runoff=0.00 cfs 0.003 af

Subcatchment 21S: Sub 21 Runoff Area=3,953 sf 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 2P: Rain Garden Peak Elev=131.89' Storage=536 cf Inflow=0.10 cfs 0.021 af
Primary=0.02 cfs 0.011 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.011 af

Pond 3P: Rain Garden Peak Elev=133.86' Storage=325 cf Inflow=2.70 cfs 0.206 af
Primary=0.83 cfs 0.167 af Secondary=1.84 cfs 0.039 af Outflow=2.68 cfs 0.206 af

Pond 4P: Infiltration Chambers Peak Elev=130.82' Storage=17,572 cf Inflow=24.93 cfs 1.956 af
Discarded=0.43 cfs 0.150 af Primary=15.83 cfs 1.714 af Outflow=16.25 cfs 1.864 af

Link 1L: Leacing CB Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Link 2L: Isolated Wetlands Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Link 3L: Spofford Pond Wetlands Inflow=0.02 cfs 0.012 af
Primary=0.02 cfs 0.012 af

Link 4L: Vernal Pool Wetlands Inflow=17.87 cfs 1.922 af
Primary=17.87 cfs 1.922 af

Total Runoff Area = 6.990 ac Runoff Volume = 2.189 af Average Runoff Depth = 3.76"
29.27% Pervious = 2.046 ac 70.73% Impervious = 4.944 ac

Summary for Subcatchment 1S: Roof

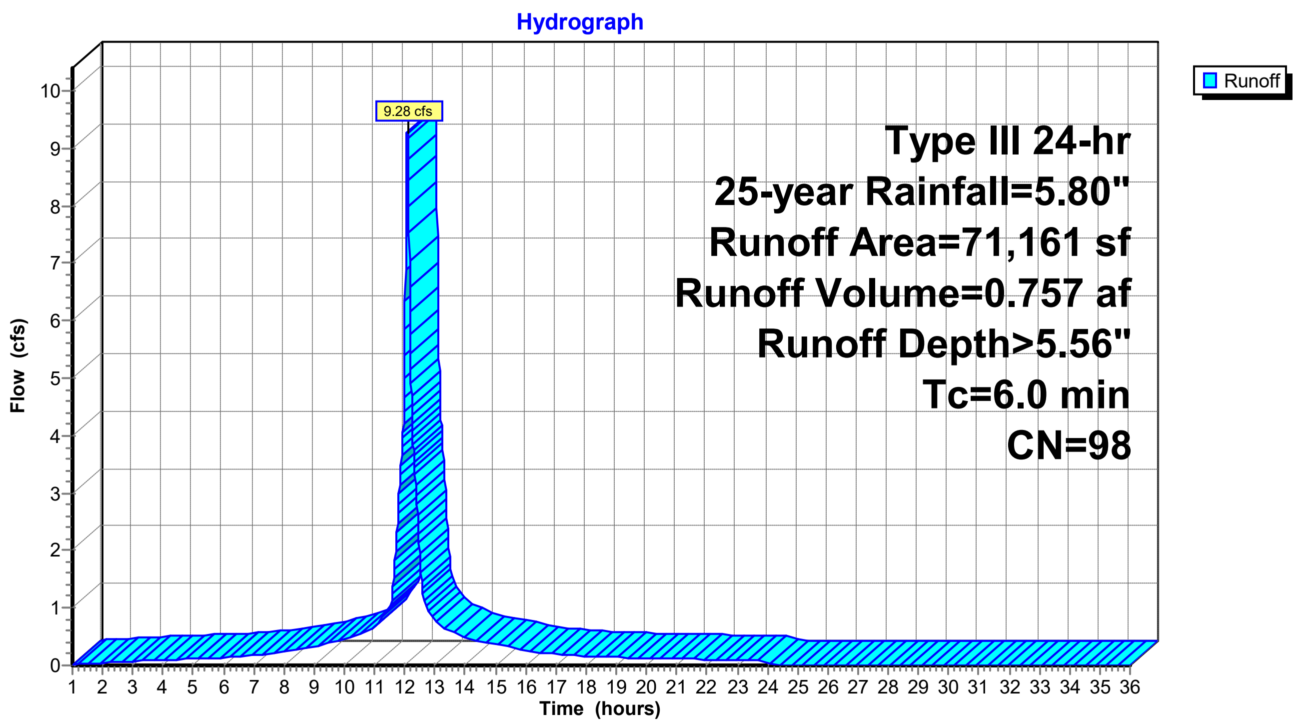
Runoff = 9.28 cfs @ 12.08 hrs, Volume= 0.757 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

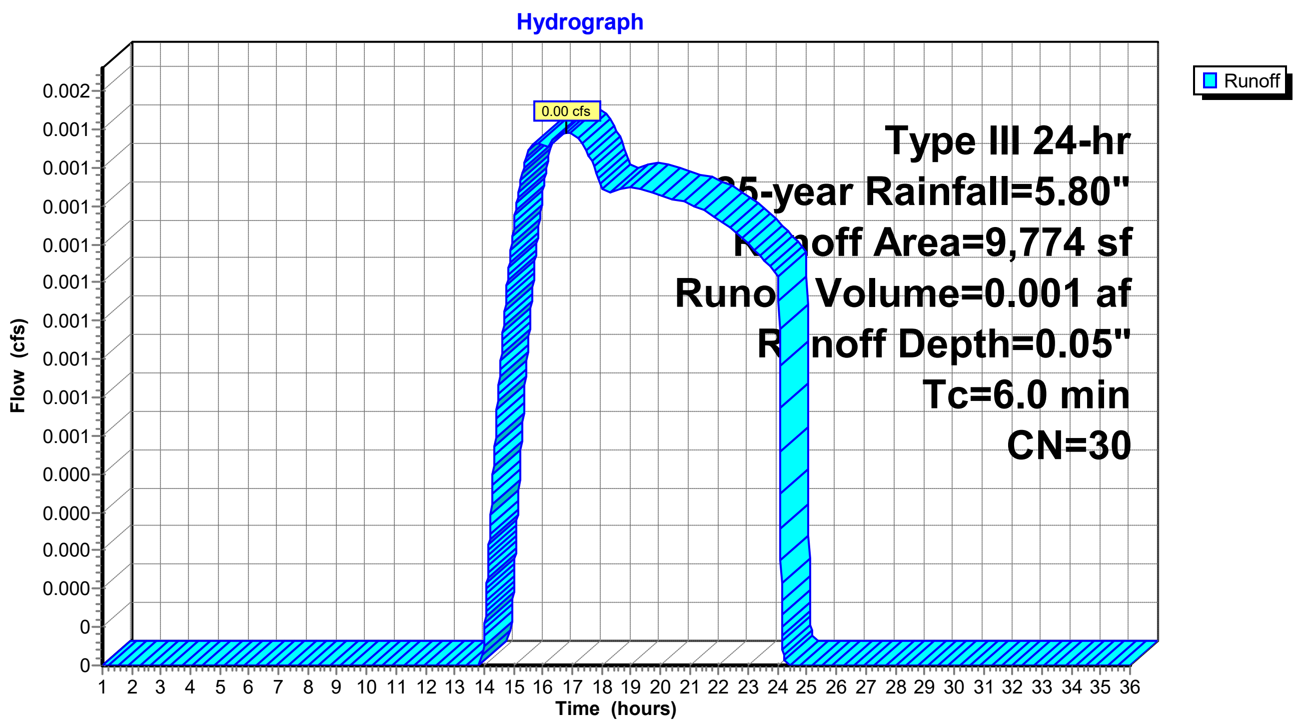
Runoff = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

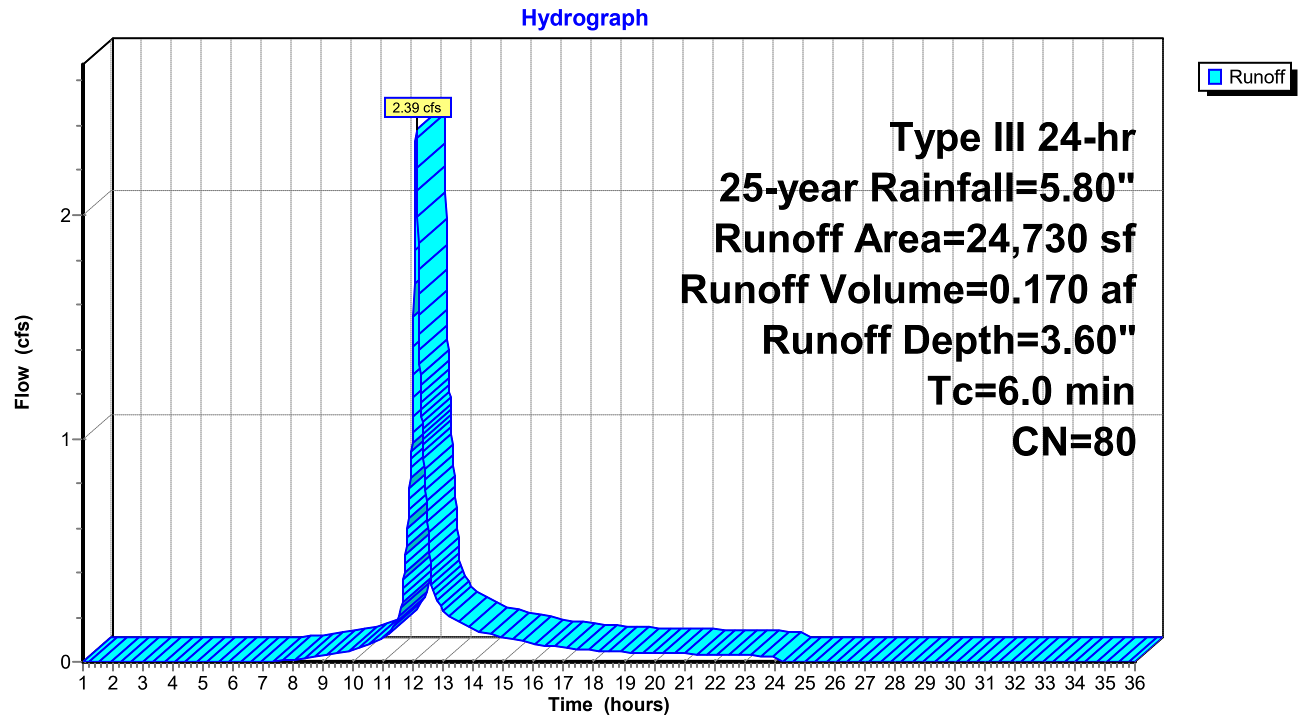
Runoff = 2.39 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

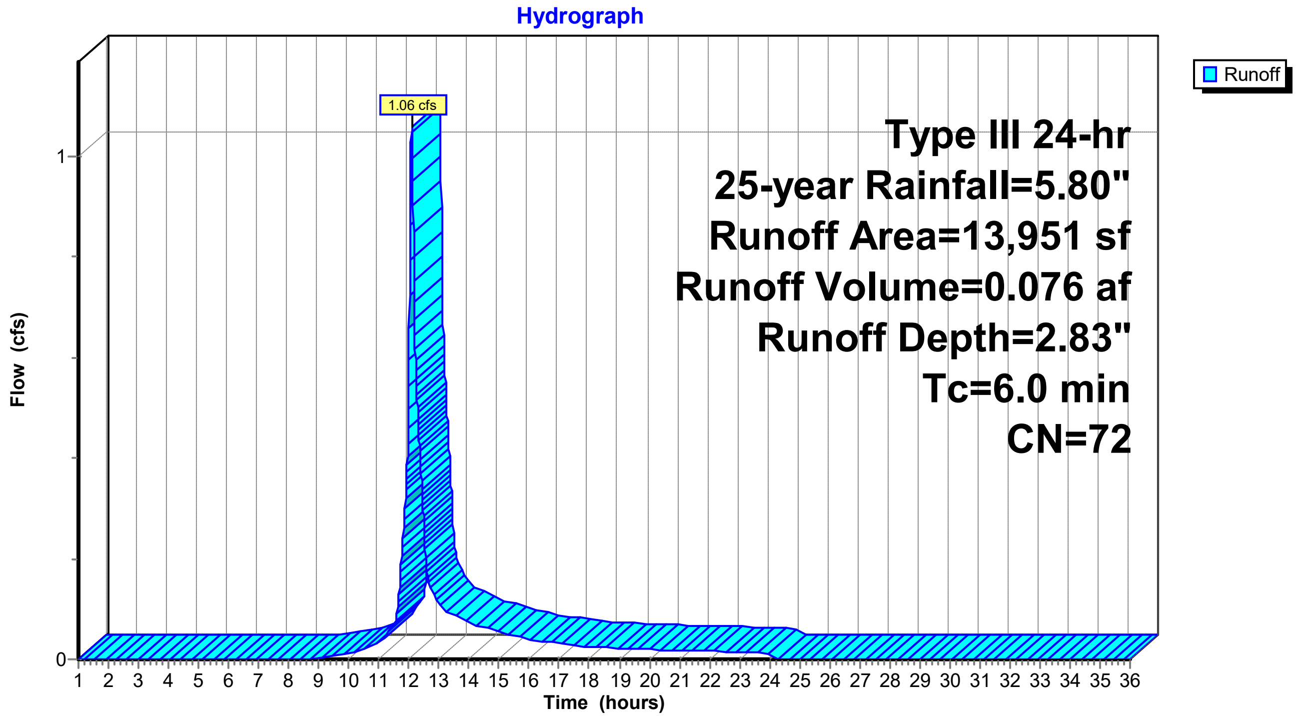
Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951	72	Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

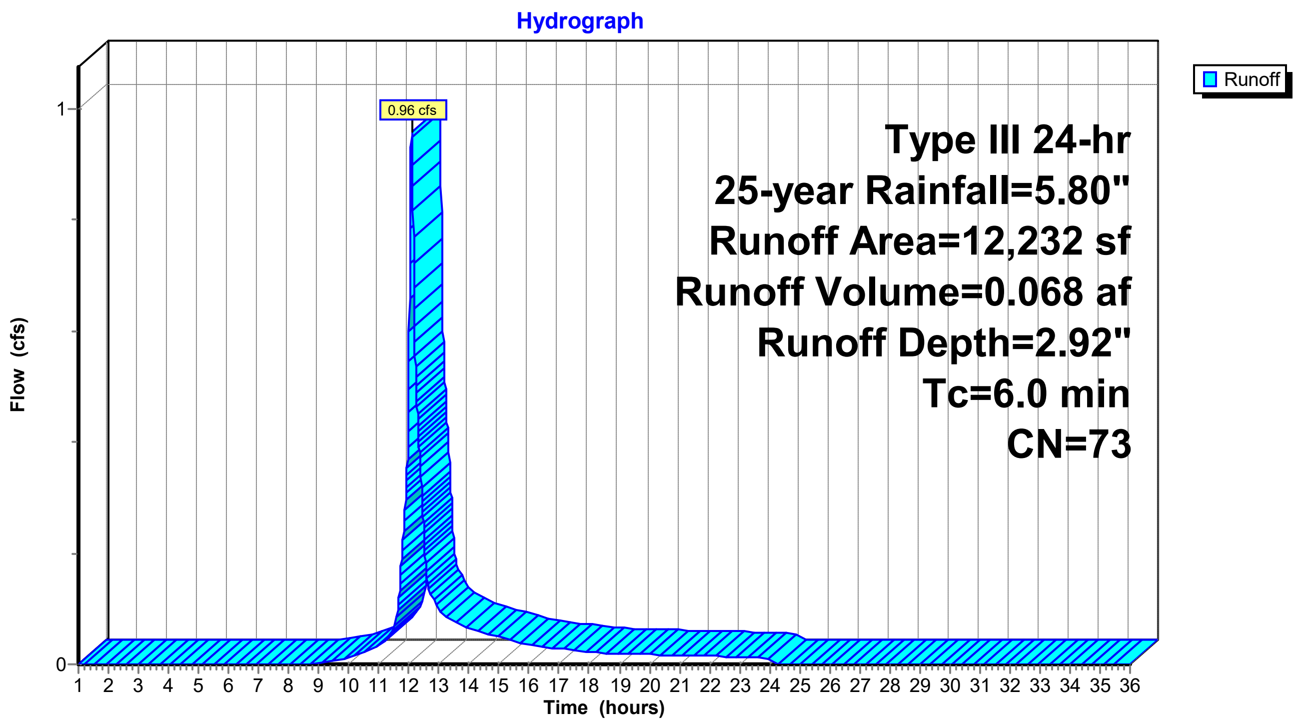
Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	7,665	98	Paved parking, HSG A
	201	30	Woods, Good, HSG A
*	4,366	30	Grass
	12,232	73	Weighted Average
	4,567		37.34% Pervious Area
	7,665		62.66% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

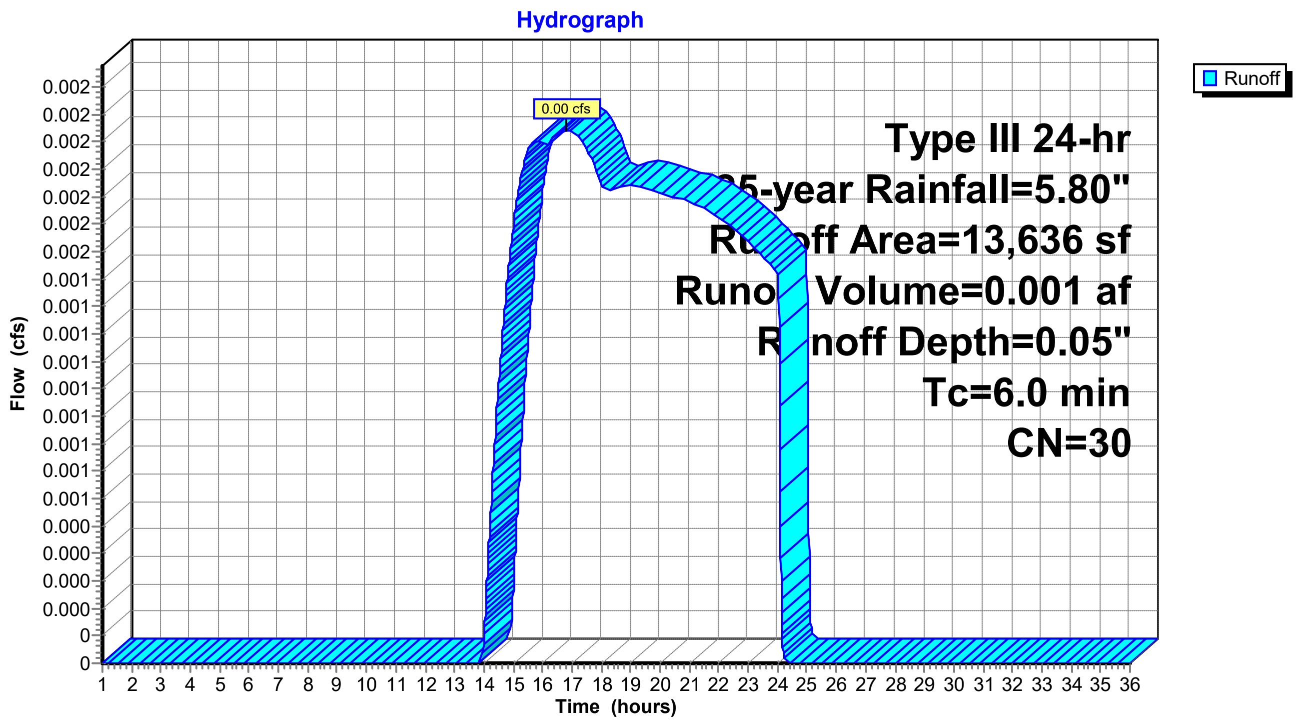
Runoff = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,897	30	Grass
*	7,739	30	Woods
	13,636	30	Weighted Average
	13,636		100.00% Pervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

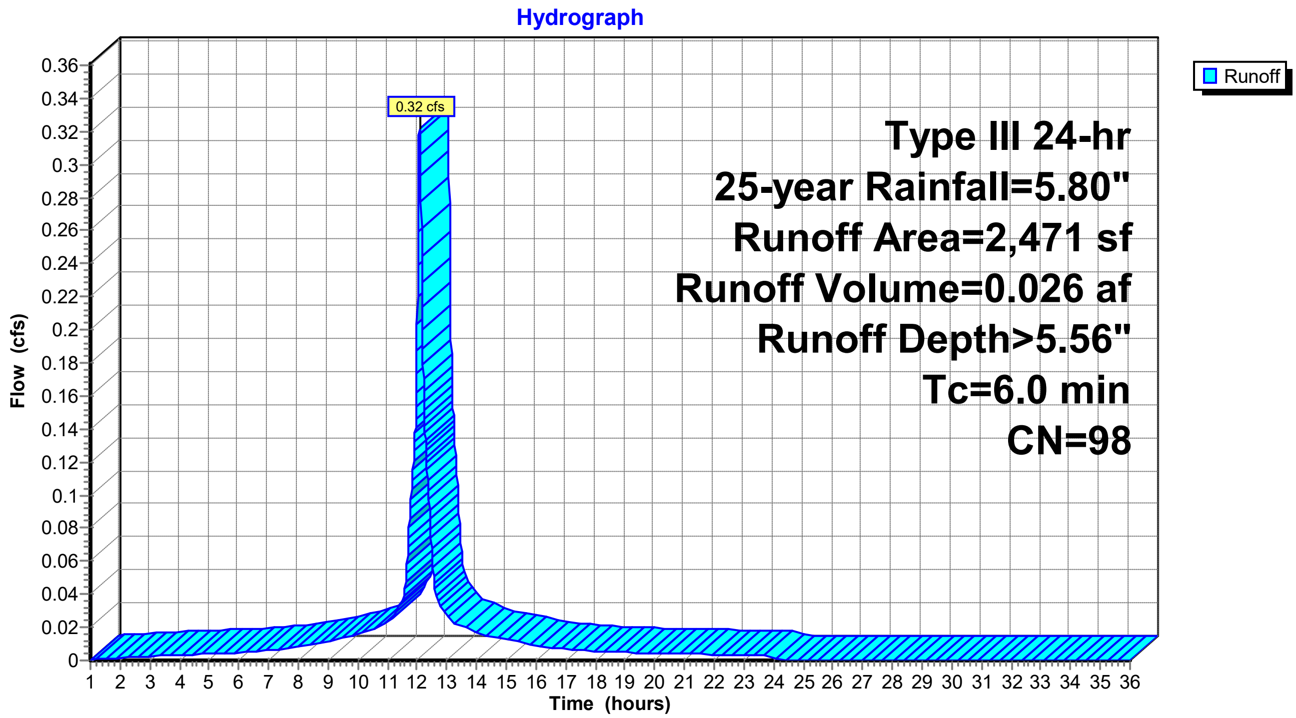
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

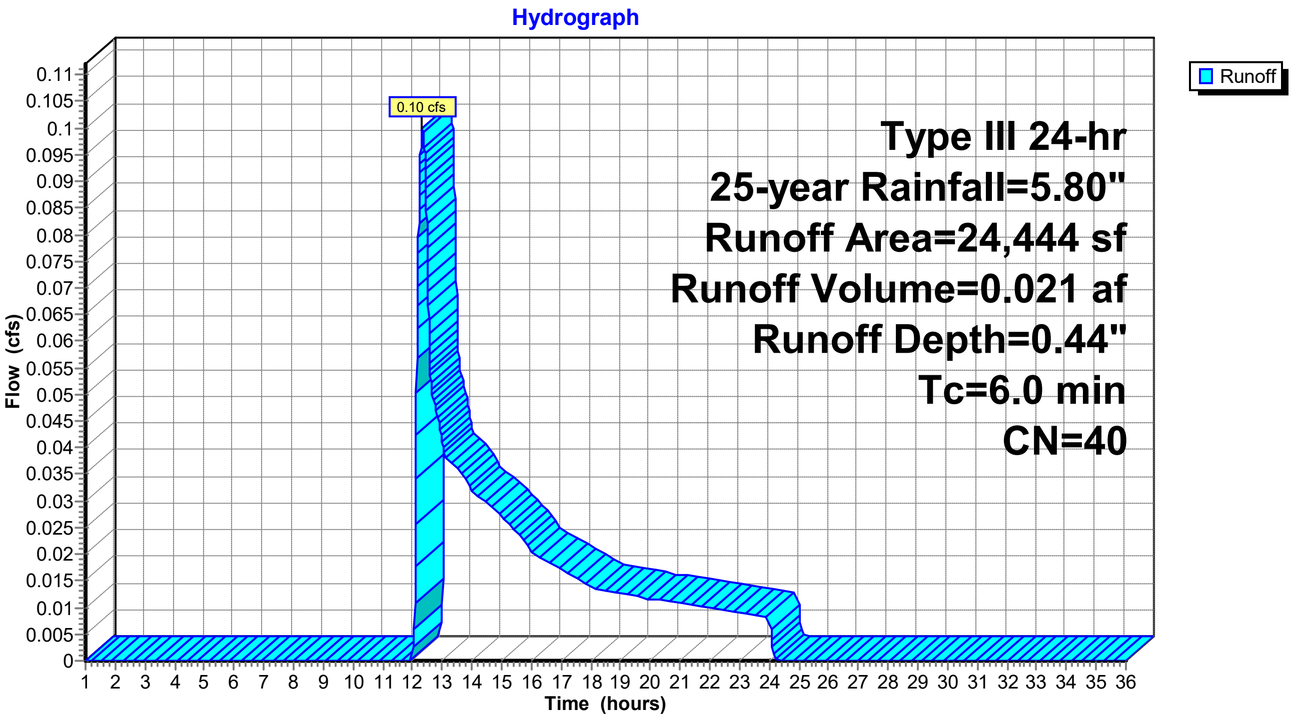
Runoff = 0.10 cfs @ 12.34 hrs, Volume= 0.021 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	3,592	98	Paved parking, HSG A
*	20,852	30	Grass
	24,444	40	Weighted Average
	20,852		85.31% Pervious Area
	3,592		14.69% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

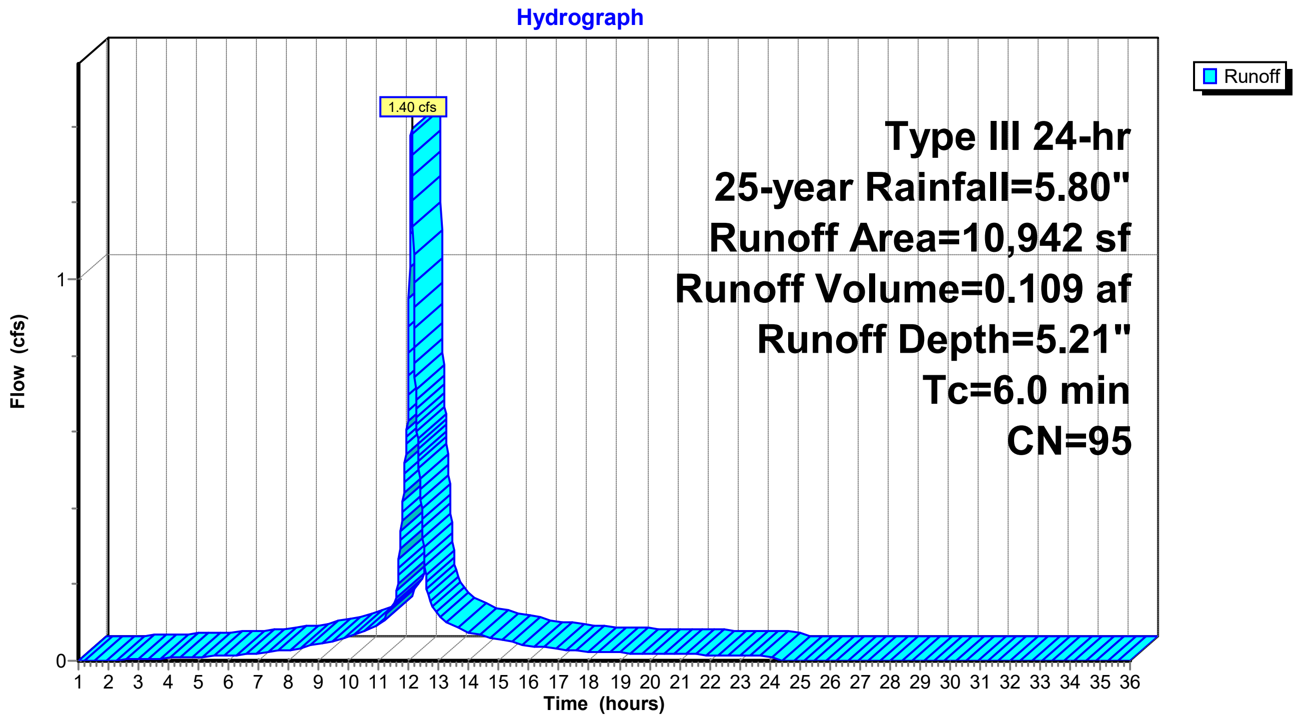
Runoff = 1.40 cfs @ 12.08 hrs, Volume= 0.109 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942	95	Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

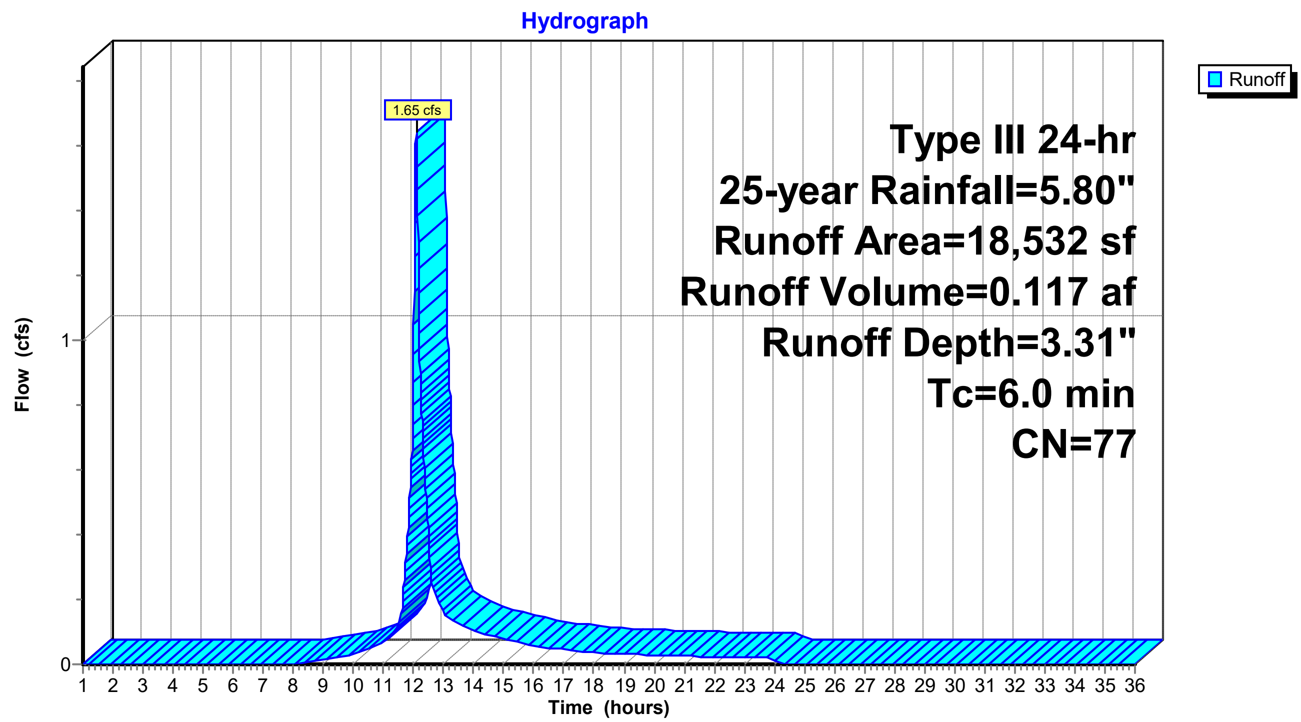
Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532	77	Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

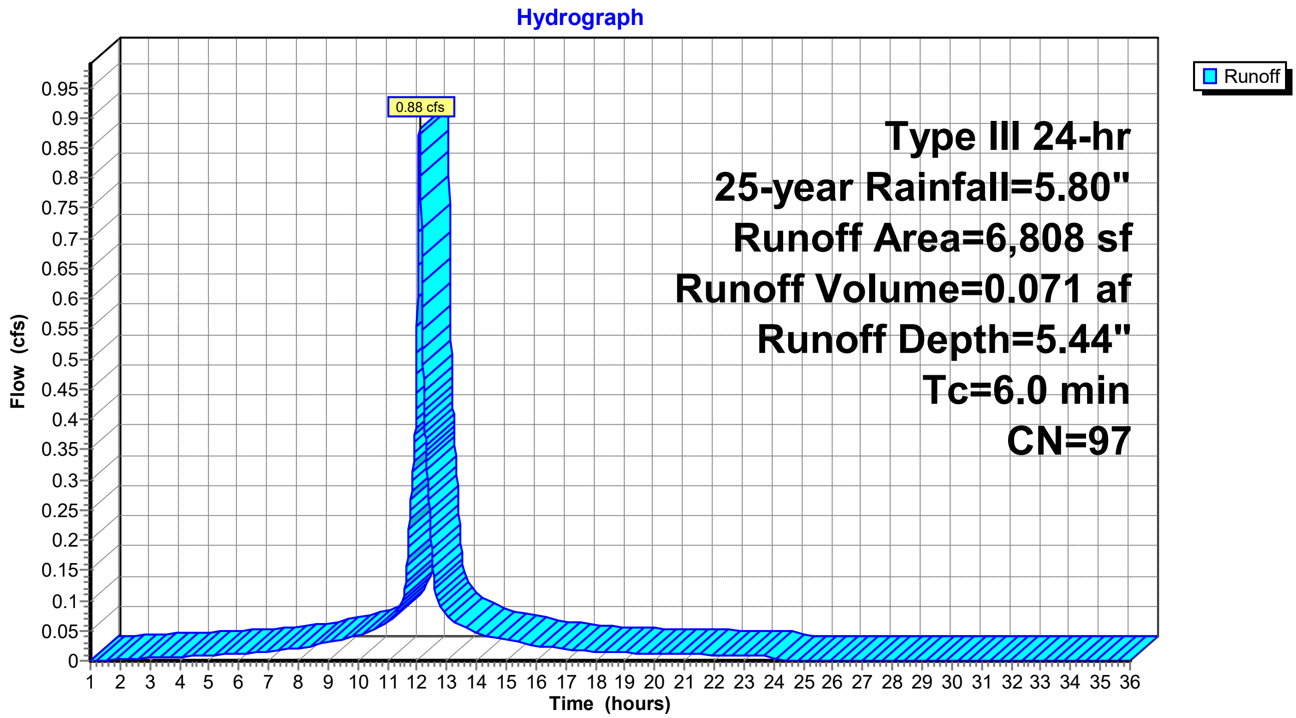
Runoff = 0.88 cfs @ 12.08 hrs, Volume= 0.071 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808	97	Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 11S: Sub 11



Summary for Subcatchment 12S: Sub 12

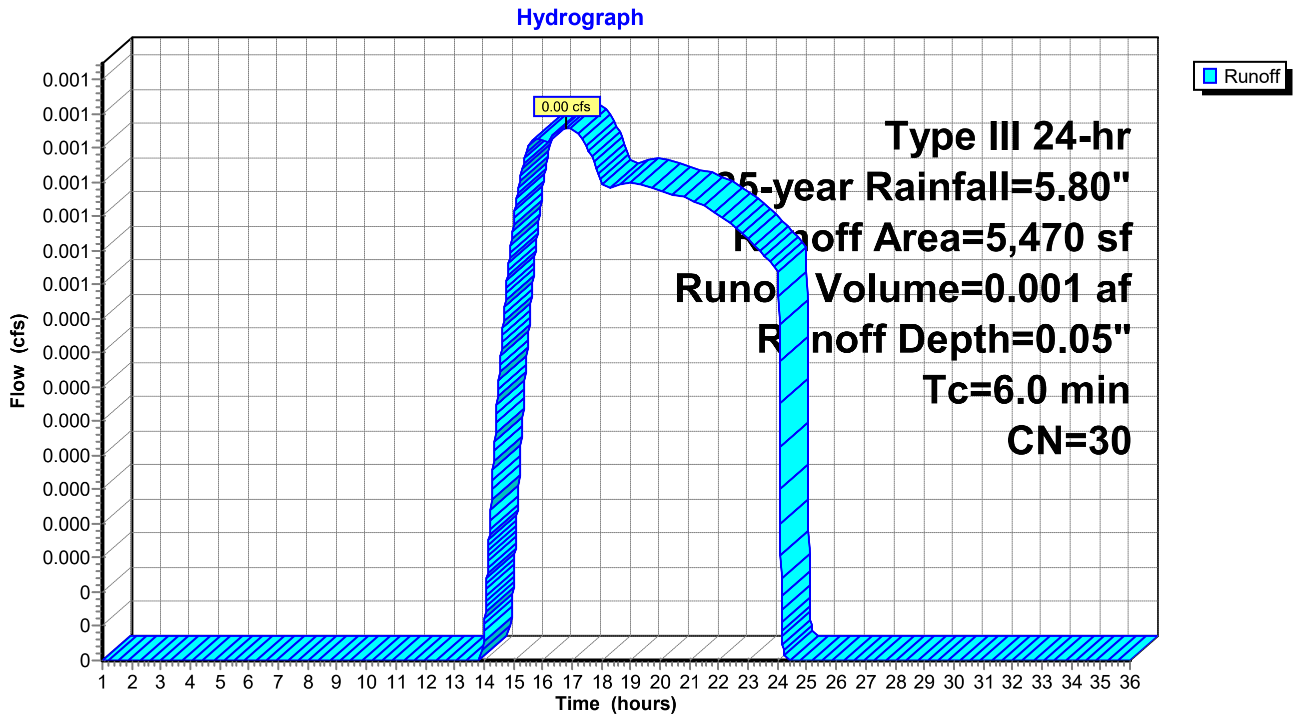
Runoff = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,470	30	Grass
	5,470		100.00% Pervious Area

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

Subcatchment 12S: Sub 12



Summary for Subcatchment 13S: Sub 13

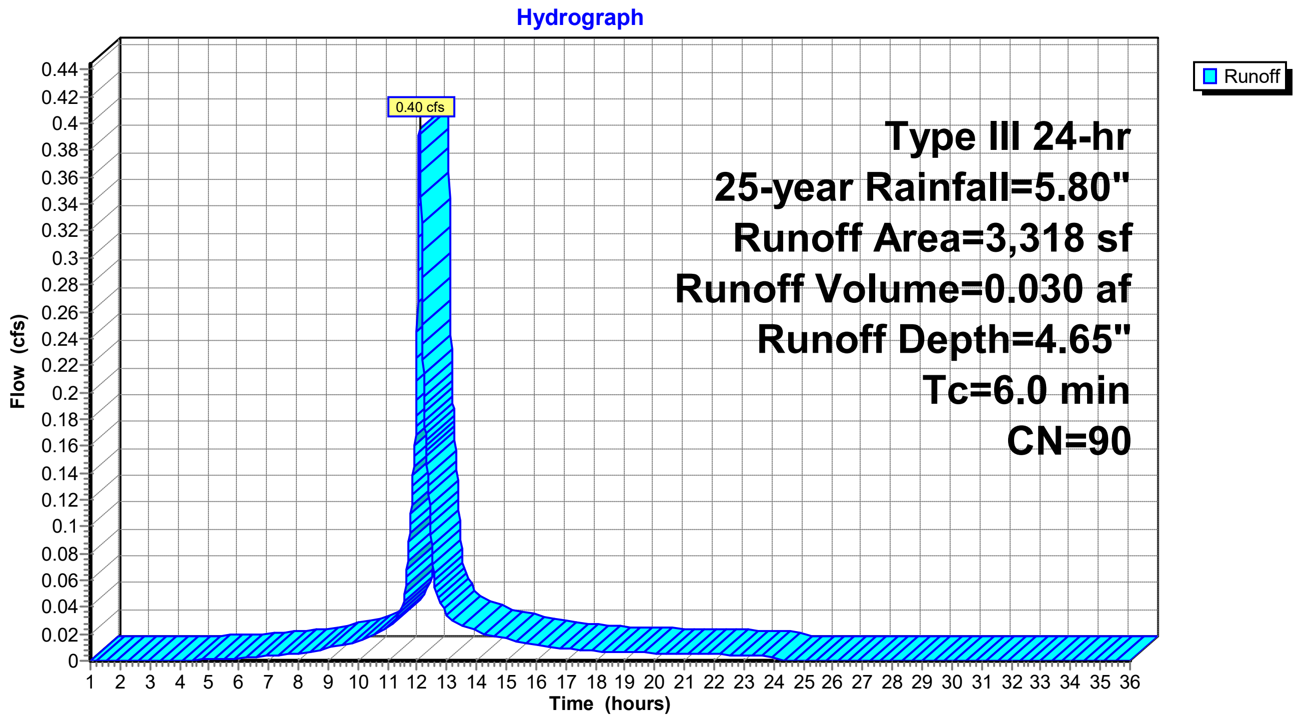
Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.030 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318	90	Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 13S: Sub 13



Summary for Subcatchment 14S: Sub 14

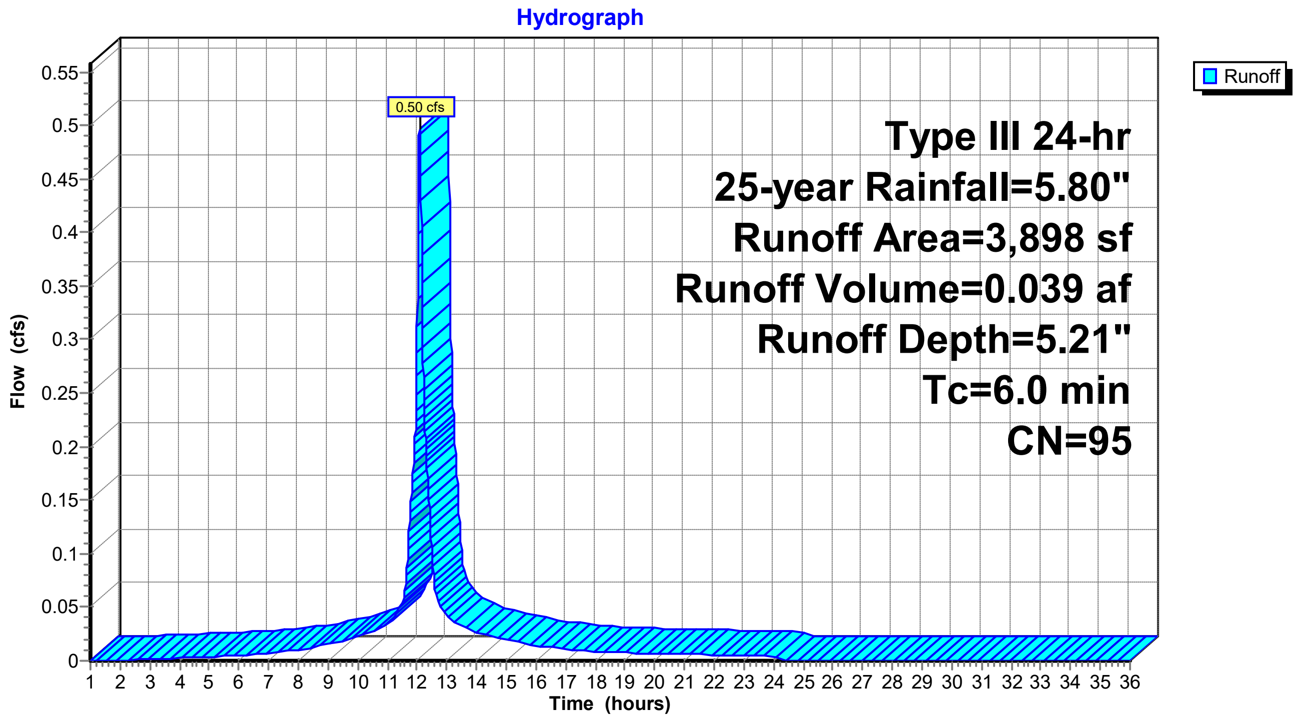
Runoff = 0.50 cfs @ 12.08 hrs, Volume= 0.039 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898	95	Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 14S: Sub 14



Summary for Subcatchment 15S: Sub 15

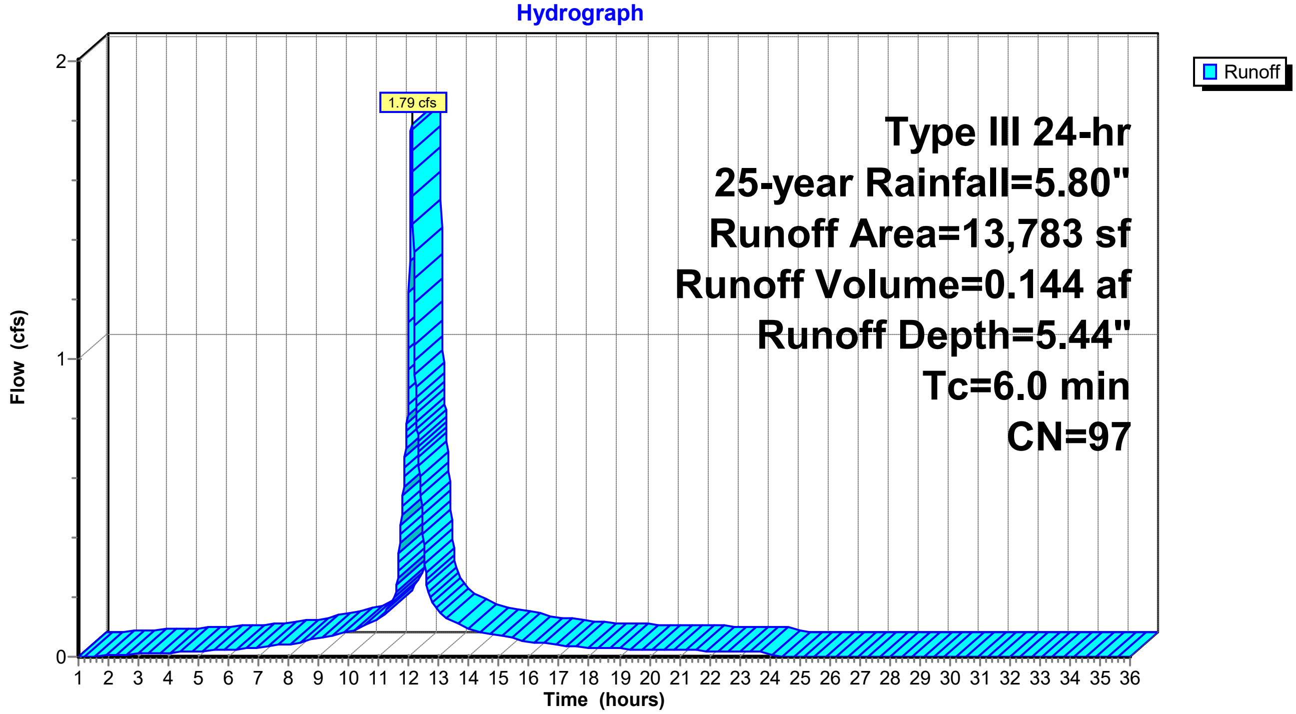
Runoff = 1.79 cfs @ 12.08 hrs, Volume= 0.144 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783	97	Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 15S: Sub 15



Summary for Subcatchment 16S: Sub 16

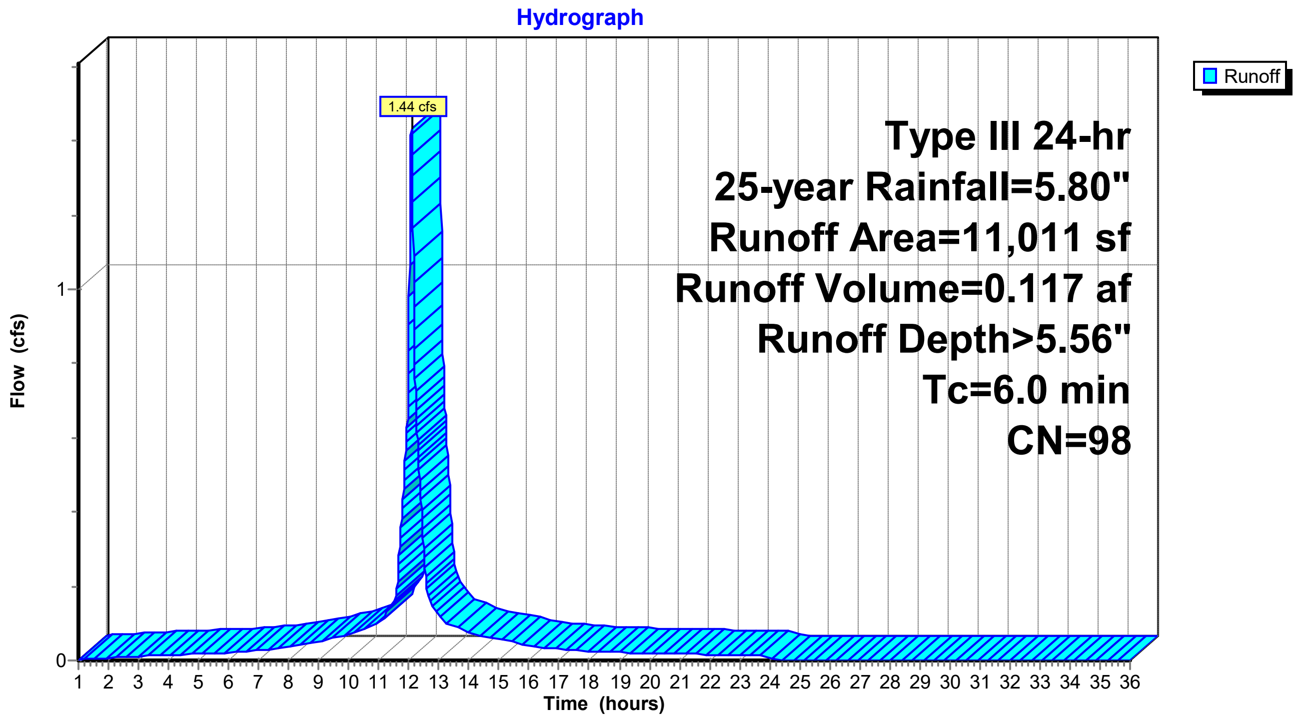
Runoff = 1.44 cfs @ 12.08 hrs, Volume= 0.117 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 16S: Sub 16



Summary for Subcatchment 17S: Sub 17

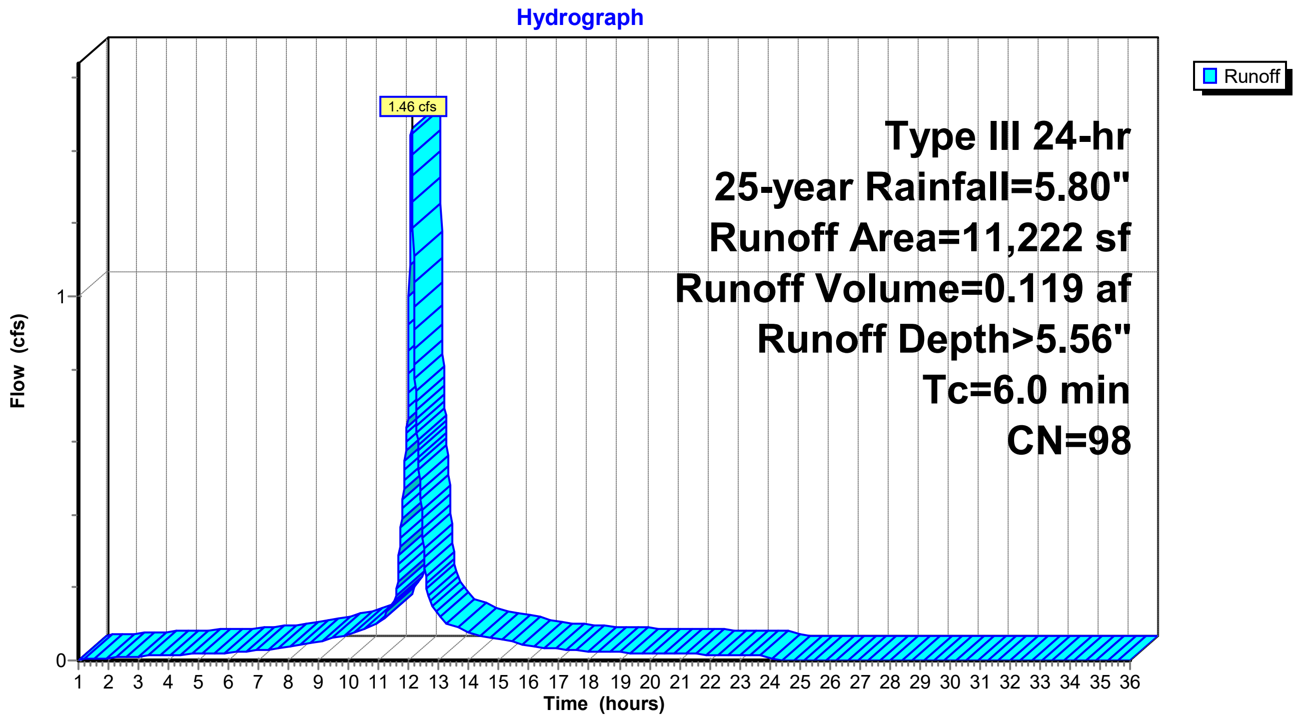
Runoff = 1.46 cfs @ 12.08 hrs, Volume= 0.119 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 17S: Sub 17



Summary for Subcatchment 18S: Sub 18

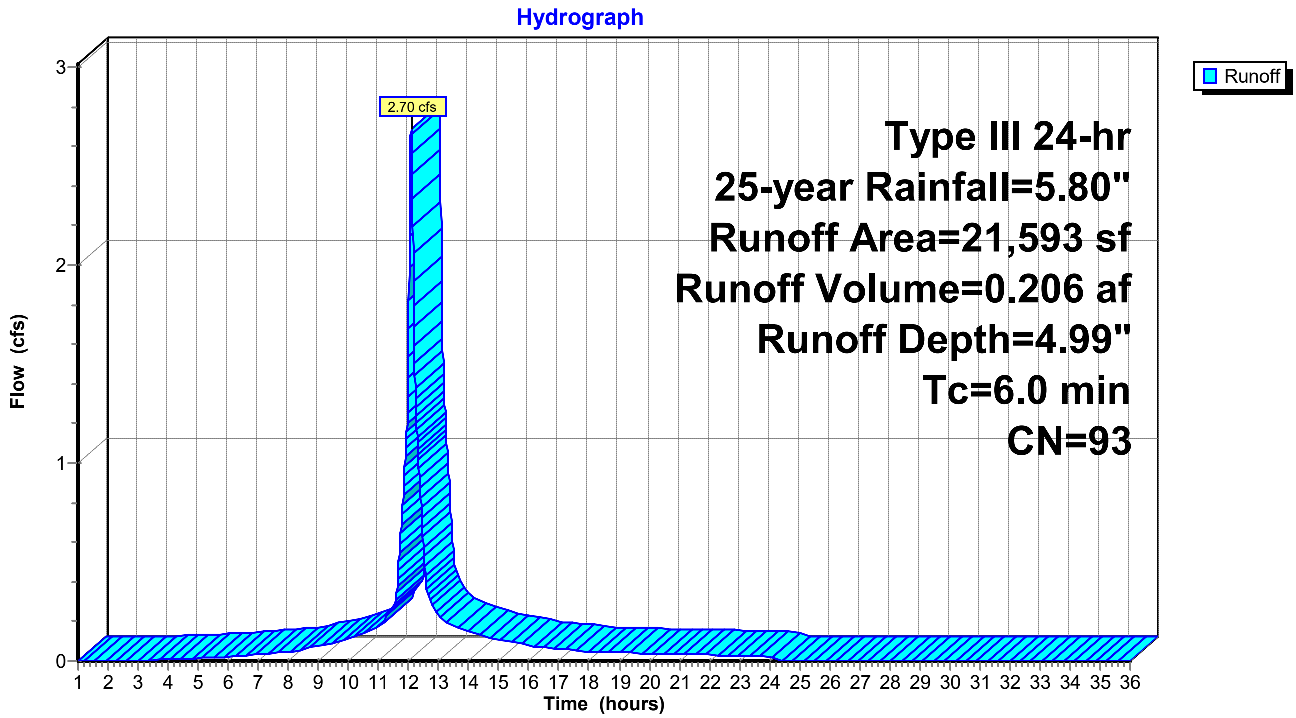
Runoff = 2.70 cfs @ 12.08 hrs, Volume= 0.206 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	1,568	30	Grass
	20,025	98	Paved parking, HSG A
	21,593	93	Weighted Average
	1,568		7.26% Pervious Area
	20,025		92.74% Impervious Area

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

Subcatchment 18S: Sub 18



Summary for Subcatchment 19S: Sub 19

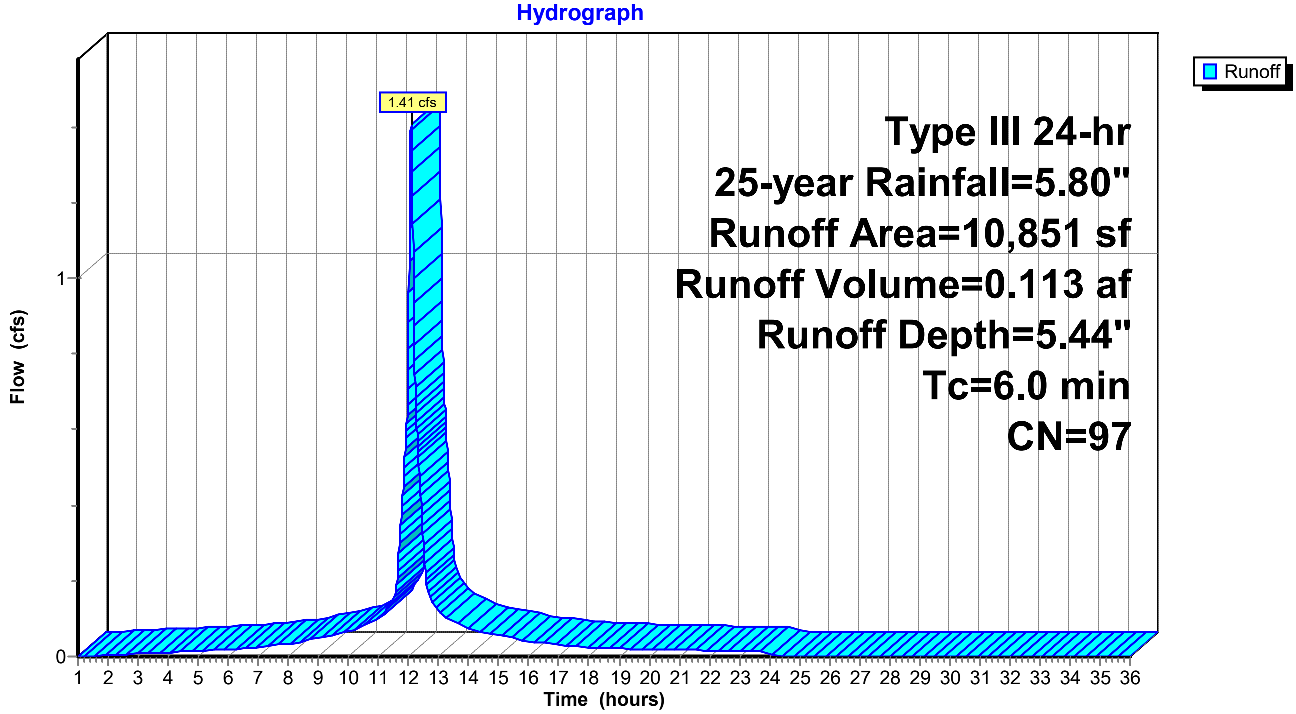
Runoff = 1.41 cfs @ 12.08 hrs, Volume= 0.113 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851	97	Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 19S: Sub 19



Summary for Subcatchment 20S: Sub 20

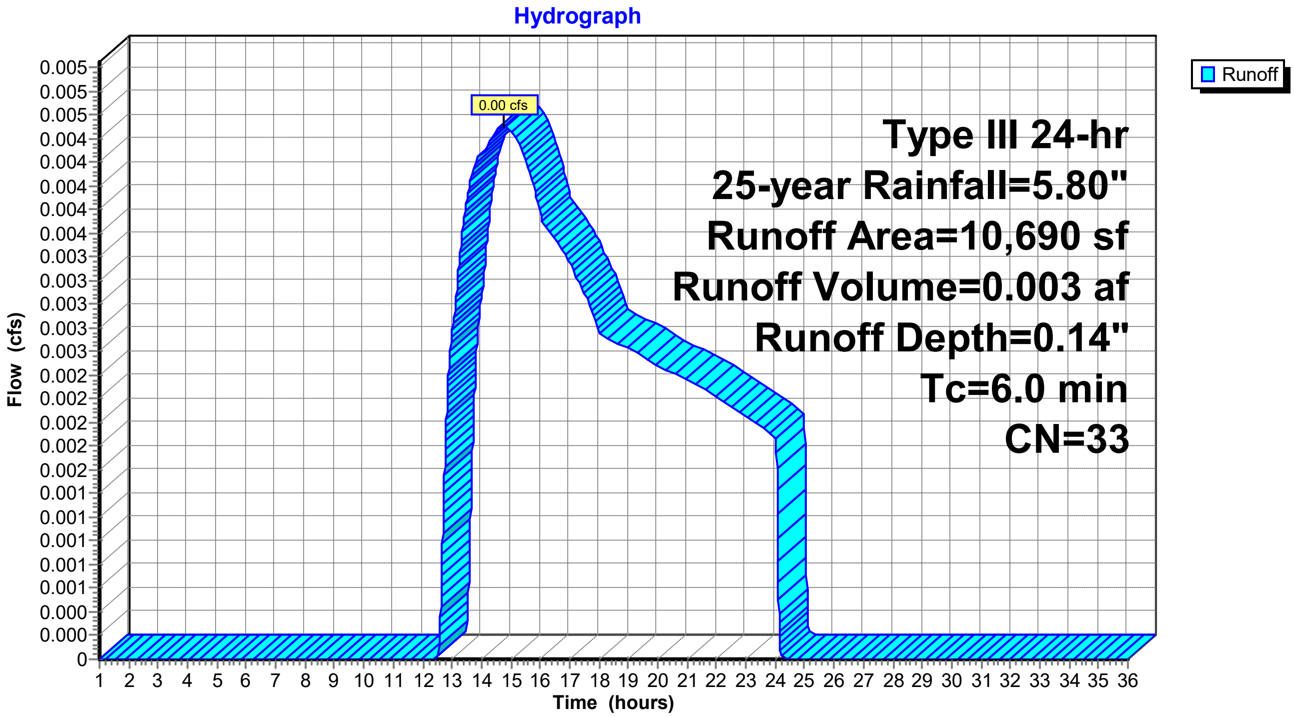
Runoff = 0.00 cfs @ 14.74 hrs, Volume= 0.003 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,866	30	Grass
	397	98	Paved parking, HSG A
*	4,427	30	Woods
	10,690	33	Weighted Average
	10,293		96.29% Pervious Area
	397		3.71% Impervious Area

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

Subcatchment 20S: Sub 20



Summary for Subcatchment 21S: Sub 21

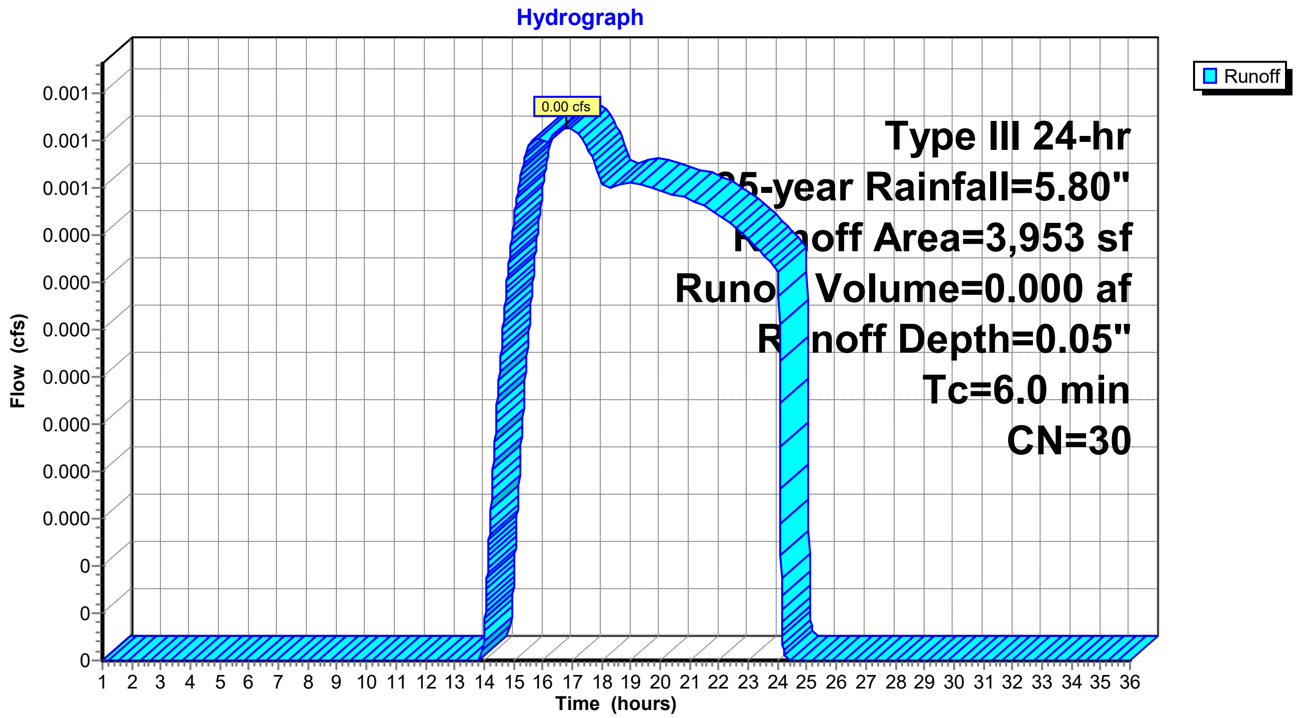
Runoff = 0.00 cfs @ 16.78 hrs, Volume= 0.000 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,953	30	Grass
	3,953		100.00% Pervious Area

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

Subcatchment 21S: Sub 21



Summary for Pond 2P: Rain Garden

Inflow Area = 0.561 ac, 14.69% Impervious, Inflow Depth = 0.44" for 25-year event
Inflow = 0.10 cfs @ 12.34 hrs, Volume= 0.021 af
Outflow = 0.02 cfs @ 17.65 hrs, Volume= 0.011 af, Atten= 85%, Lag= 318.9 min
Primary = 0.02 cfs @ 17.65 hrs, Volume= 0.011 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 131.89' @ 17.65 hrs Surf.Area= 863 sf Storage= 536 cf

Plug-Flow detention time= 455.7 min calculated for 0.011 af (54% of inflow)
Center-of-Mass det. time= 300.9 min (1,258.7 - 957.8)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	5,119 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

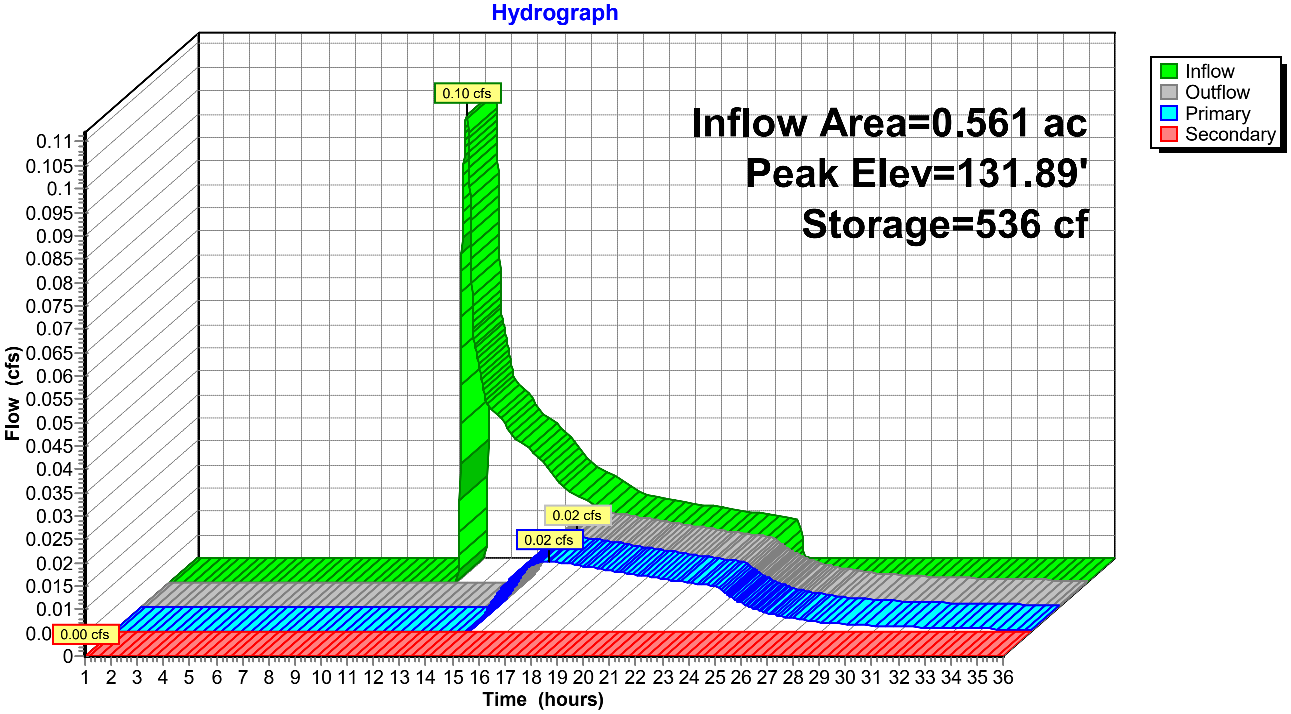
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
131.00	380	117.0	0	0	380
132.00	940	197.0	639	639	2,385
133.00	2,137	251.0	1,498	2,137	4,323
134.00	3,916	351.0	2,982	5,119	9,123

Device	Routing	Invert	Outlet Devices
#1	Secondary	132.95'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	131.70'	**12.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.70' / 130.87' S= 0.0098 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf

Primary OutFlow Max=0.02 cfs @ 17.65 hrs HW=131.89' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 0.02 cfs @ 0.23 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Rain Garden



Summary for Pond 3P: Rain Garden

Inflow Area = 0.496 ac, 92.74% Impervious, Inflow Depth = 4.99" for 25-year event
Inflow = 2.70 cfs @ 12.08 hrs, Volume= 0.206 af
Outflow = 2.68 cfs @ 12.09 hrs, Volume= 0.206 af, Atten= 1%, Lag= 0.6 min
Primary = 0.83 cfs @ 12.09 hrs, Volume= 0.167 af
Secondary = 1.84 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 133.86' @ 12.09 hrs Surf.Area= 636 sf Storage= 325 cf

Plug-Flow detention time= 8.6 min calculated for 0.206 af (100% of inflow)
Center-of-Mass det. time= 8.5 min (782.4 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	133.00'	1,491 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

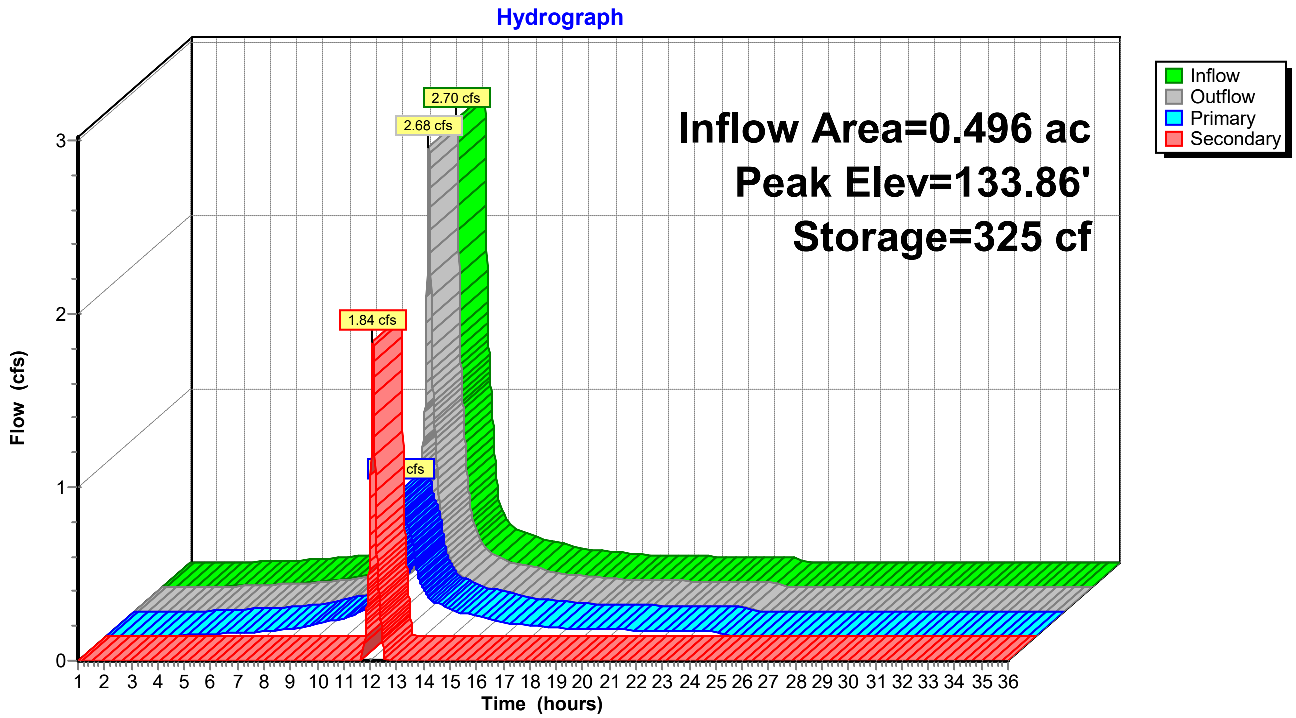
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.00	167	151.5	0	0	167
134.00	739	233.4	419	419	2,683
135.00	1,444	246.6	1,072	1,491	3,241

Device	Routing	Invert	Outlet Devices
#1	Secondary	133.69'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	133.00'	**18.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.00' / 129.45' S= 0.0403 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=133.86' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 0.83 cfs @ 1.14 fps)

Secondary OutFlow Max=1.84 cfs @ 12.09 hrs HW=133.86' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 1.84 cfs @ 1.36 fps)

Pond 3P: Rain Garden



Summary for Pond 4P: Infiltration Chambers

Inflow Area =	4.934 ac, 89.04% Impervious, Inflow Depth > 4.76" for 25-year event			
Inflow =	24.93 cfs @	12.08 hrs, Volume=	1.956 af	
Outflow =	16.25 cfs @	12.17 hrs, Volume=	1.864 af,	Atten= 35%, Lag= 5.4 min
Discarded =	0.43 cfs @	12.17 hrs, Volume=	0.150 af	
Primary =	15.83 cfs @	12.17 hrs, Volume=	1.714 af	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 130.82' @ 12.17 hrs Surf.Area= 7,446 sf Storage= 17,572 cf

Plug-Flow detention time= 83.2 min calculated for 1.863 af (95% of inflow)
Center-of-Mass det. time= 55.7 min (821.8 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	10,337 cf	**65.75'W x 113.25'L x 5.50'H Field A** 40,954 cf Overall - 15,112 cf Embedded = 25,842 cf x 40.0% Voids
#2A	128.25'	15,112 cf	**ADS_StormTech MC-3500 d +Cap** x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 9 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf
		25,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**24.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.65' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 4	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	128.65'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.43 cfs @ 12.17 hrs HW=130.82' (Free Discharge)
└─**4=Exfiltration** (Controls 0.43 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Passes 0.43 cfs of 0.59 cfs potential flow)

Primary OutFlow Max=15.82 cfs @ 12.17 hrs HW=130.82' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 15.82 cfs @ 5.45 fps)

Pond 4P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

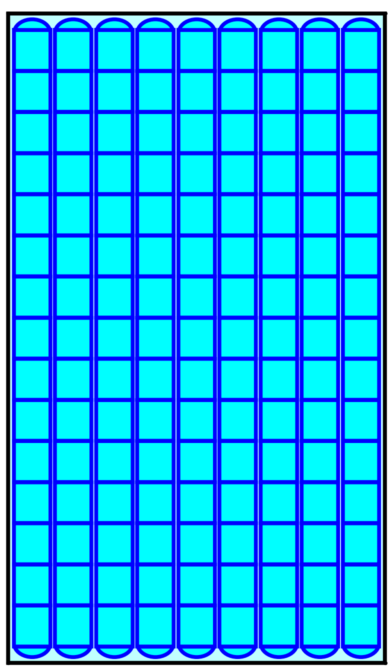
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

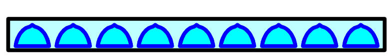
135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 15,111.7 cf Chamber Storage

40,954.0 cf Field - 15,111.7 cf Chambers = 25,842.3 cf Stone x 40.0% Voids = 10,336.9 cf Stone Storage

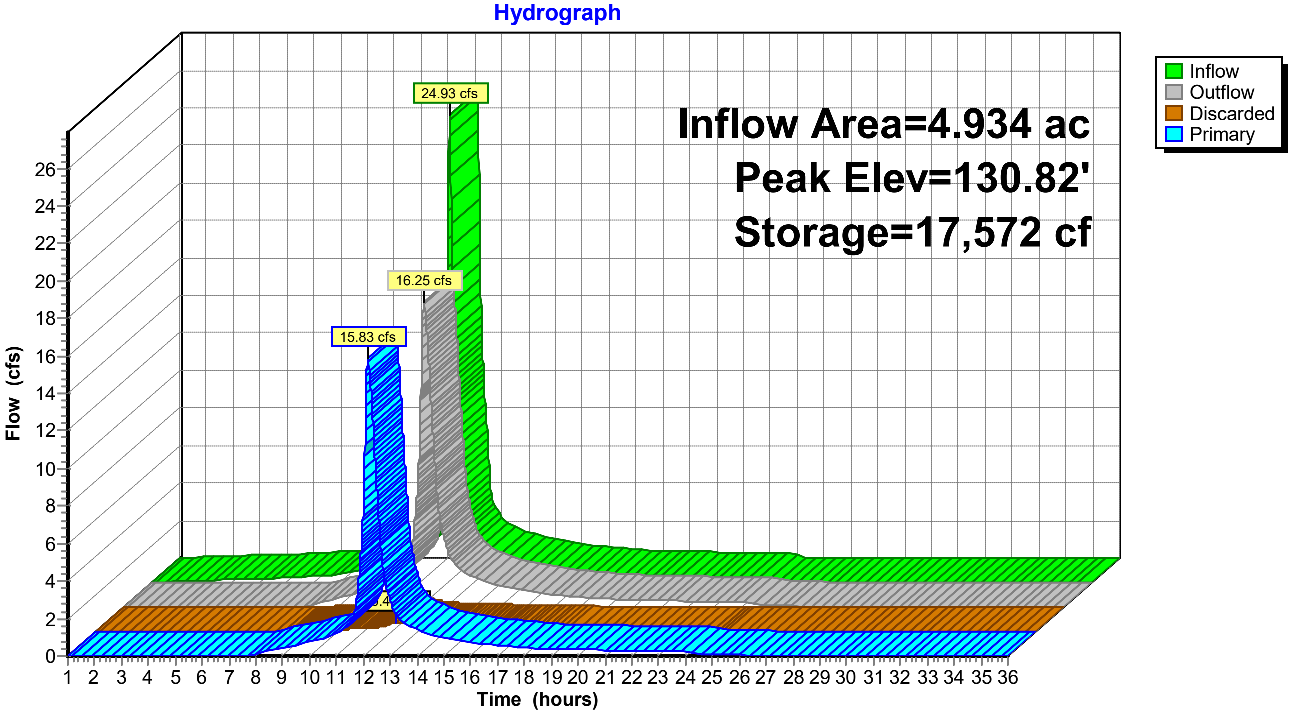
Chamber Storage + Stone Storage = 25,448.6 cf = 0.584 af
Overall Storage Efficiency = 62.1%
Overall System Size = 113.25' x 65.75' x 5.50'

135 Chambers
1,516.8 cy Field
957.1 cy Stone





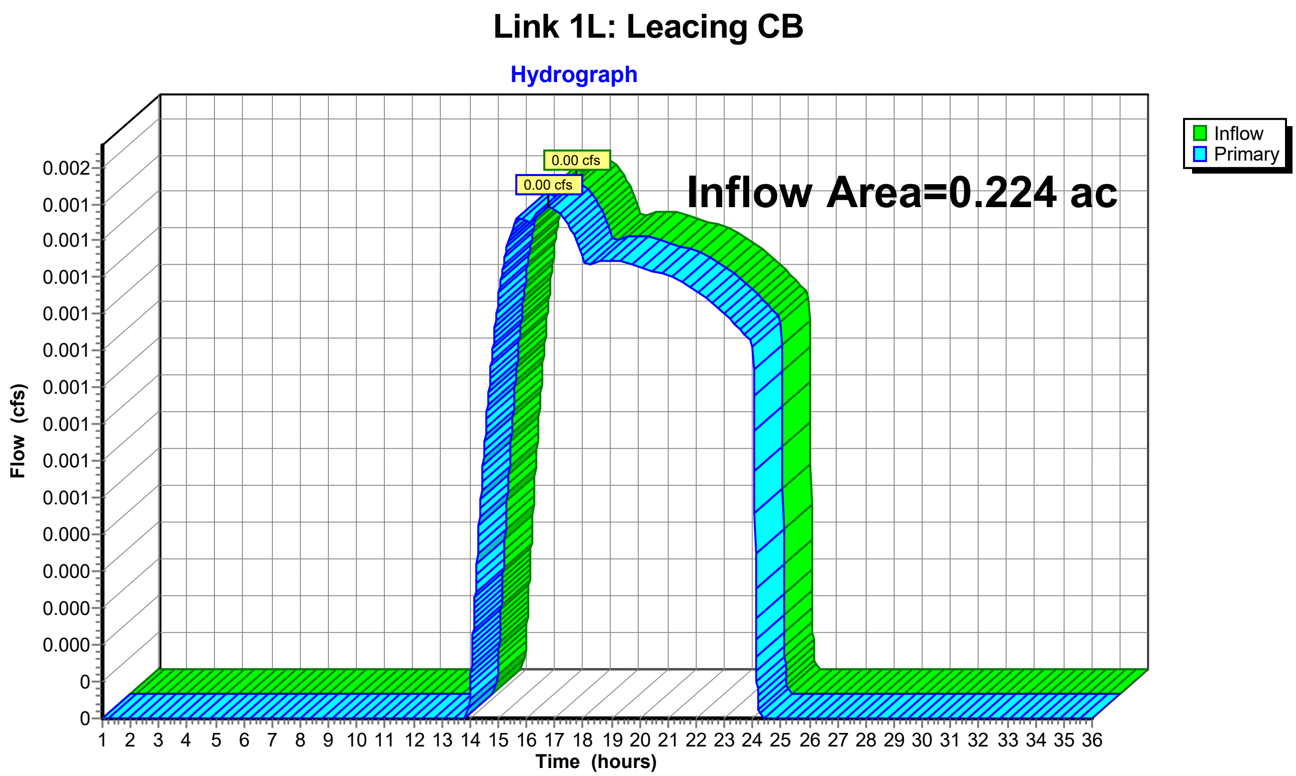
Pond 4P: Infiltration Chambers



Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.05" for 25-year event
Inflow = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

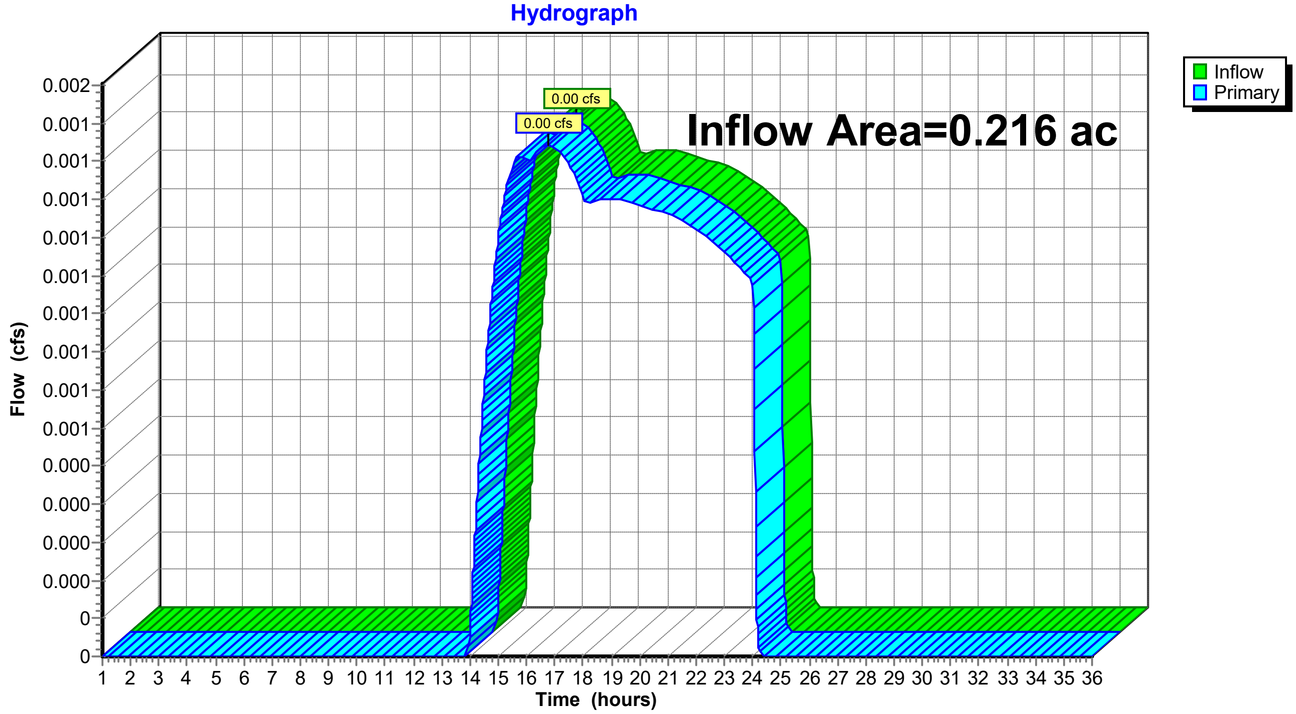


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.216 ac, 0.00% Impervious, Inflow Depth = 0.05" for 25-year event
Inflow = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 16.78 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

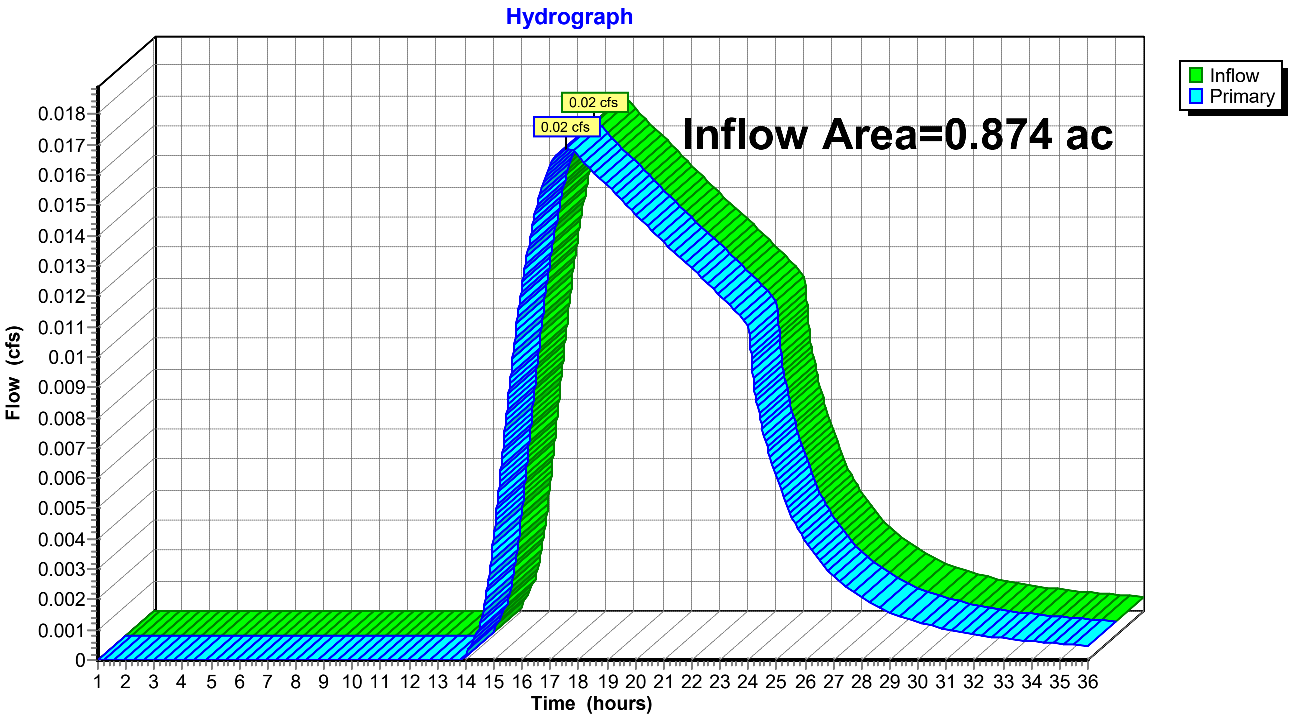


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area =	0.874 ac,	9.43% Impervious,	Inflow Depth > 0.17"	for 25-year event
Inflow =	0.02 cfs @	17.58 hrs, Volume=	0.012 af	
Primary =	0.02 cfs @	17.58 hrs, Volume=	0.012 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

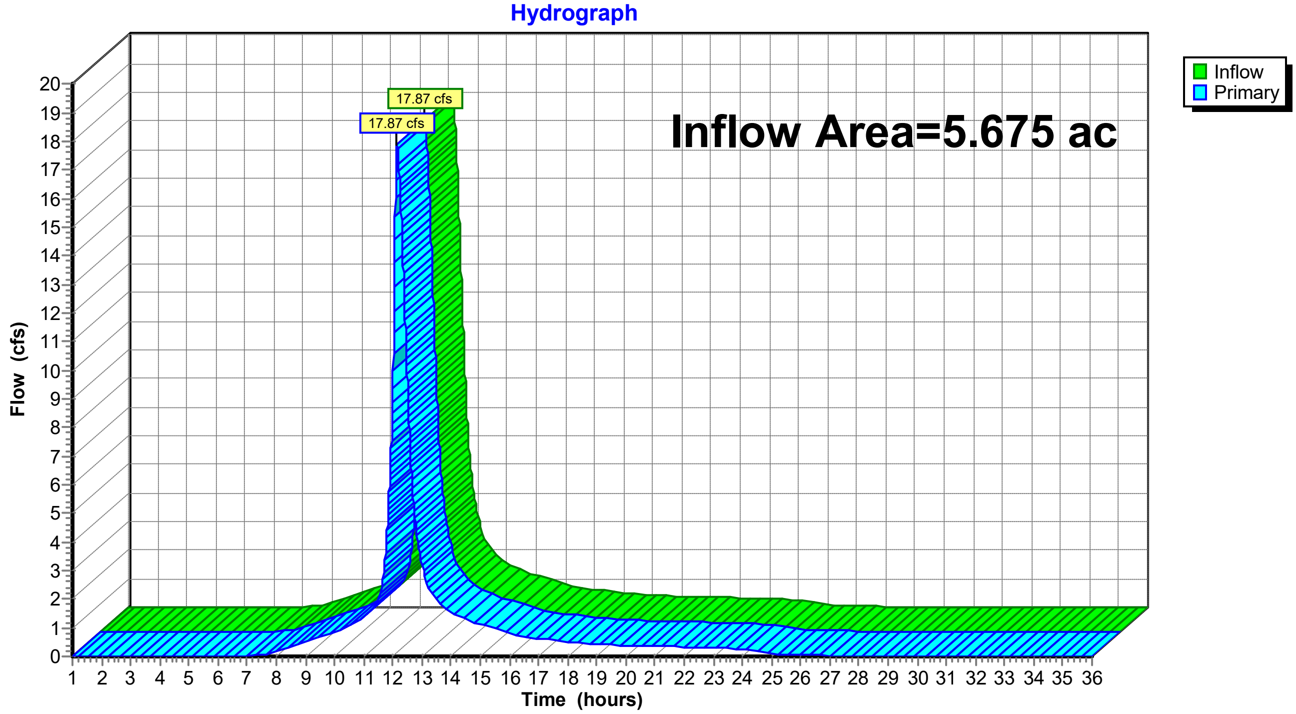


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area = 5.675 ac, 85.67% Impervious, Inflow Depth > 4.07" for 25-year event
Inflow = 17.87 cfs @ 12.15 hrs, Volume= 1.922 af
Primary = 17.87 cfs @ 12.15 hrs, Volume= 1.922 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof	Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>6.86" Tc=6.0 min CN=98 Runoff=11.38 cfs 0.934 af
Subcatchment 2S: Sub 2	Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.23" Tc=6.0 min CN=30 Runoff=0.01 cfs 0.004 af
Subcatchment 3S: Sub 3	Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=4.79" Tc=6.0 min CN=80 Runoff=3.15 cfs 0.226 af
Subcatchment 4S: Sub 4	Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=3.91" Tc=6.0 min CN=72 Runoff=1.47 cfs 0.104 af
Subcatchment 5S: Sub 5	Runoff Area=12,232 sf 62.66% Impervious Runoff Depth=4.02" Tc=6.0 min CN=73 Runoff=1.32 cfs 0.094 af
Subcatchment 6S: Sub 6	Runoff Area=13,636 sf 0.00% Impervious Runoff Depth=0.23" Tc=6.0 min CN=30 Runoff=0.01 cfs 0.006 af
Subcatchment 7S: Sub 7	Runoff Area=2,471 sf 100.00% Impervious Runoff Depth>6.86" Tc=6.0 min CN=98 Runoff=0.40 cfs 0.032 af
Subcatchment 8S: Sub 8	Runoff Area=24,444 sf 14.69% Impervious Runoff Depth=0.88" Tc=6.0 min CN=40 Runoff=0.32 cfs 0.041 af
Subcatchment 9S: Sub 9	Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=6.51" Tc=6.0 min CN=95 Runoff=1.72 cfs 0.136 af
Subcatchment 10S: Sub 10	Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=4.46" Tc=6.0 min CN=77 Runoff=2.21 cfs 0.158 af
Subcatchment 11S: Sub 11	Runoff Area=6,808 sf 98.43% Impervious Runoff Depth>6.74" Tc=6.0 min CN=97 Runoff=1.08 cfs 0.088 af
Subcatchment 12S: Sub 12	Runoff Area=5,470 sf 0.00% Impervious Runoff Depth=0.23" Tc=6.0 min CN=30 Runoff=0.00 cfs 0.002 af
Subcatchment 13S: Sub 13	Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=5.92" Tc=6.0 min CN=90 Runoff=0.50 cfs 0.038 af
Subcatchment 14S: Sub 14	Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=6.51" Tc=6.0 min CN=95 Runoff=0.61 cfs 0.049 af
Subcatchment 15S: Sub 15	Runoff Area=13,783 sf 99.17% Impervious Runoff Depth>6.74" Tc=6.0 min CN=97 Runoff=2.20 cfs 0.178 af
Subcatchment 16S: Sub 16	Runoff Area=11,011 sf 100.00% Impervious Runoff Depth>6.86" Tc=6.0 min CN=98 Runoff=1.76 cfs 0.144 af

Subcatchment 17S: Sub 17 Runoff Area=11,222 sf 100.00% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=98 Runoff=1.79 cfs 0.147 af

Subcatchment 18S: Sub 18 Runoff Area=21,593 sf 92.74% Impervious Runoff Depth=6.27"
Tc=6.0 min CN=93 Runoff=3.35 cfs 0.259 af

Subcatchment 19S: Sub 19 Runoff Area=10,851 sf 98.57% Impervious Runoff Depth>6.74"
Tc=6.0 min CN=97 Runoff=1.73 cfs 0.140 af

Subcatchment 20S: Sub 20 Runoff Area=10,690 sf 3.71% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=33 Runoff=0.03 cfs 0.008 af

Subcatchment 21S: Sub 21 Runoff Area=3,953 sf 0.00% Impervious Runoff Depth=0.23"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.002 af

Pond 2P: Rain Garden Peak Elev=132.04' Storage=681 cf Inflow=0.32 cfs 0.041 af
Primary=0.05 cfs 0.032 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.032 af

Pond 3P: Rain Garden Peak Elev=133.90' Storage=347 cf Inflow=3.35 cfs 0.259 af
Primary=0.90 cfs 0.201 af Secondary=2.43 cfs 0.058 af Outflow=3.33 cfs 0.259 af

Pond 4P: Infiltration Chambers Peak Elev=131.53' Storage=20,901 cf Inflow=31.33 cfs 2.469 af
Discarded=0.43 cfs 0.183 af Primary=18.35 cfs 2.192 af Outflow=18.78 cfs 2.376 af

Link 1L: Leacing CB Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Link 2L: Isolated Wetlands Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Link 3L: Spofford Pond Wetlands Inflow=0.06 cfs 0.038 af
Primary=0.06 cfs 0.038 af

Link 4L: Vernal Pool Wetlands Inflow=20.69 cfs 2.459 af
Primary=20.69 cfs 2.459 af

Total Runoff Area = 6.990 ac Runoff Volume = 2.791 af Average Runoff Depth = 4.79"
29.27% Pervious = 2.046 ac 70.73% Impervious = 4.944 ac

Summary for Subcatchment 1S: Roof

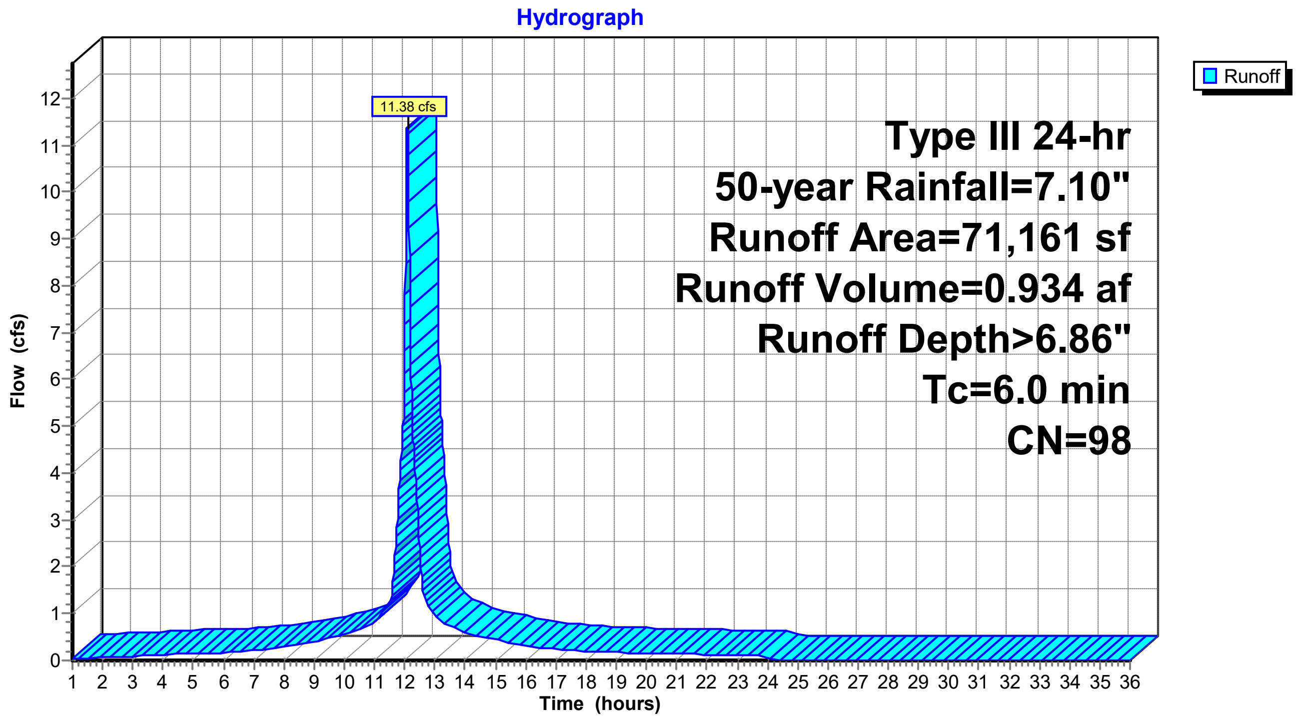
Runoff = 11.38 cfs @ 12.08 hrs, Volume= 0.934 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

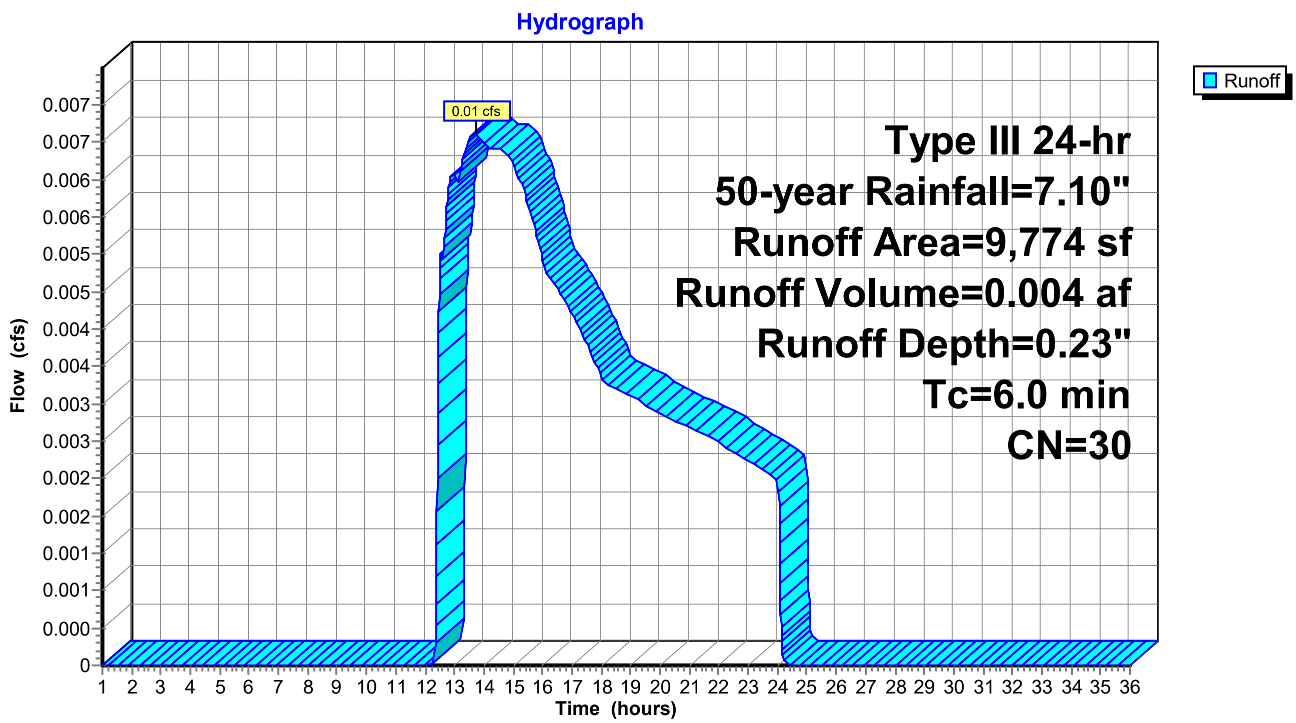
Runoff = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

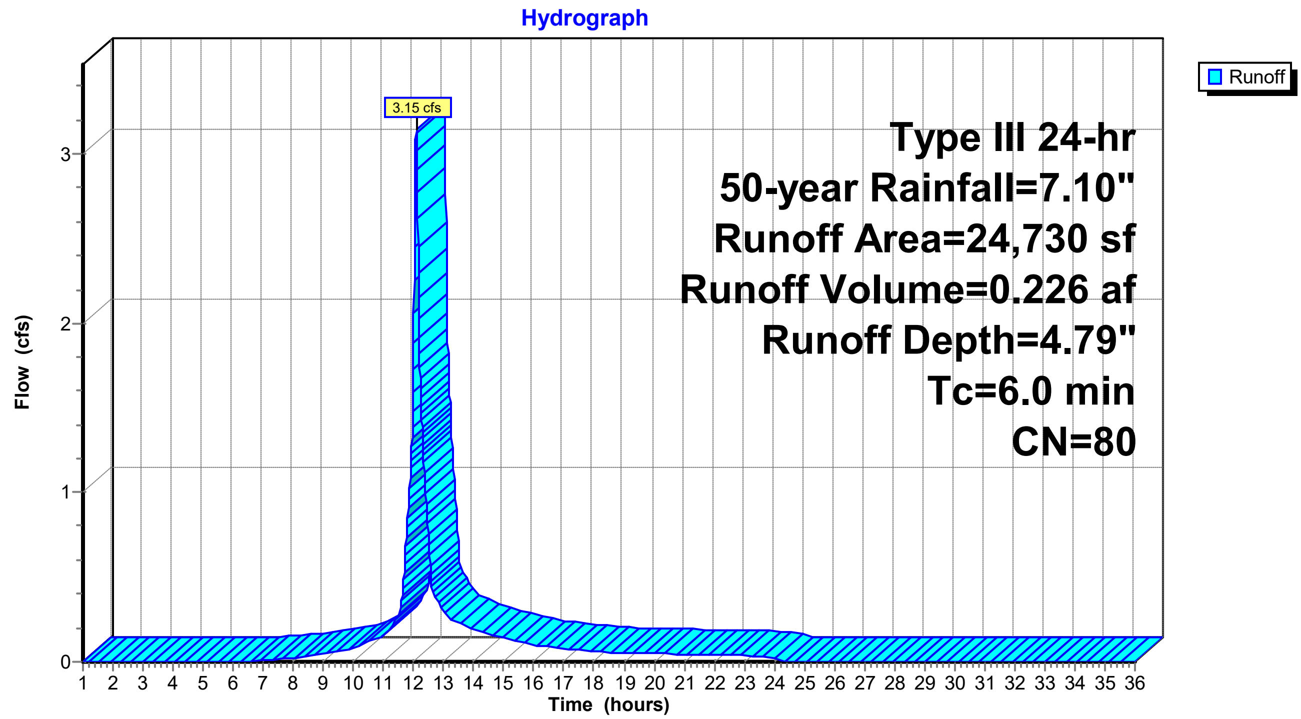
Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.226 af, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

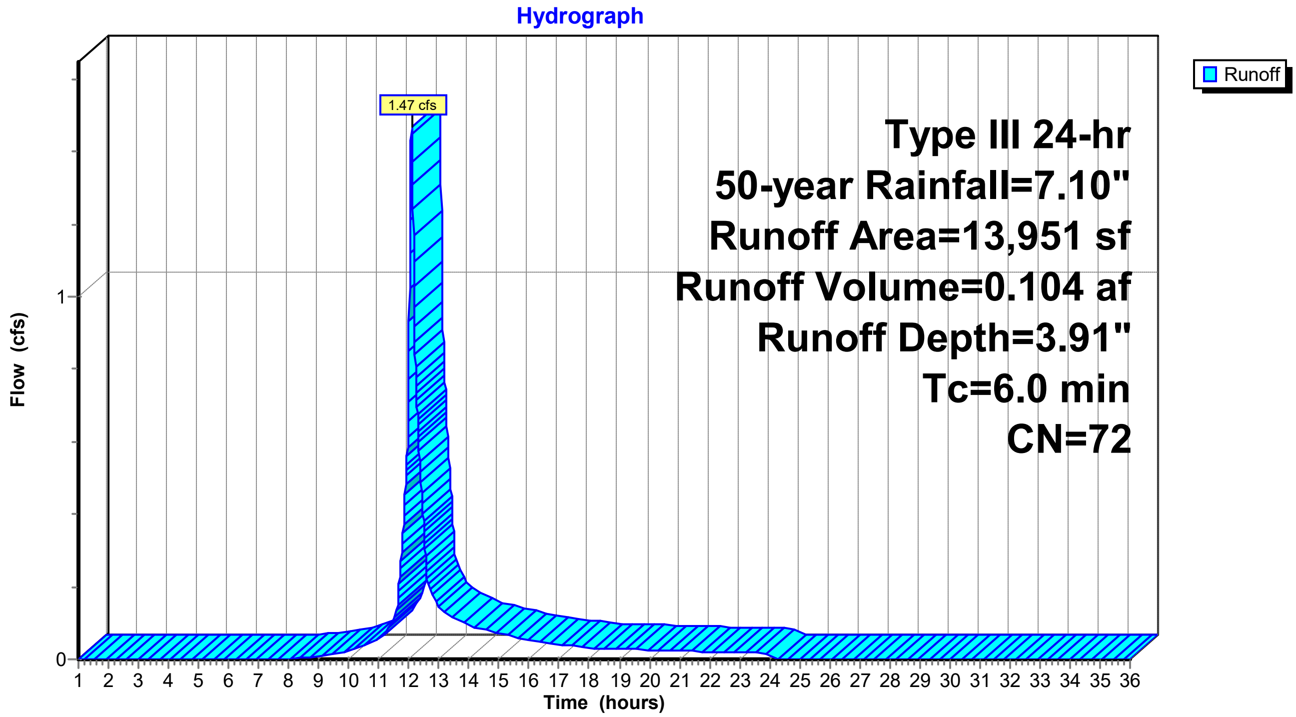
Runoff = 1.47 cfs @ 12.09 hrs, Volume= 0.104 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951	72	Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

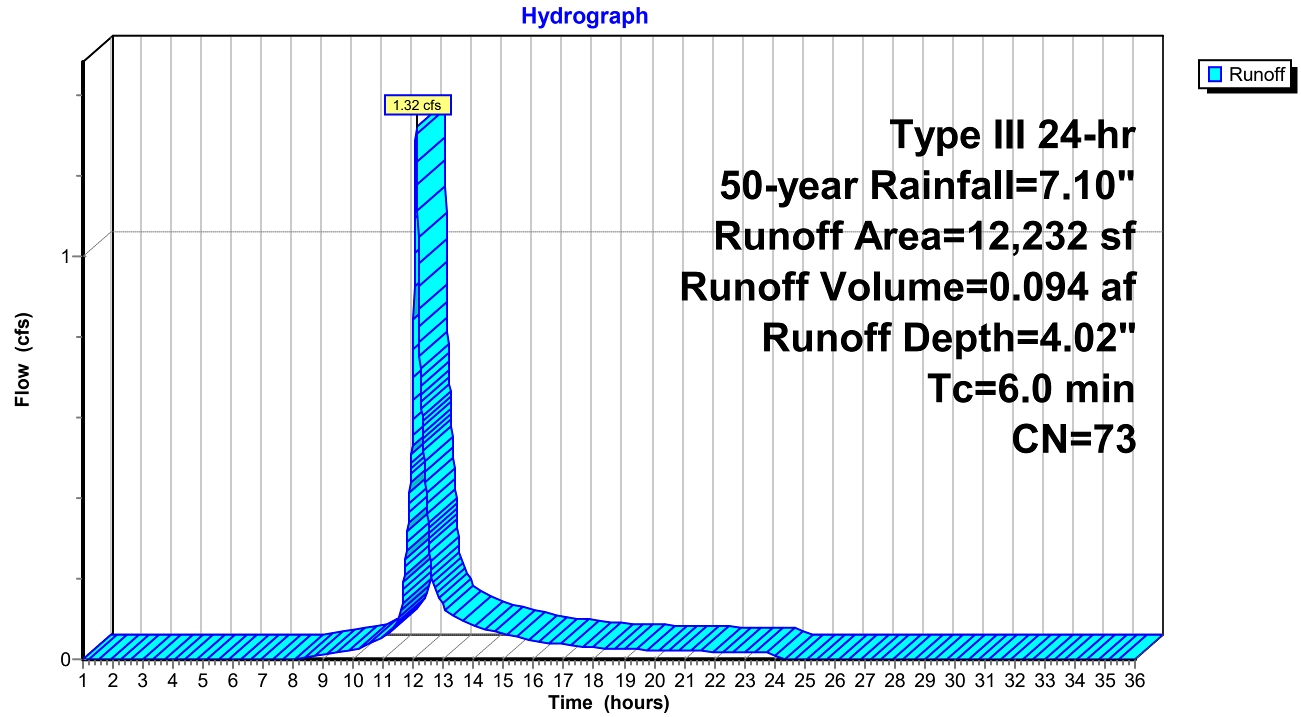
Runoff = 1.32 cfs @ 12.09 hrs, Volume= 0.094 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	7,665	98	Paved parking, HSG A
	201	30	Woods, Good, HSG A
*	4,366	30	Grass
	12,232	73	Weighted Average
	4,567		37.34% Pervious Area
	7,665		62.66% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

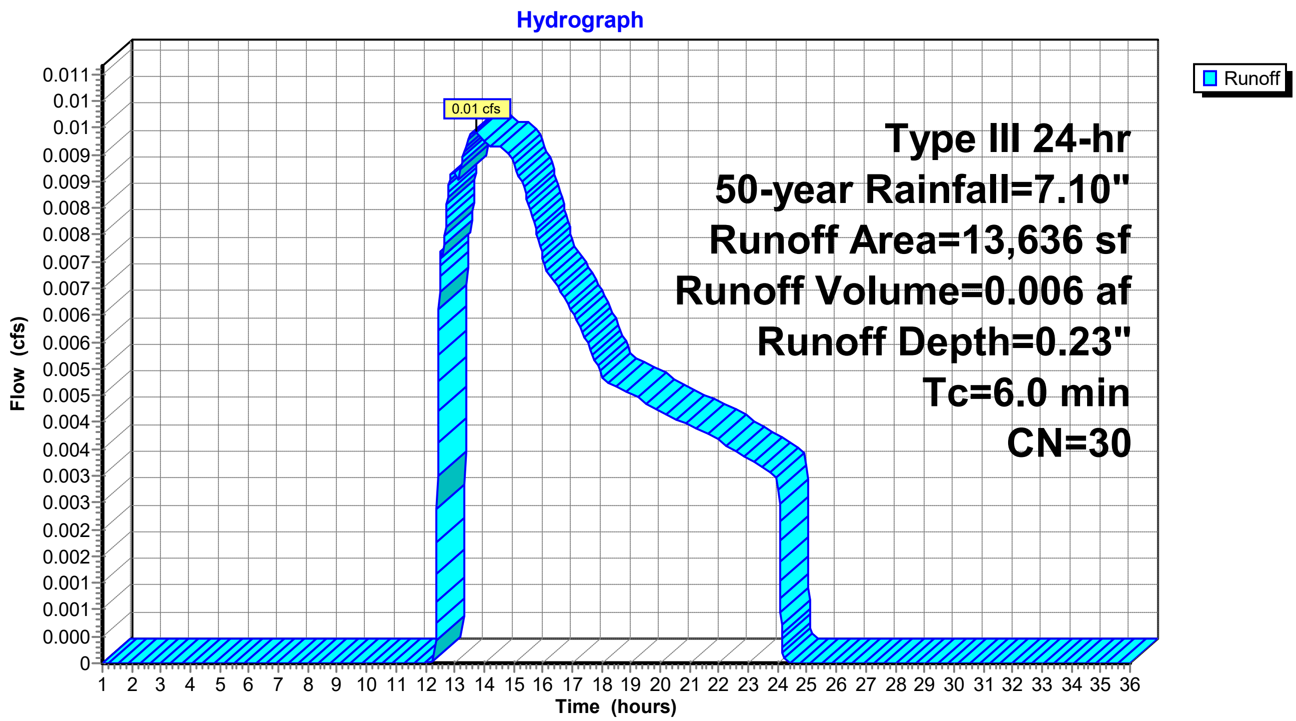
Runoff = 0.01 cfs @ 13.70 hrs, Volume= 0.006 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	5,897	30	Grass
*	7,739	30	Woods
	13,636	30	Weighted Average
	13,636		100.00% Pervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

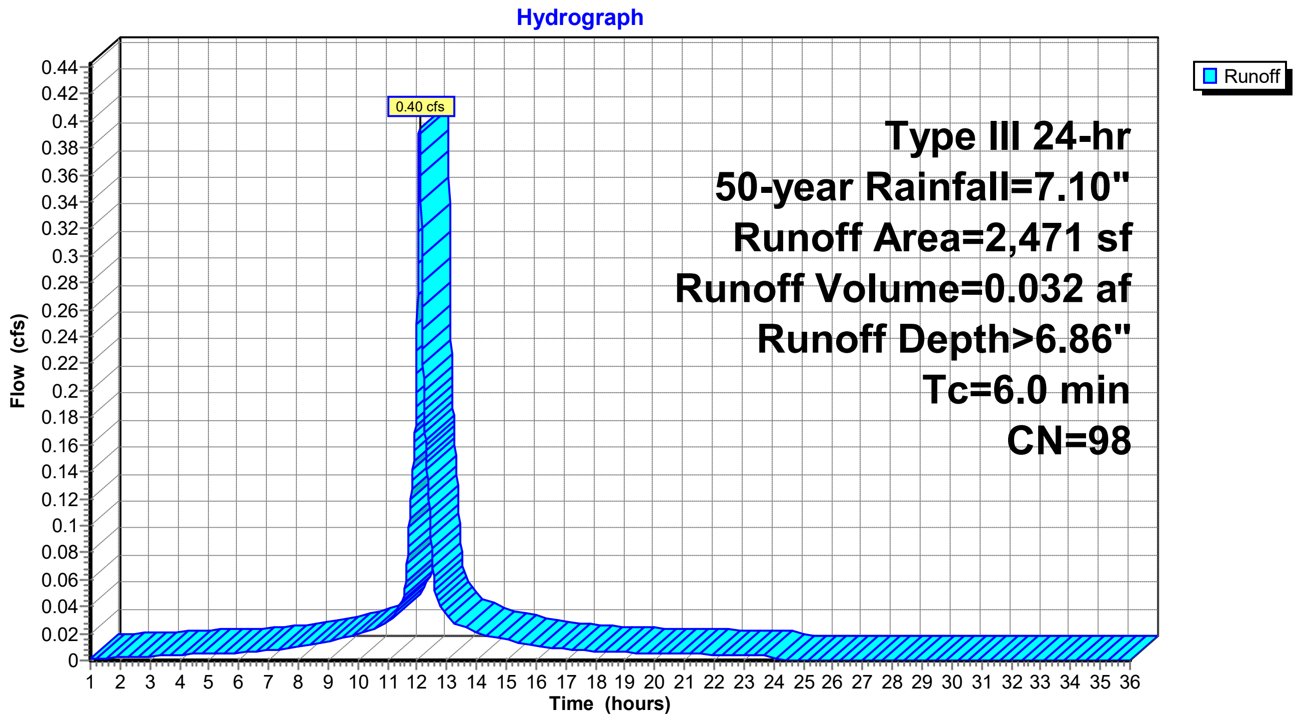
Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

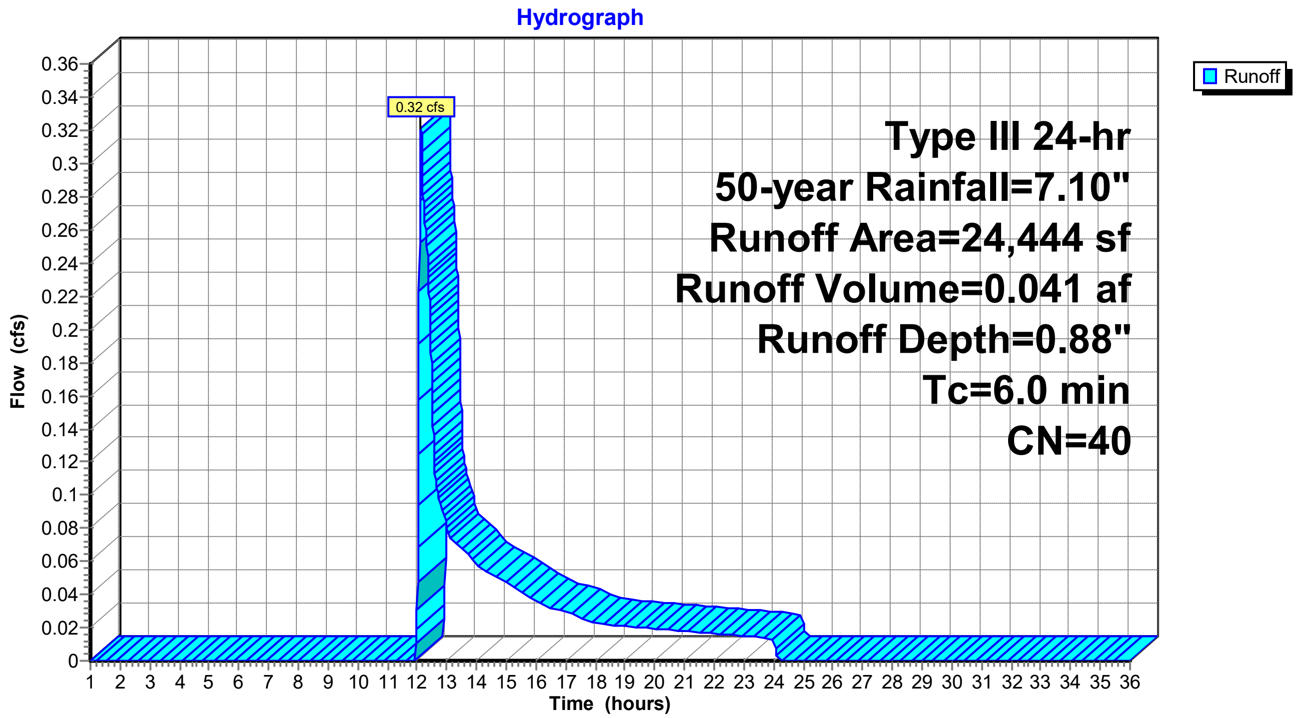
Runoff = 0.32 cfs @ 12.13 hrs, Volume= 0.041 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	3,592	98	Paved parking, HSG A
*	20,852	30	Grass
	24,444	40	Weighted Average
	20,852		85.31% Pervious Area
	3,592		14.69% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

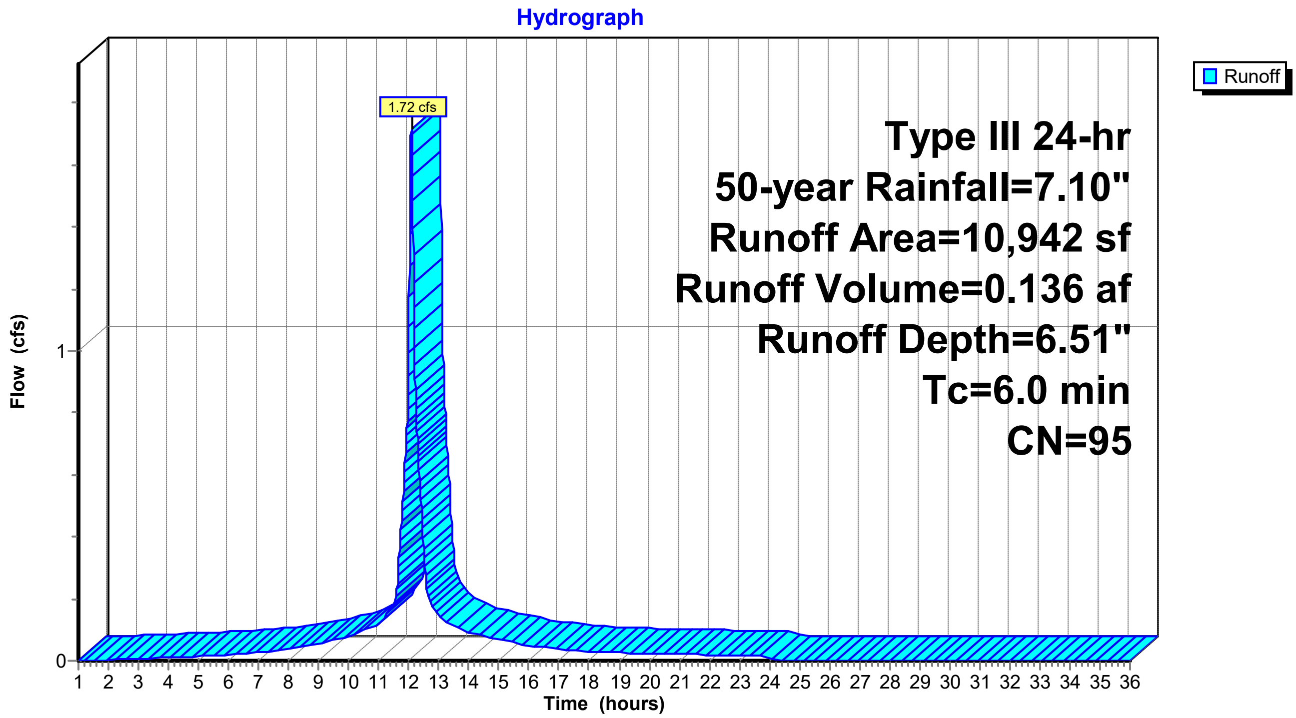
Runoff = 1.72 cfs @ 12.08 hrs, Volume= 0.136 af, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942	95	Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

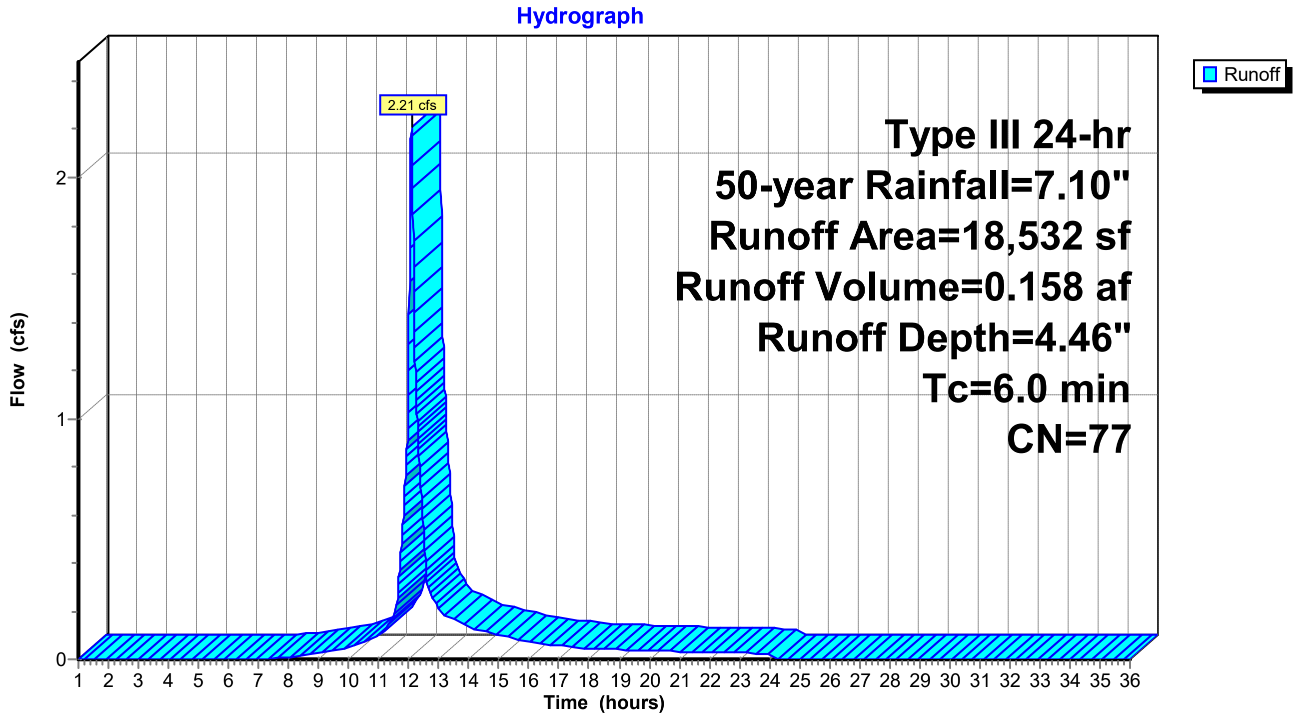
Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532	77	Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

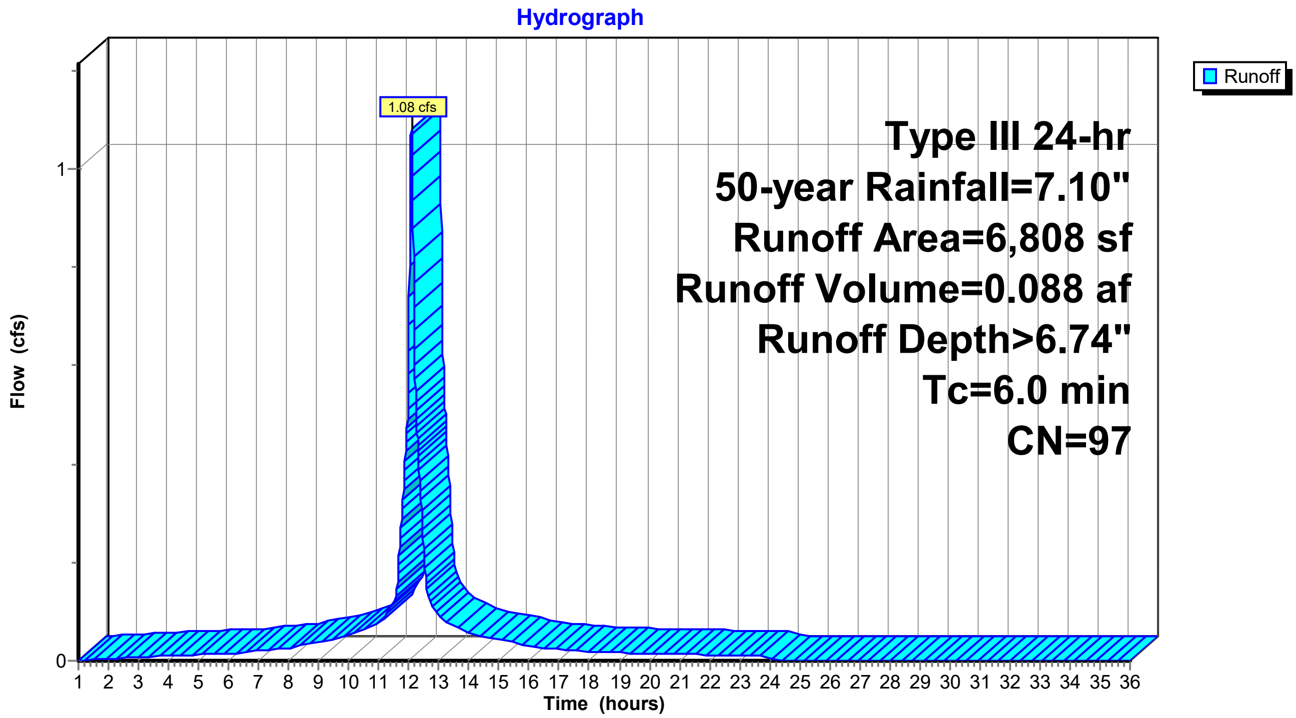
Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.088 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808	97	Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 11S: Sub 11



Summary for Subcatchment 12S: Sub 12

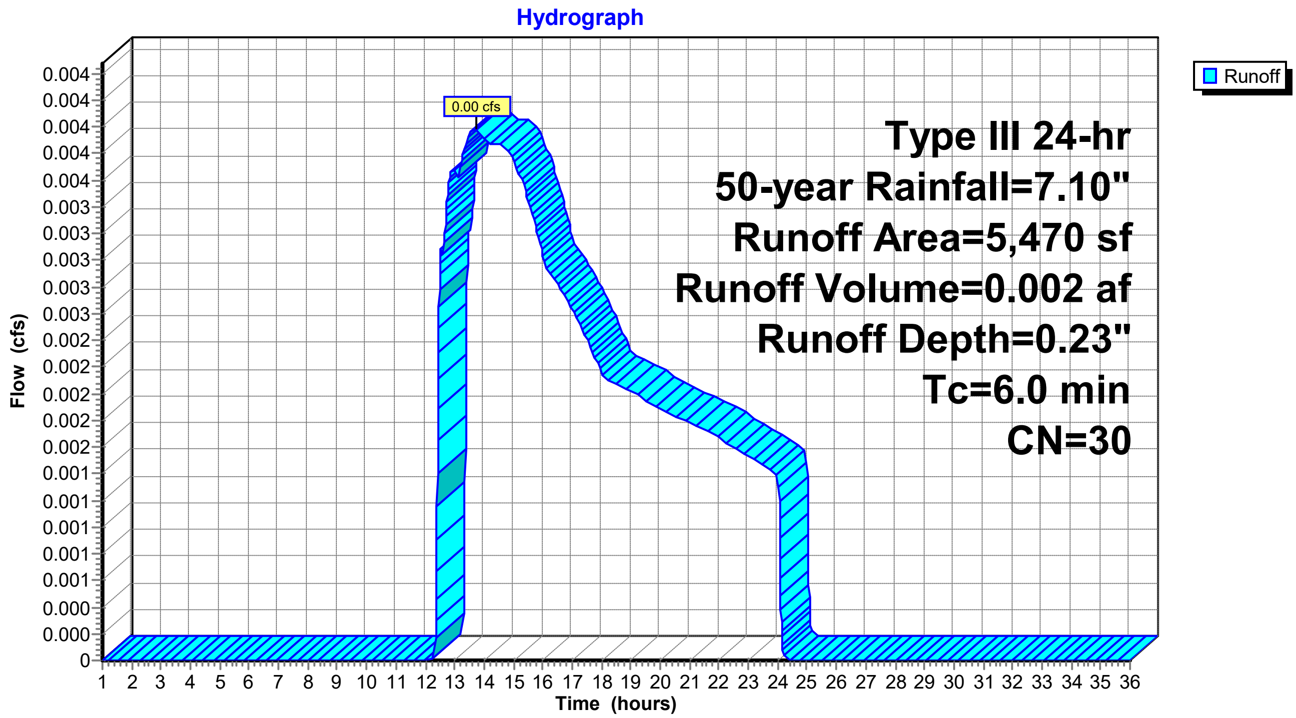
Runoff = 0.00 cfs @ 13.70 hrs, Volume= 0.002 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	5,470	30	Grass
	5,470		100.00% Pervious Area

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

Subcatchment 12S: Sub 12



Summary for Subcatchment 13S: Sub 13

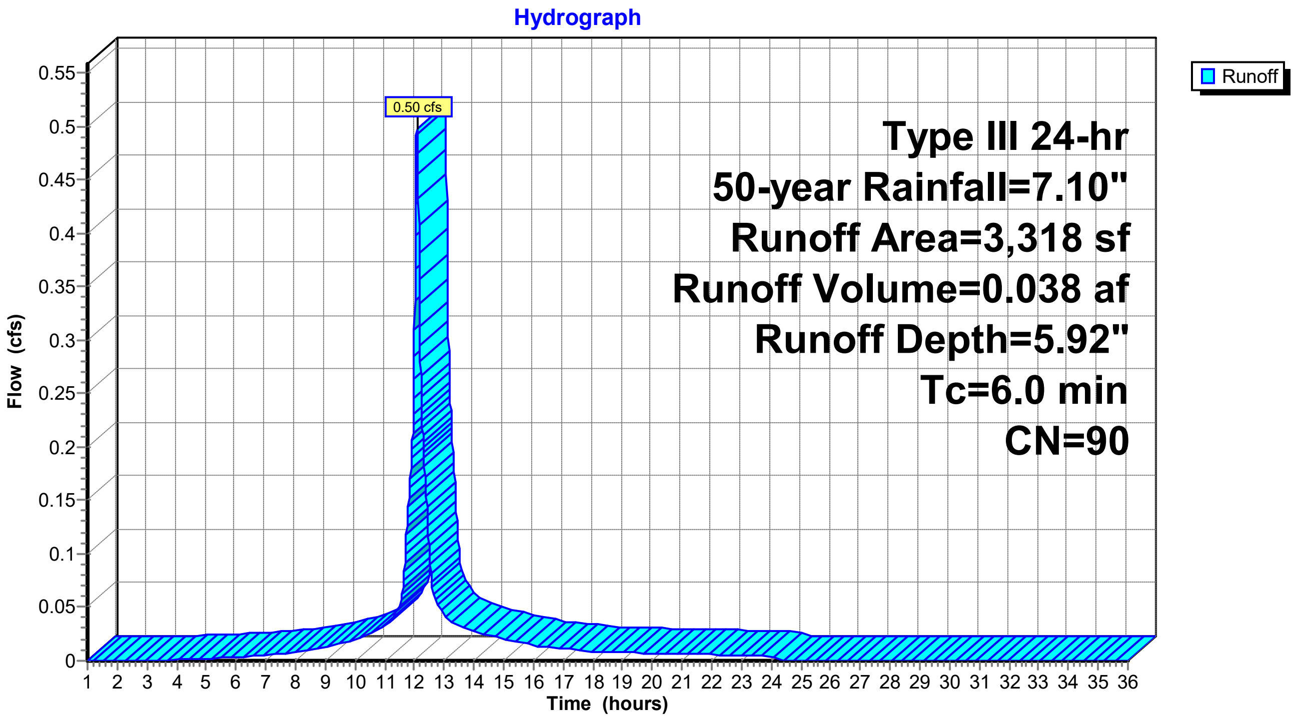
Runoff = 0.50 cfs @ 12.08 hrs, Volume= 0.038 af, Depth= 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318	90	Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 13S: Sub 13



Summary for Subcatchment 14S: Sub 14

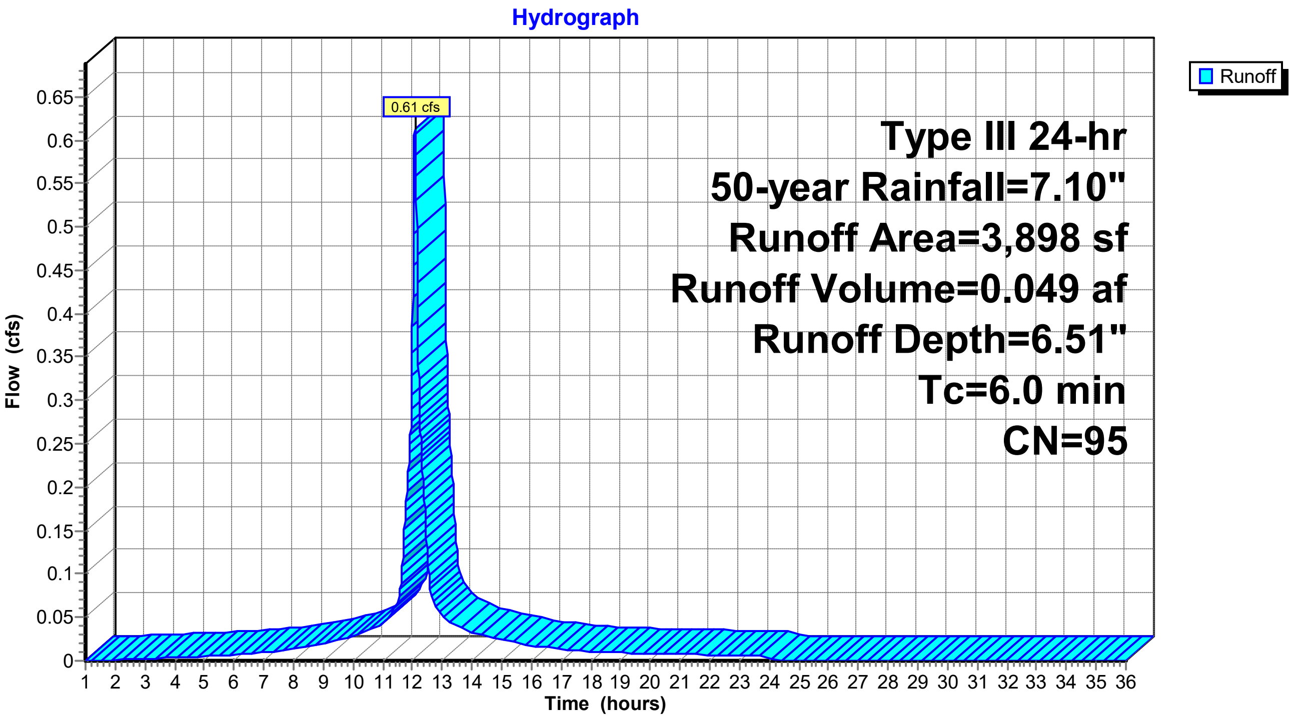
Runoff = 0.61 cfs @ 12.08 hrs, Volume= 0.049 af, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898	95	Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 14S: Sub 14



Summary for Subcatchment 15S: Sub 15

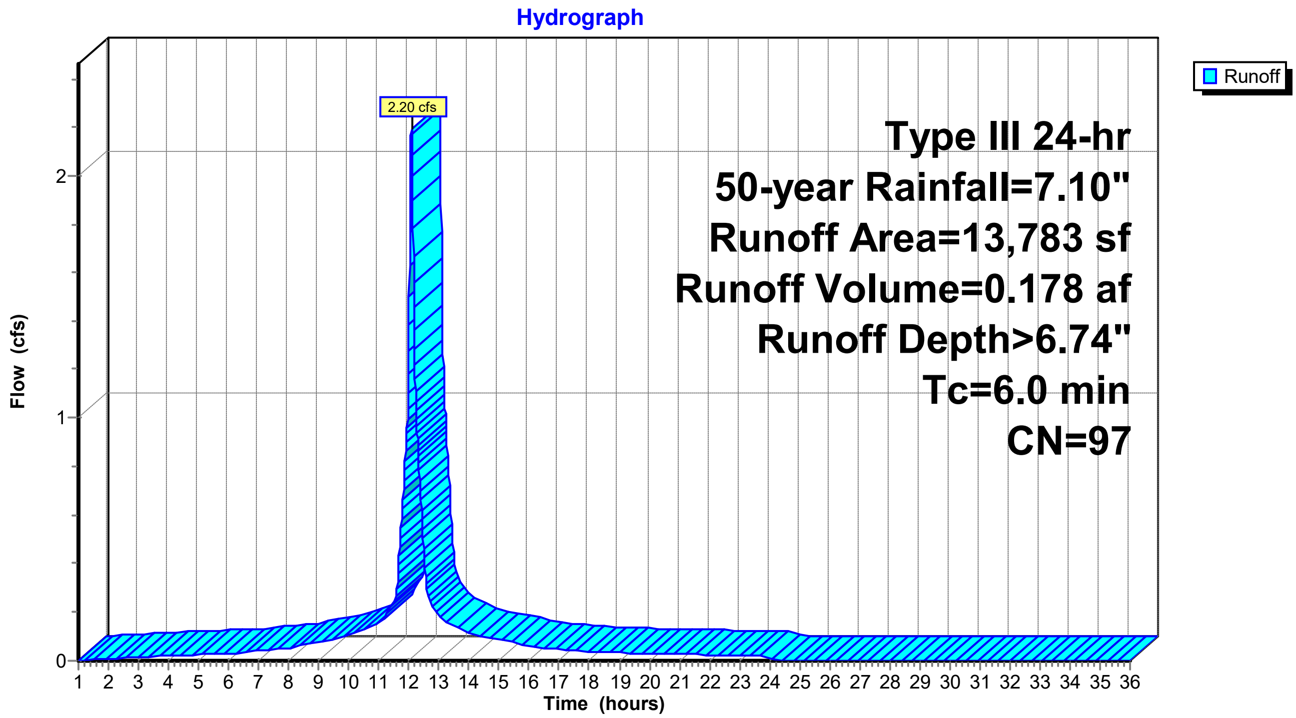
Runoff = 2.20 cfs @ 12.08 hrs, Volume= 0.178 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783	97	Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 15S: Sub 15



Summary for Subcatchment 16S: Sub 16

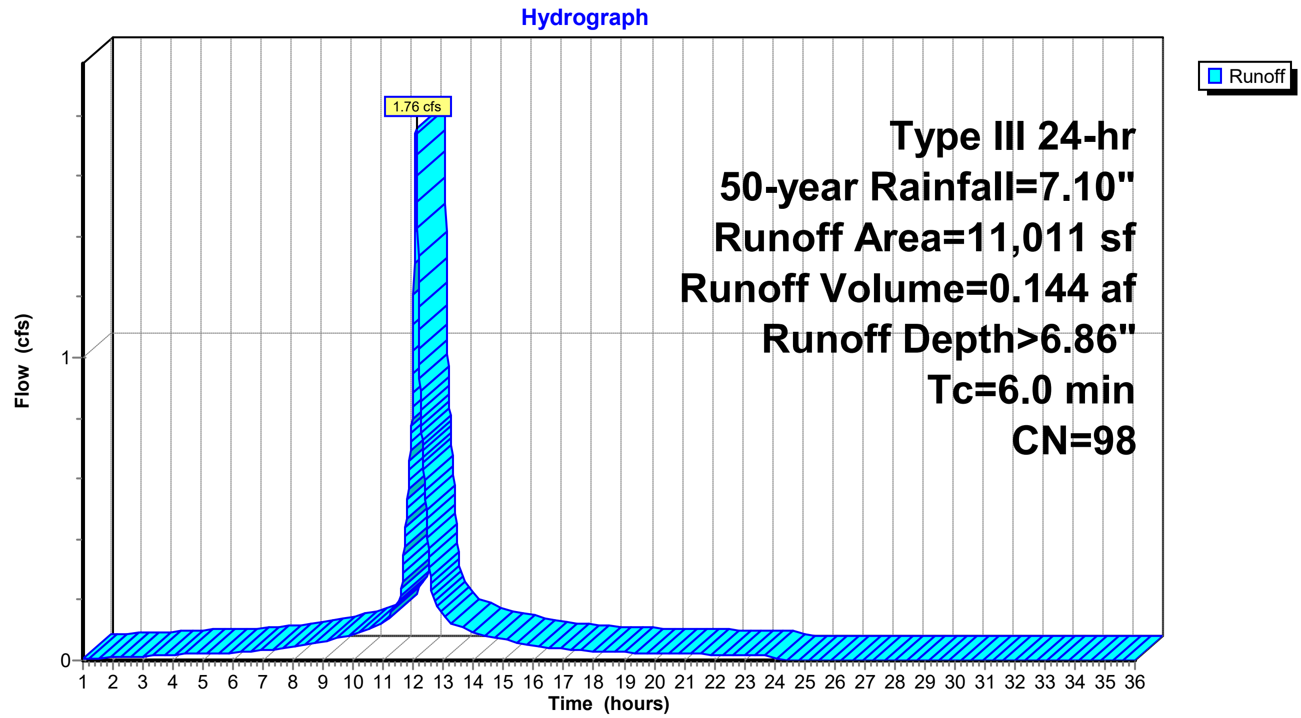
Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.144 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 16S: Sub 16



Summary for Subcatchment 17S: Sub 17

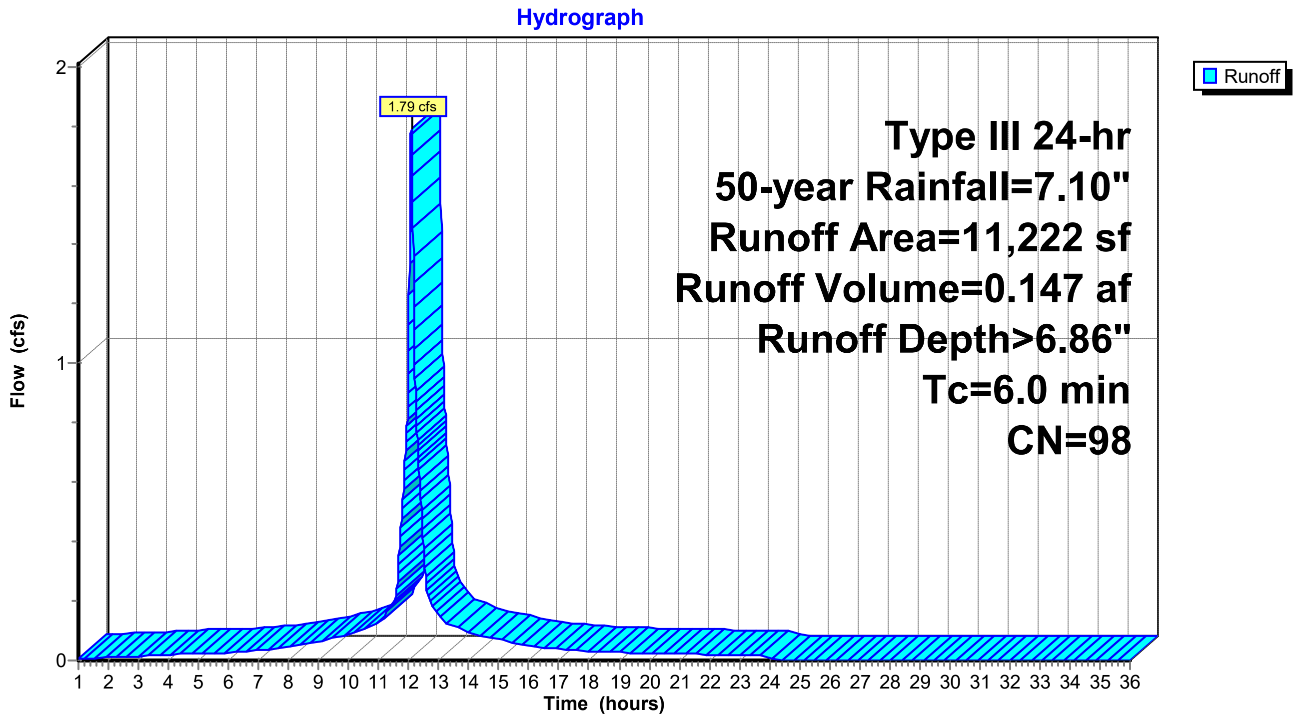
Runoff = 1.79 cfs @ 12.08 hrs, Volume= 0.147 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 17S: Sub 17



Summary for Subcatchment 18S: Sub 18

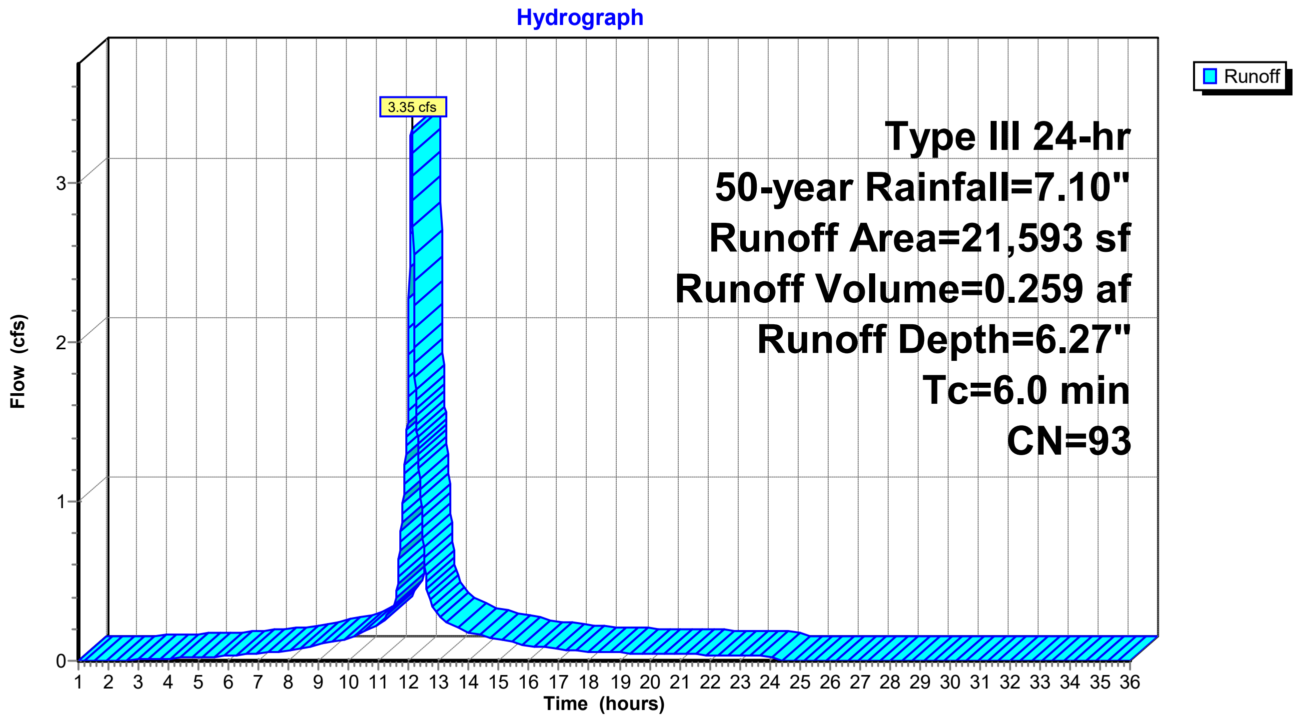
Runoff = 3.35 cfs @ 12.08 hrs, Volume= 0.259 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	1,568	30	Grass
	20,025	98	Paved parking, HSG A
	21,593	93	Weighted Average
	1,568		7.26% Pervious Area
	20,025		92.74% Impervious Area

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

Subcatchment 18S: Sub 18



Summary for Subcatchment 19S: Sub 19

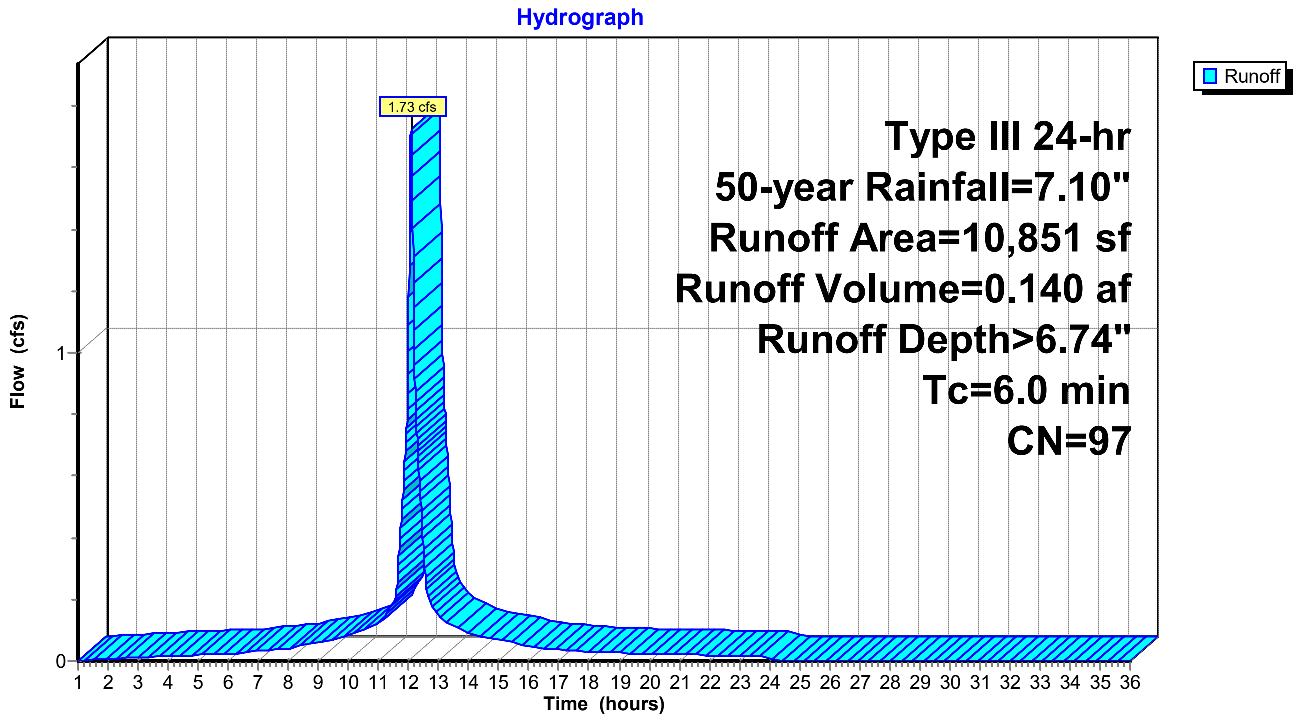
Runoff = 1.73 cfs @ 12.08 hrs, Volume= 0.140 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851	97	Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 19S: Sub 19



Summary for Subcatchment 20S: Sub 20

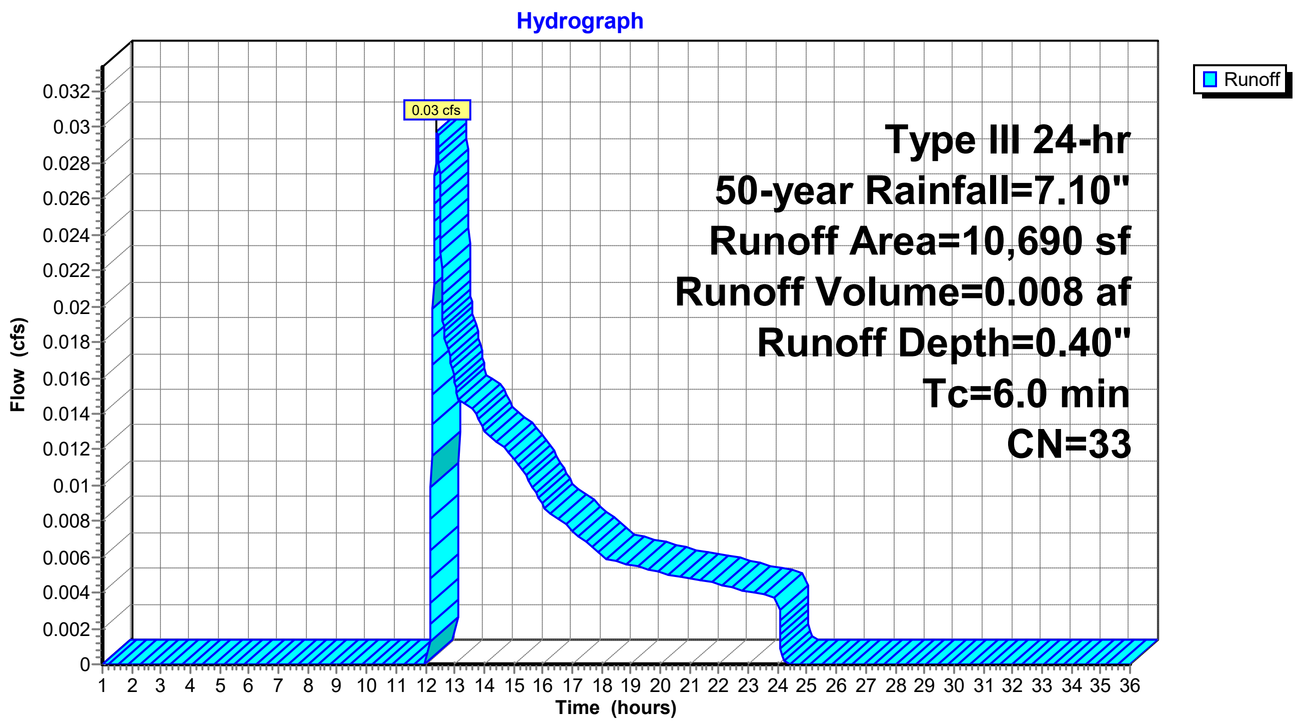
Runoff = 0.03 cfs @ 12.40 hrs, Volume= 0.008 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	5,866	30	Grass
	397	98	Paved parking, HSG A
*	4,427	30	Woods
	10,690	33	Weighted Average
	10,293		96.29% Pervious Area
	397		3.71% Impervious Area

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

Subcatchment 20S: Sub 20



Summary for Subcatchment 21S: Sub 21

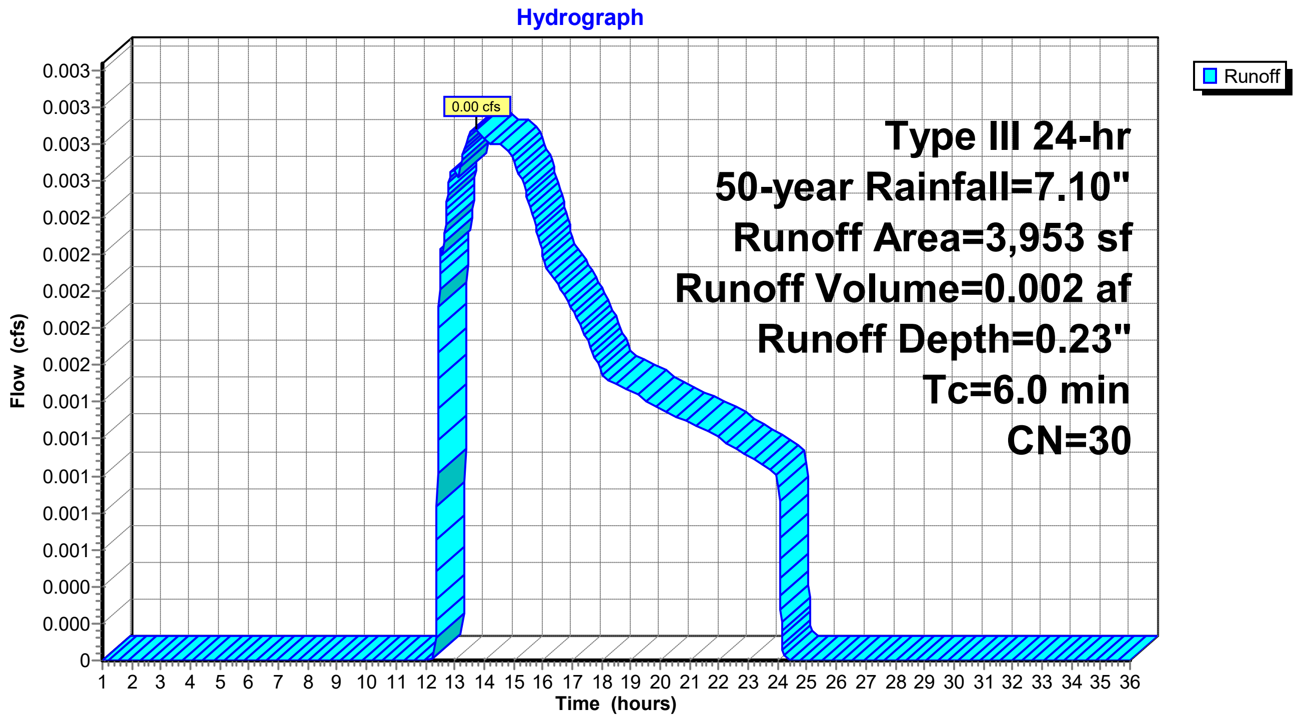
Runoff = 0.00 cfs @ 13.70 hrs, Volume= 0.002 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-year Rainfall=7.10"

	Area (sf)	CN	Description
*	3,953	30	Grass
	3,953		100.00% Pervious Area

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

Subcatchment 21S: Sub 21



Summary for Pond 2P: Rain Garden

Inflow Area = 0.561 ac, 14.69% Impervious, Inflow Depth = 0.88" for 50-year event
Inflow = 0.32 cfs @ 12.13 hrs, Volume= 0.041 af
Outflow = 0.05 cfs @ 14.44 hrs, Volume= 0.032 af, Atten= 83%, Lag= 138.6 min
Primary = 0.05 cfs @ 14.44 hrs, Volume= 0.032 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 132.04' @ 14.44 hrs Surf.Area= 982 sf Storage= 681 cf

Plug-Flow detention time= 257.6 min calculated for 0.032 af (77% of inflow)
Center-of-Mass det. time= 163.3 min (1,085.6 - 922.3)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	5,119 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

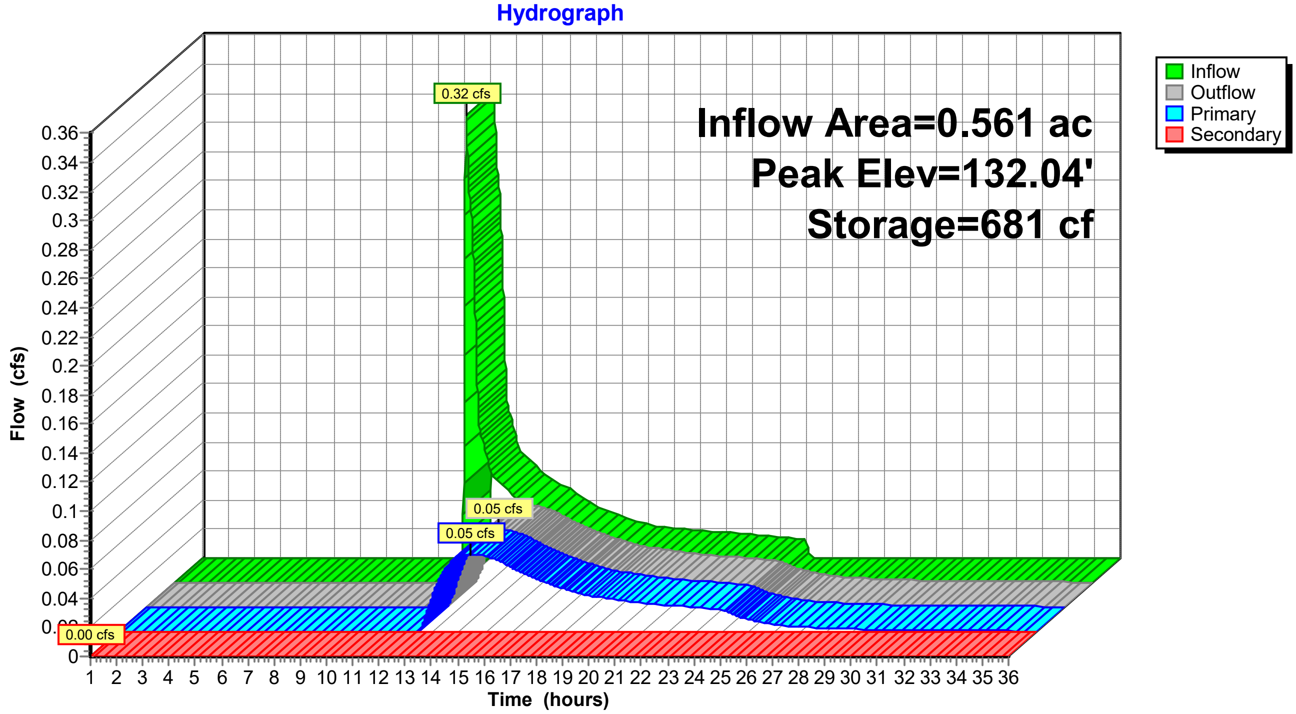
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
131.00	380	117.0	0	0	380
132.00	940	197.0	639	639	2,385
133.00	2,137	251.0	1,498	2,137	4,323
134.00	3,916	351.0	2,982	5,119	9,123

Device	Routing	Invert	Outlet Devices
#1	Secondary	132.95'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	131.70'	**12.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.70' / 130.87' S= 0.0098 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 14.44 hrs HW=132.04' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 0.05 cfs @ 0.33 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Rain Garden



Summary for Pond 3P: Rain Garden

Inflow Area = 0.496 ac, 92.74% Impervious, Inflow Depth = 6.27" for 50-year event
Inflow = 3.35 cfs @ 12.08 hrs, Volume= 0.259 af
Outflow = 3.33 cfs @ 12.09 hrs, Volume= 0.259 af, Atten= 1%, Lag= 0.6 min
Primary = 0.90 cfs @ 12.09 hrs, Volume= 0.201 af
Secondary = 2.43 cfs @ 12.09 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 133.90' @ 12.09 hrs Surf.Area= 662 sf Storage= 347 cf

Plug-Flow detention time= 7.8 min calculated for 0.259 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (776.2 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1	133.00'	1,491 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

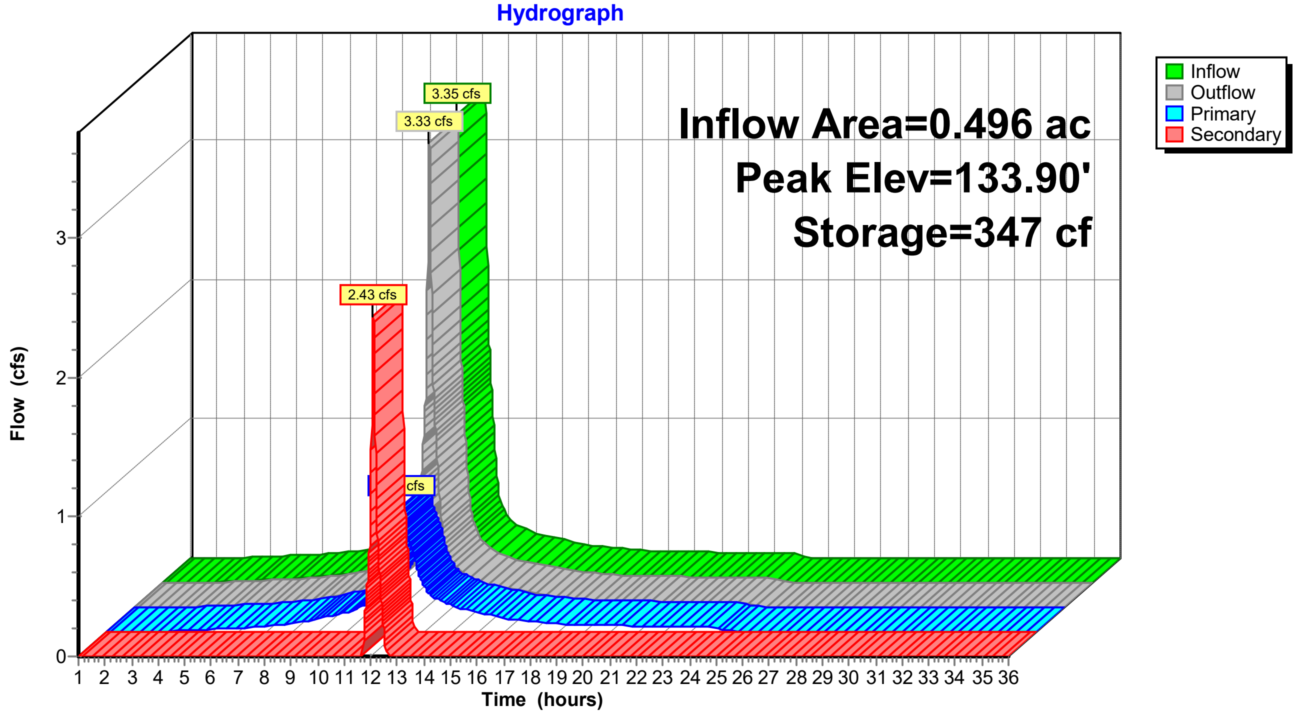
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.00	167	151.5	0	0	167
134.00	739	233.4	419	419	2,683
135.00	1,444	246.6	1,072	1,491	3,241

Device	Routing	Invert	Outlet Devices
#1	Secondary	133.69'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	133.00'	**18.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.00' / 129.45' S= 0.0403 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=133.90' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 0.90 cfs @ 1.17 fps)

Secondary OutFlow Max=2.42 cfs @ 12.09 hrs HW=133.90' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Weir Controls 2.42 cfs @ 1.49 fps)

Pond 3P: Rain Garden



Summary for Pond 4P: Infiltration Chambers

Inflow Area = 4.934 ac, 89.04% Impervious, Inflow Depth > 6.00" for 50-year event
Inflow = 31.33 cfs @ 12.08 hrs, Volume= 2.469 af
Outflow = 18.78 cfs @ 12.19 hrs, Volume= 2.376 af, Atten= 40%, Lag= 6.3 min
Discarded = 0.43 cfs @ 12.19 hrs, Volume= 0.183 af
Primary = 18.35 cfs @ 12.19 hrs, Volume= 2.192 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 131.53' @ 12.19 hrs Surf.Area= 7,446 sf Storage= 20,901 cf

Plug-Flow detention time= 72.2 min calculated for 2.375 af (96% of inflow)
Center-of-Mass det. time= 49.7 min (812.6 - 762.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	10,337 cf	**65.75'W x 113.25'L x 5.50'H Field A** 40,954 cf Overall - 15,112 cf Embedded = 25,842 cf x 40.0% Voids
#2A	128.25'	15,112 cf	**ADS_StormTech MC-3500 d +Cap** x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 9 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf
		25,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**24.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.65' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 4	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	128.65'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.43 cfs @ 12.19 hrs HW=131.53' (Free Discharge)
└─**4=Exfiltration** (Controls 0.43 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Passes 0.43 cfs of 0.69 cfs potential flow)

Primary OutFlow Max=18.35 cfs @ 12.19 hrs HW=131.53' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 18.35 cfs @ 5.84 fps)

Pond 4P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

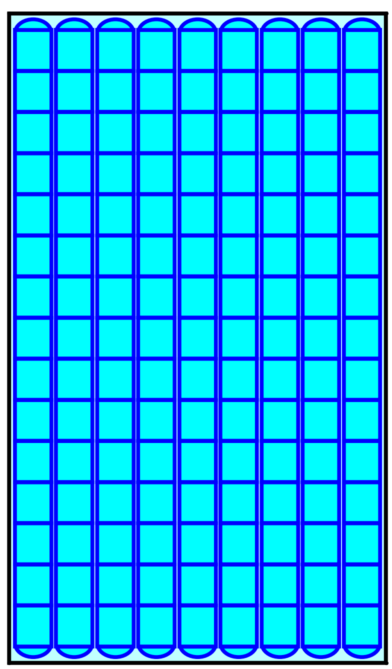
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

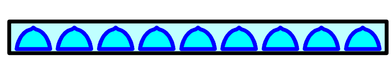
135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 15,111.7 cf Chamber Storage

40,954.0 cf Field - 15,111.7 cf Chambers = 25,842.3 cf Stone x 40.0% Voids = 10,336.9 cf Stone Storage

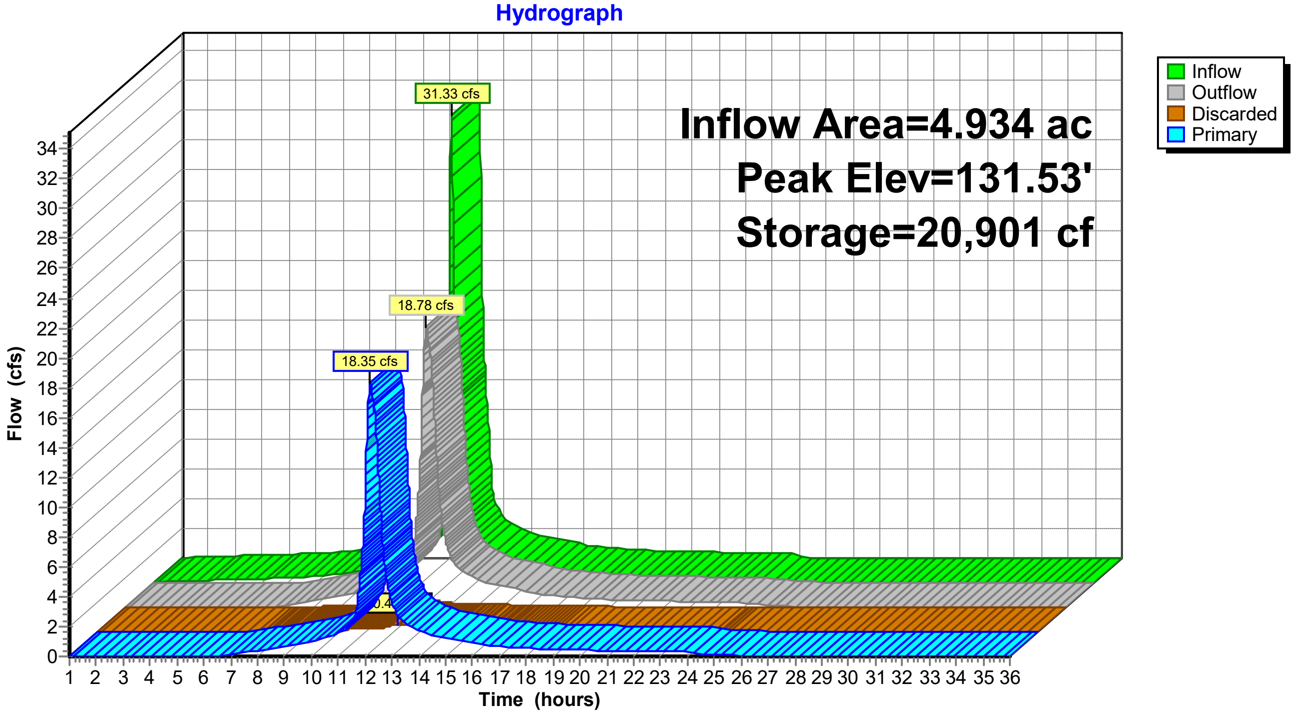
Chamber Storage + Stone Storage = 25,448.6 cf = 0.584 af
Overall Storage Efficiency = 62.1%
Overall System Size = 113.25' x 65.75' x 5.50'

135 Chambers
1,516.8 cy Field
957.1 cy Stone





Pond 4P: Infiltration Chambers

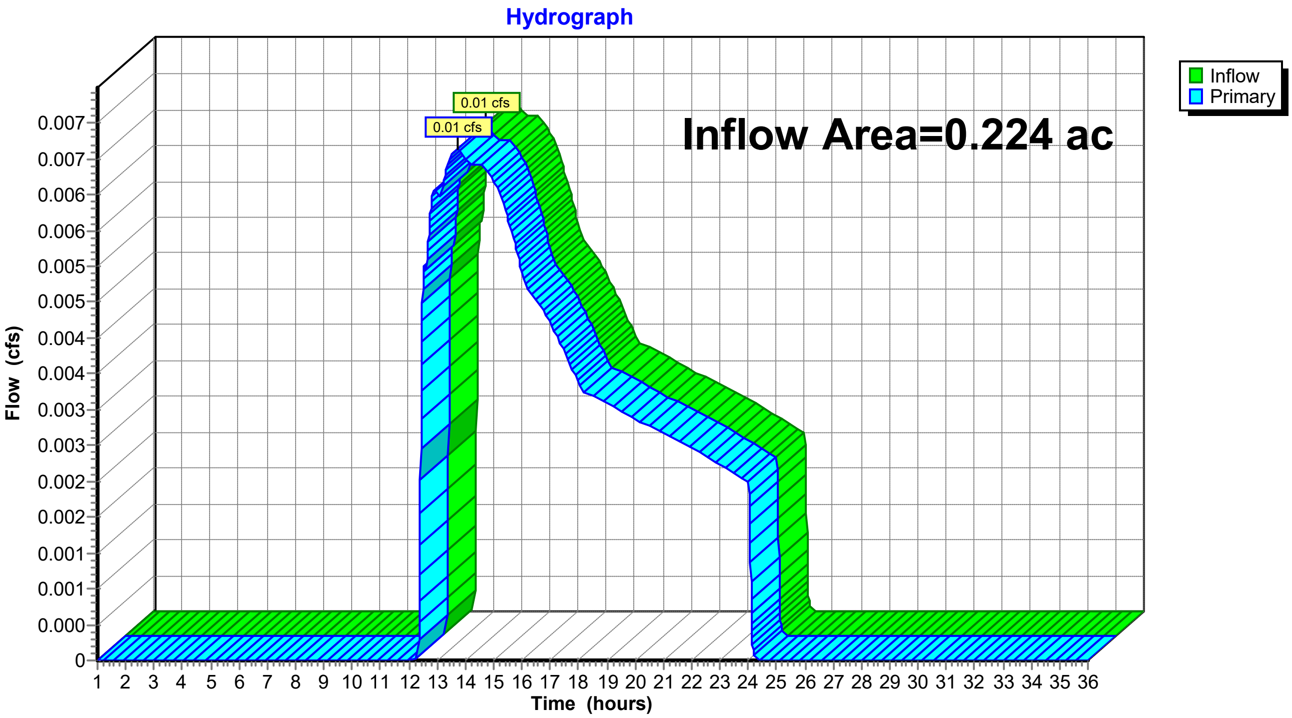


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.23" for 50-year event
Inflow = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

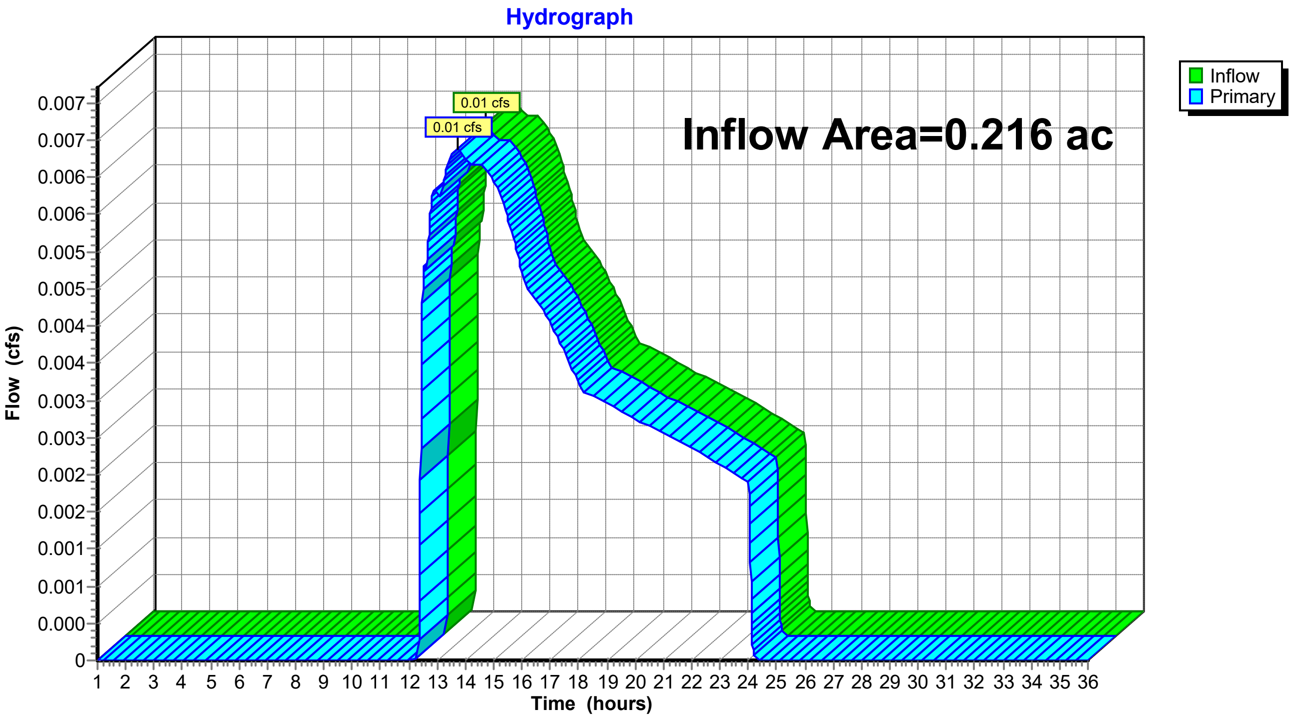


Summary for Link 2L: Isolated Wetlands

Inflow Area = 0.216 ac, 0.00% Impervious, Inflow Depth = 0.23" for 50-year event
Inflow = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 13.70 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

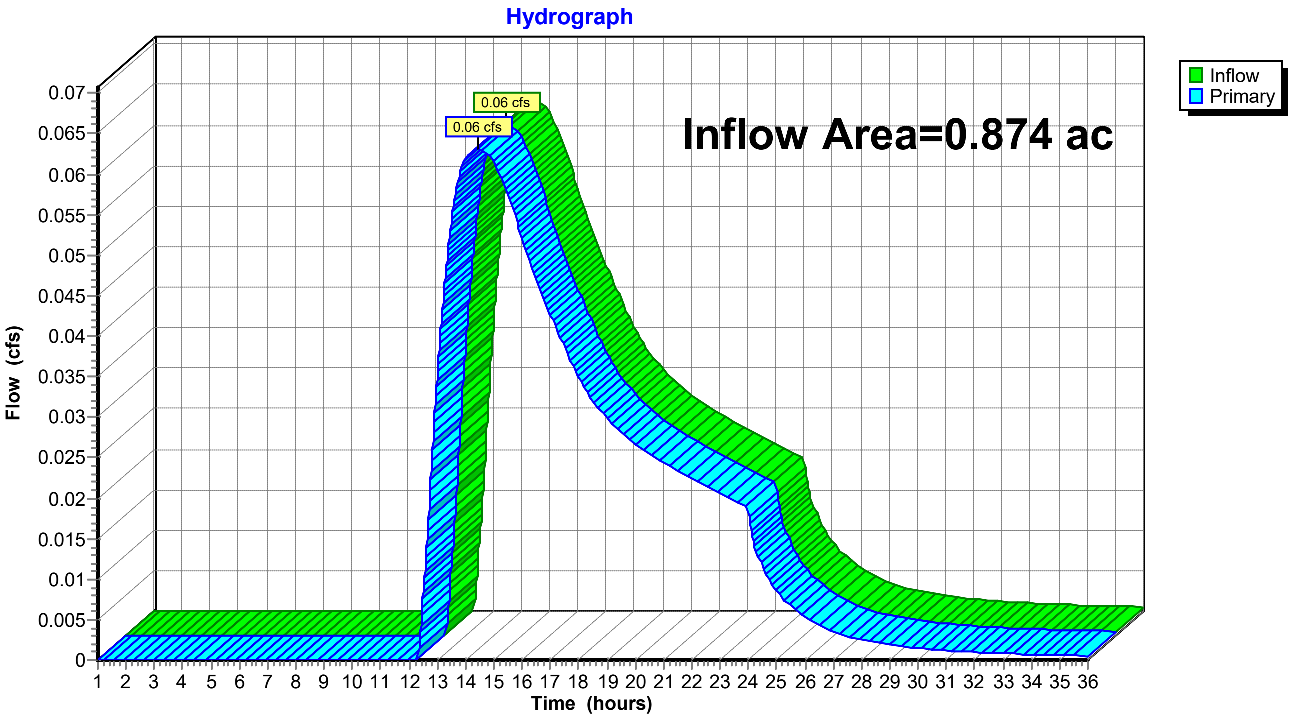


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 0.874 ac, 9.43% Impervious, Inflow Depth > 0.52" for 50-year event
Inflow = 0.06 cfs @ 14.42 hrs, Volume= 0.038 af
Primary = 0.06 cfs @ 14.42 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

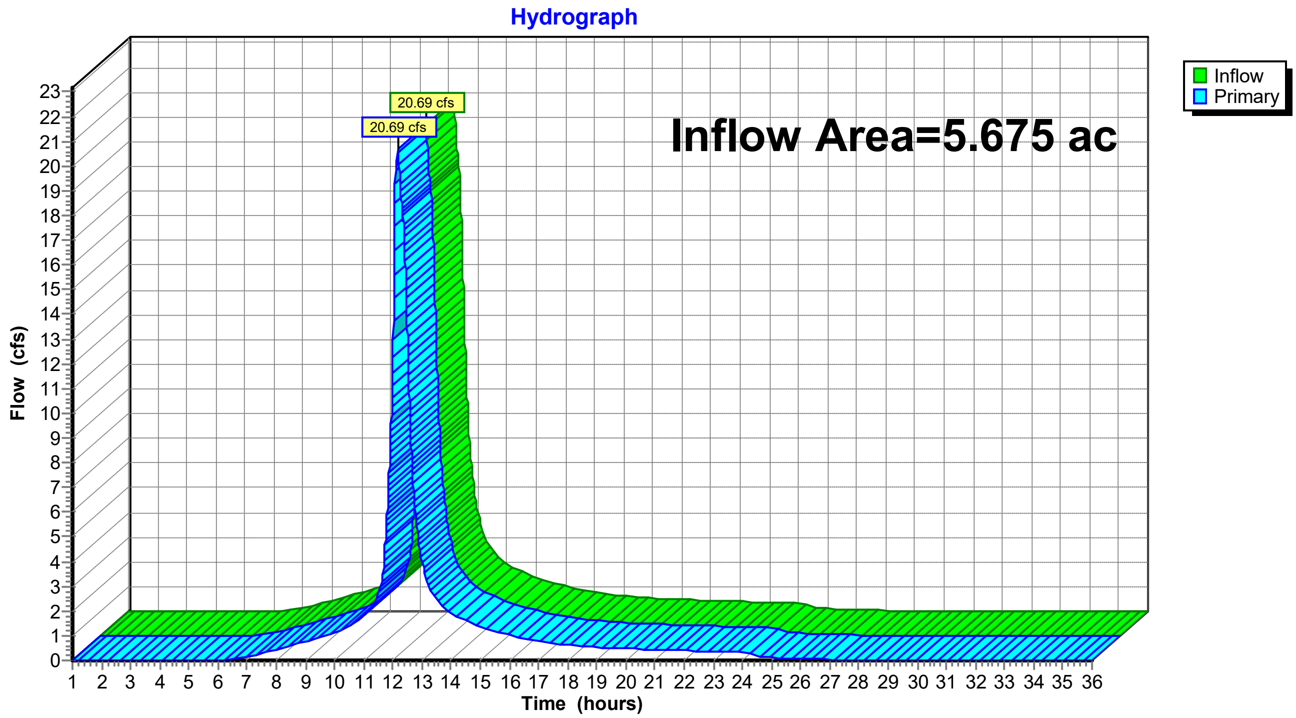


Summary for Link 4L: Vernal Pool Wetlands

Inflow Area =	5.675 ac,	85.67% Impervious,	Inflow Depth > 5.20"	for 50-year event
Inflow =	20.69 cfs @	12.16 hrs, Volume=	2.459 af	
Primary =	20.69 cfs @	12.16 hrs, Volume=	2.459 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Roof Runoff Area=71,161 sf 100.00% Impervious Runoff Depth>8.06"
Tc=6.0 min CN=98 Runoff=13.31 cfs 1.097 af

Subcatchment 2S: Sub 2 Runoff Area=9,774 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=30 Runoff=0.04 cfs 0.009 af

Subcatchment 3S: Sub 3 Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=5.91"
Tc=6.0 min CN=80 Runoff=3.86 cfs 0.279 af

Subcatchment 4S: Sub 4 Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=4.96"
Tc=6.0 min CN=72 Runoff=1.86 cfs 0.132 af

Subcatchment 5S: Sub 5 Runoff Area=12,232 sf 62.66% Impervious Runoff Depth=5.08"
Tc=6.0 min CN=73 Runoff=1.67 cfs 0.119 af

Subcatchment 6S: Sub 6 Runoff Area=13,636 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=30 Runoff=0.05 cfs 0.013 af

Subcatchment 7S: Sub 7 Runoff Area=2,471 sf 100.00% Impervious Runoff Depth>8.06"
Tc=6.0 min CN=98 Runoff=0.46 cfs 0.038 af

Subcatchment 8S: Sub 8 Runoff Area=24,444 sf 14.69% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=40 Runoff=0.66 cfs 0.065 af

Subcatchment 9S: Sub 9 Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=7.70"
Tc=6.0 min CN=95 Runoff=2.02 cfs 0.161 af

Subcatchment 10S: Sub 10 Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=5.55"
Tc=6.0 min CN=77 Runoff=2.74 cfs 0.197 af

Subcatchment 11S: Sub 11 Runoff Area=6,808 sf 98.43% Impervious Runoff Depth>7.94"
Tc=6.0 min CN=97 Runoff=1.27 cfs 0.103 af

Subcatchment 12S: Sub 12 Runoff Area=5,470 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=30 Runoff=0.02 cfs 0.005 af

Subcatchment 13S: Sub 13 Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=7.10"
Tc=6.0 min CN=90 Runoff=0.59 cfs 0.045 af

Subcatchment 14S: Sub 14 Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=7.70"
Tc=6.0 min CN=95 Runoff=0.72 cfs 0.057 af

Subcatchment 15S: Sub 15 Runoff Area=13,783 sf 99.17% Impervious Runoff Depth>7.94"
Tc=6.0 min CN=97 Runoff=2.57 cfs 0.209 af

Subcatchment 16S: Sub 16 Runoff Area=11,011 sf 100.00% Impervious Runoff Depth>8.06"
Tc=6.0 min CN=98 Runoff=2.06 cfs 0.170 af

Subcatchment 17S: Sub 17 Runoff Area=11,222 sf 100.00% Impervious Runoff Depth>8.06"
Tc=6.0 min CN=98 Runoff=2.10 cfs 0.173 af

Subcatchment 18S: Sub 18 Runoff Area=21,593 sf 92.74% Impervious Runoff Depth=7.46"
Tc=6.0 min CN=93 Runoff=3.95 cfs 0.308 af

Subcatchment 19S: Sub 19 Runoff Area=10,851 sf 98.57% Impervious Runoff Depth>7.94"
Tc=6.0 min CN=97 Runoff=2.02 cfs 0.165 af

Subcatchment 20S: Sub 20 Runoff Area=10,690 sf 3.71% Impervious Runoff Depth=0.73"
Tc=6.0 min CN=33 Runoff=0.08 cfs 0.015 af

Subcatchment 21S: Sub 21 Runoff Area=3,953 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=30 Runoff=0.01 cfs 0.004 af

Pond 2P: Rain Garden Peak Elev=132.22' Storage=871 cf Inflow=0.66 cfs 0.065 af
Primary=0.12 cfs 0.055 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.055 af

Pond 3P: Rain Garden Peak Elev=133.93' Storage=367 cf Inflow=3.95 cfs 0.308 af
Primary=0.95 cfs 0.233 af Secondary=2.97 cfs 0.075 af Outflow=3.92 cfs 0.308 af

Pond 4P: Infiltration Chambers Peak Elev=132.43' Storage=23,761 cf Inflow=37.27 cfs 2.946 af
Discarded=0.43 cfs 0.212 af Primary=22.30 cfs 2.641 af Outflow=22.74 cfs 2.853 af

Link 1L: Leacing CB Inflow=0.04 cfs 0.009 af
Primary=0.04 cfs 0.009 af

Link 2L: Isolated Wetlands Inflow=0.03 cfs 0.009 af
Primary=0.03 cfs 0.009 af

Link 3L: Spofford Pond Wetlands Inflow=0.15 cfs 0.068 af
Primary=0.15 cfs 0.068 af

Link 4L: Vernal Pool Wetlands Inflow=25.14 cfs 2.964 af
Primary=25.14 cfs 2.964 af

Total Runoff Area = 6.990 ac Runoff Volume = 3.365 af Average Runoff Depth = 5.78"
29.27% Pervious = 2.046 ac 70.73% Impervious = 4.944 ac

Summary for Subcatchment 1S: Roof

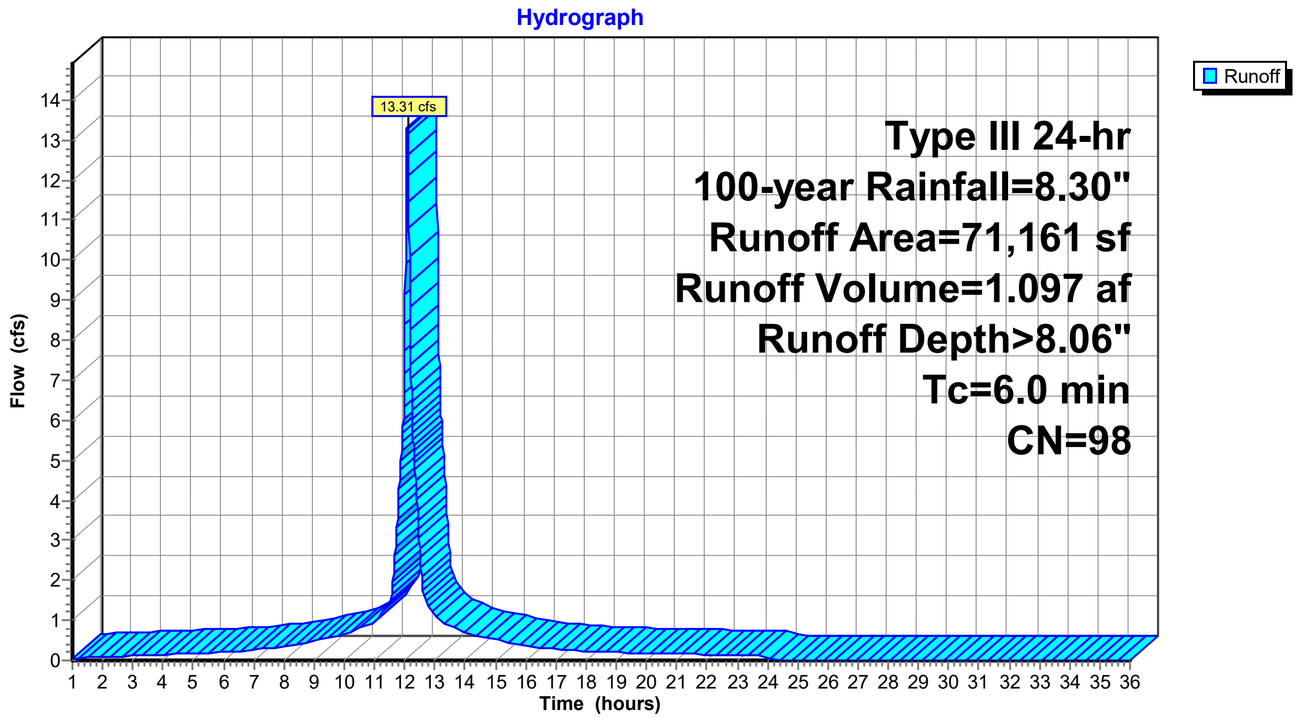
Runoff = 13.31 cfs @ 12.08 hrs, Volume= 1.097 af, Depth> 8.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 1S: Roof



Summary for Subcatchment 2S: Sub 2

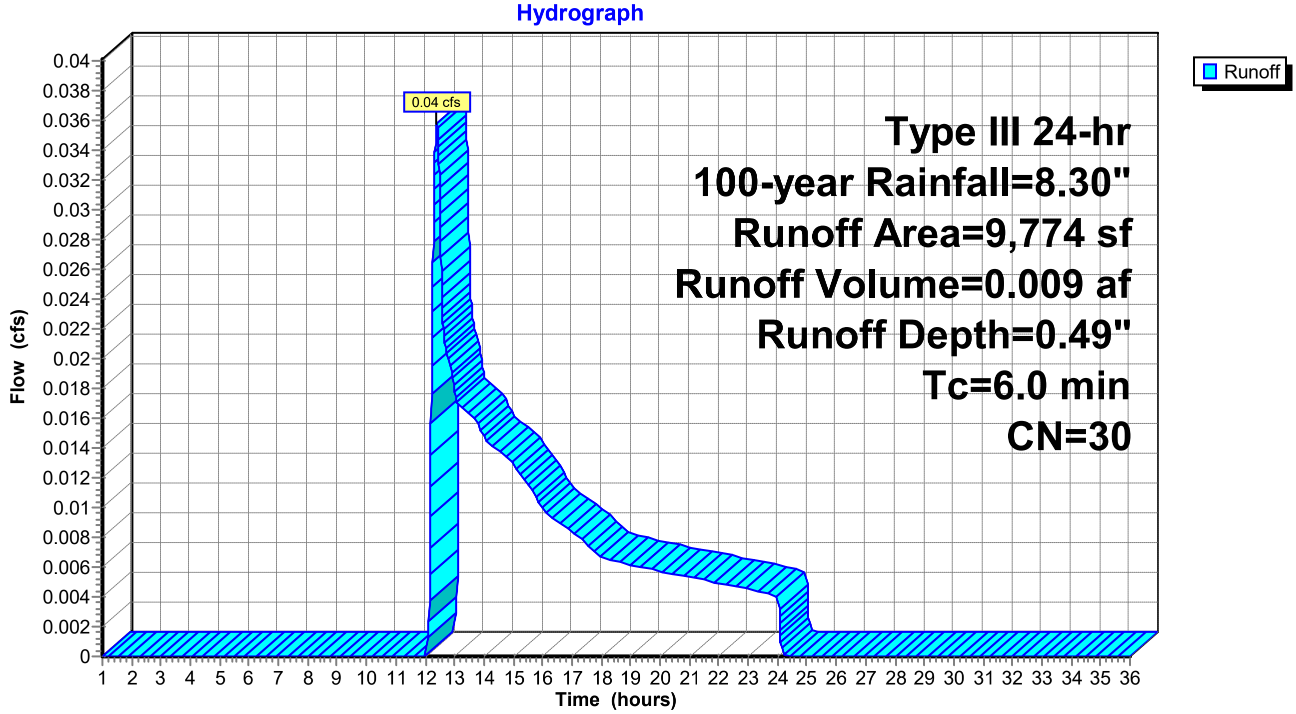
Runoff = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	9,774	30	Grass
	9,774		100.00% Pervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3

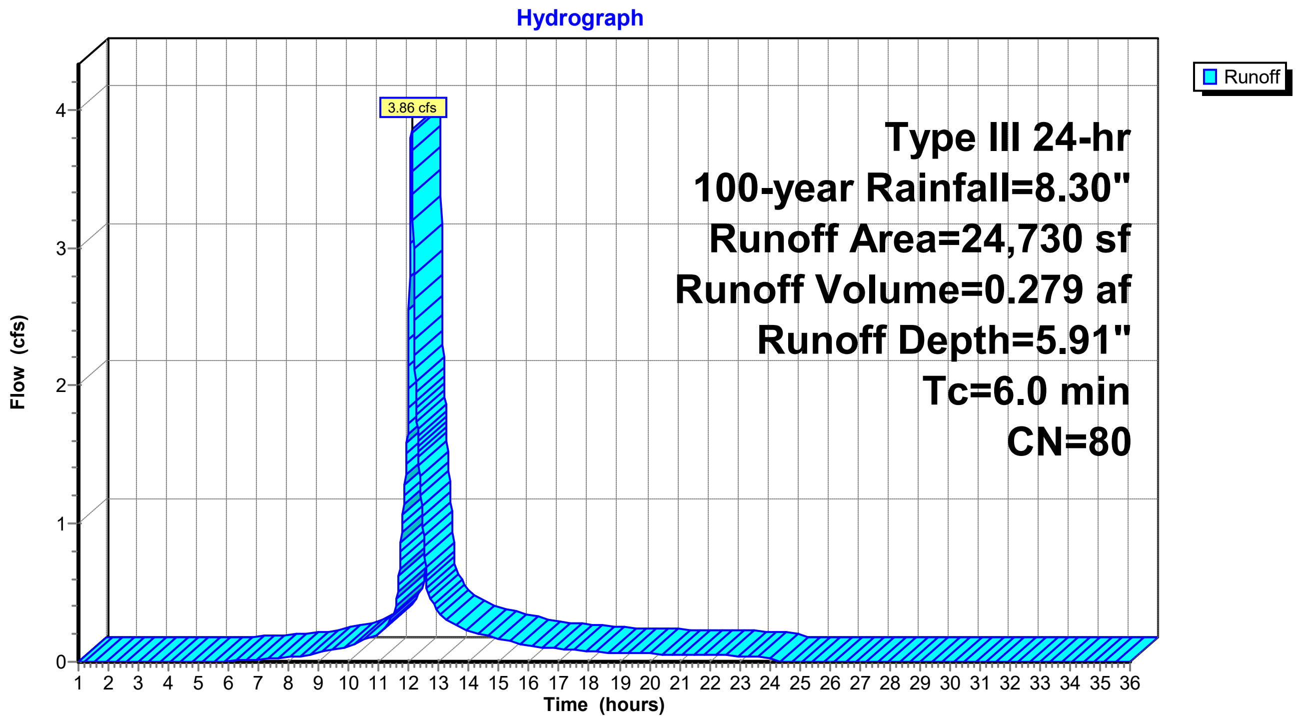
Runoff = 3.86 cfs @ 12.09 hrs, Volume= 0.279 af, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730	80	Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 3S: Sub 3



Summary for Subcatchment 4S: Sub 4

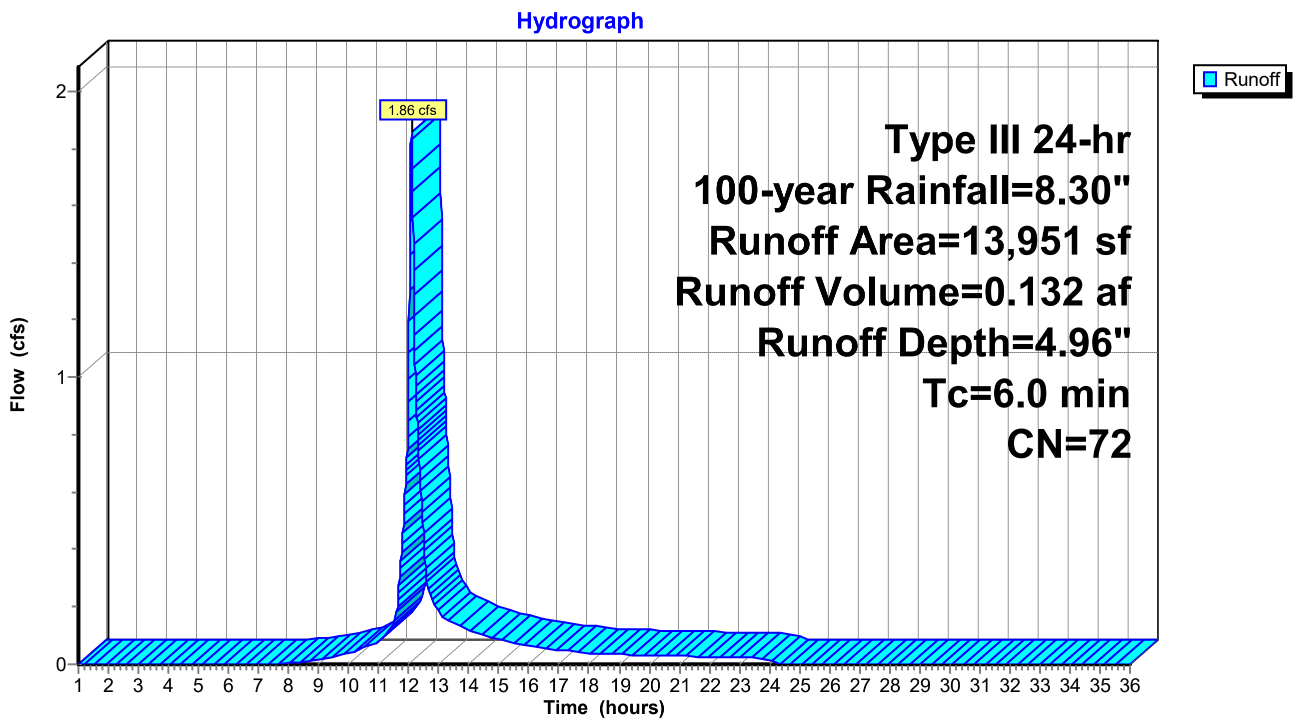
Runoff = 1.86 cfs @ 12.09 hrs, Volume= 0.132 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951	72	Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Sub 5

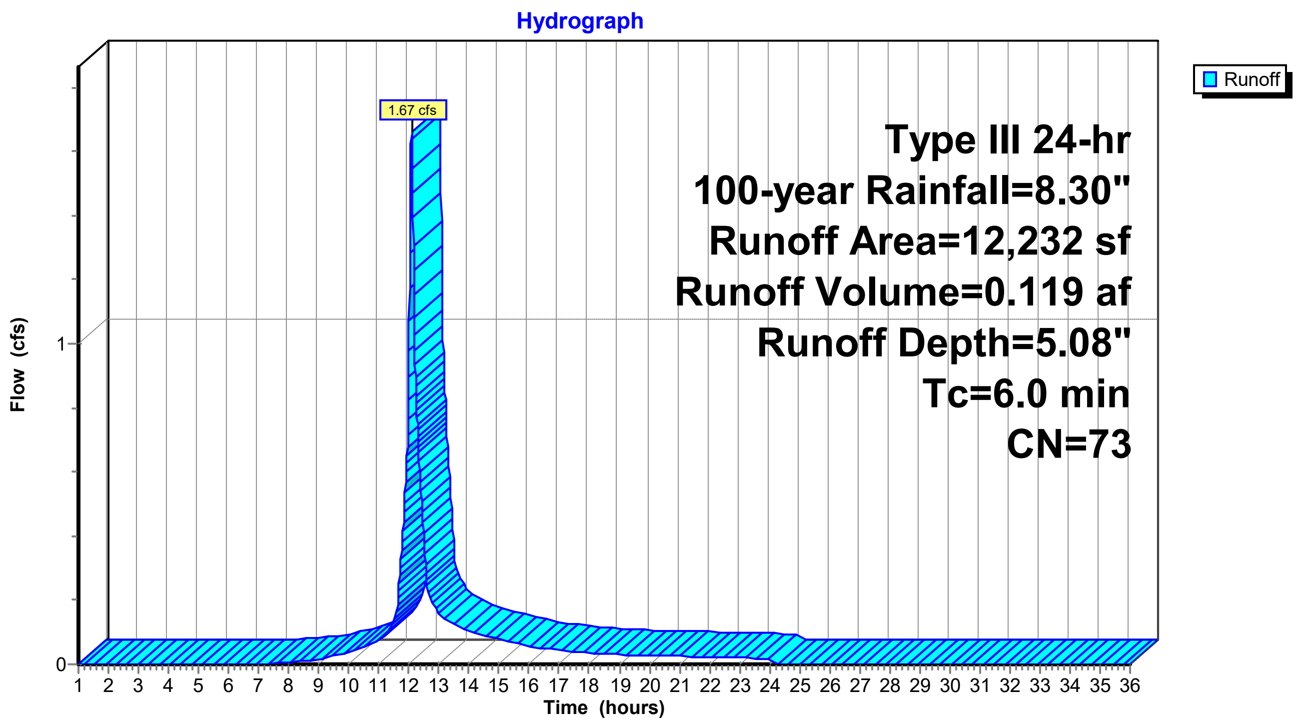
Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.119 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	7,665	98	Paved parking, HSG A
	201	30	Woods, Good, HSG A
*	4,366	30	Grass
	12,232	73	Weighted Average
	4,567		37.34% Pervious Area
	7,665		62.66% Impervious Area

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

Subcatchment 5S: Sub 5



Summary for Subcatchment 6S: Sub 6

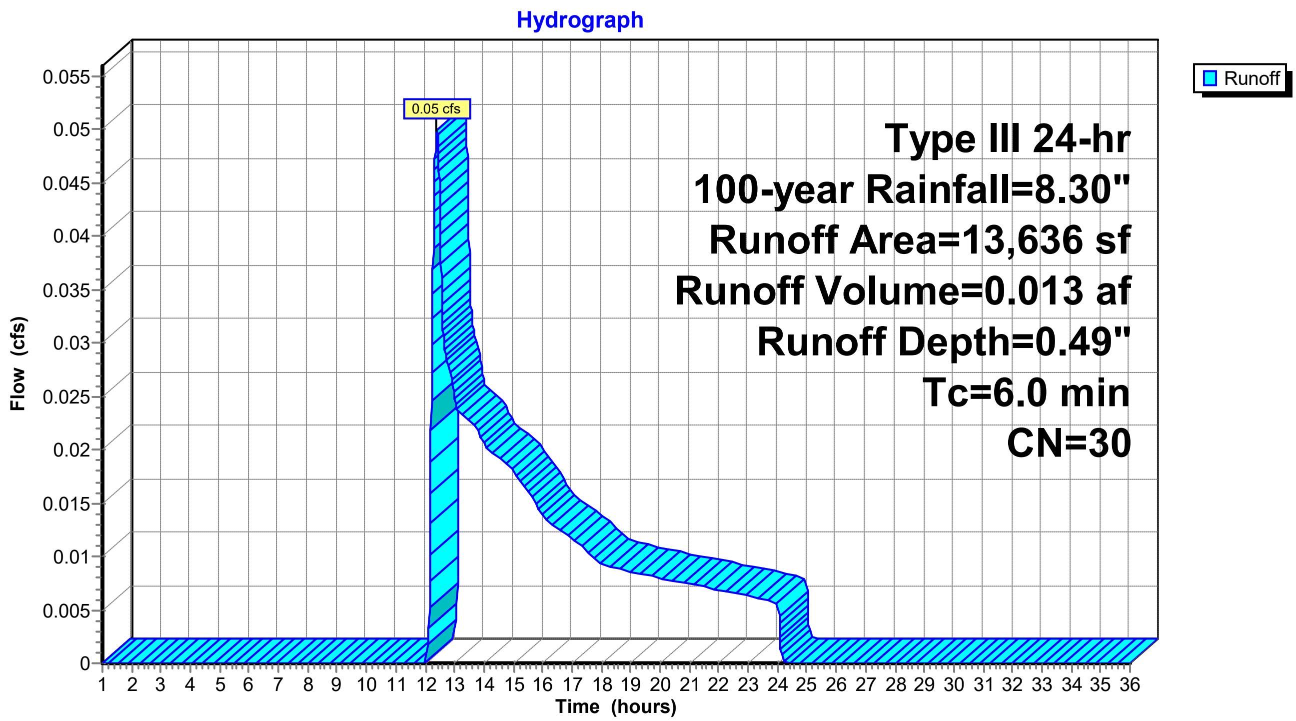
Runoff = 0.05 cfs @ 12.39 hrs, Volume= 0.013 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	5,897	30	Grass
*	7,739	30	Woods
	13,636	30	Weighted Average
	13,636		100.00% Pervious Area

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

Subcatchment 6S: Sub 6



Summary for Subcatchment 7S: Sub 7

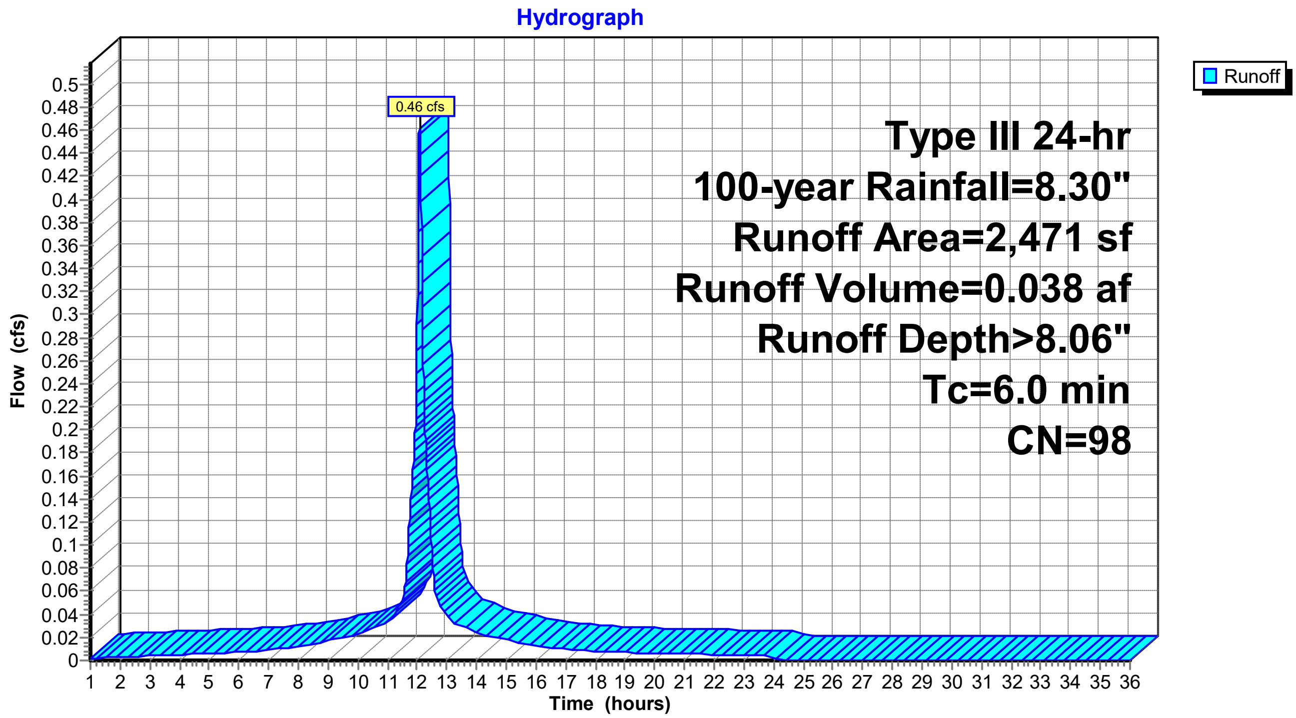
Runoff = 0.46 cfs @ 12.08 hrs, Volume= 0.038 af, Depth> 8.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 8S: Sub 8

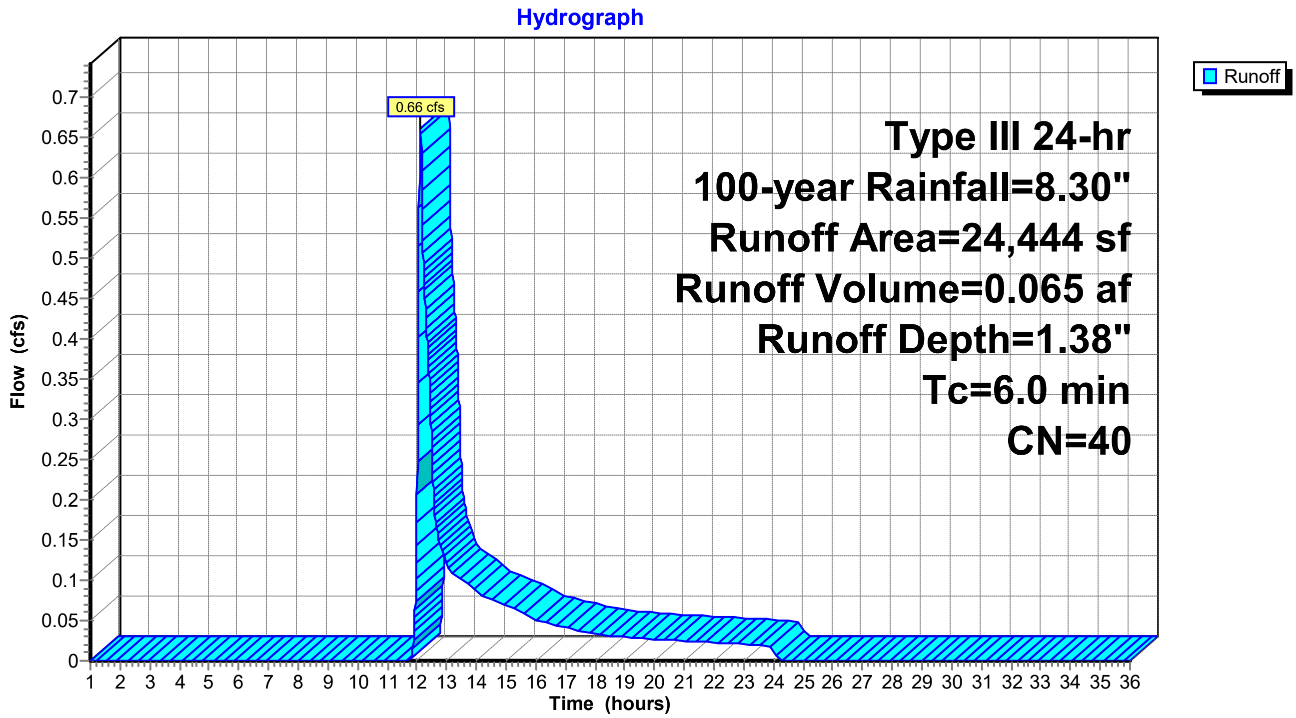
Runoff = 0.66 cfs @ 12.11 hrs, Volume= 0.065 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	3,592	98	Paved parking, HSG A
*	20,852	30	Grass
	24,444	40	Weighted Average
	20,852		85.31% Pervious Area
	3,592		14.69% Impervious Area

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

Subcatchment 8S: Sub 8



Summary for Subcatchment 9S: Sub 9

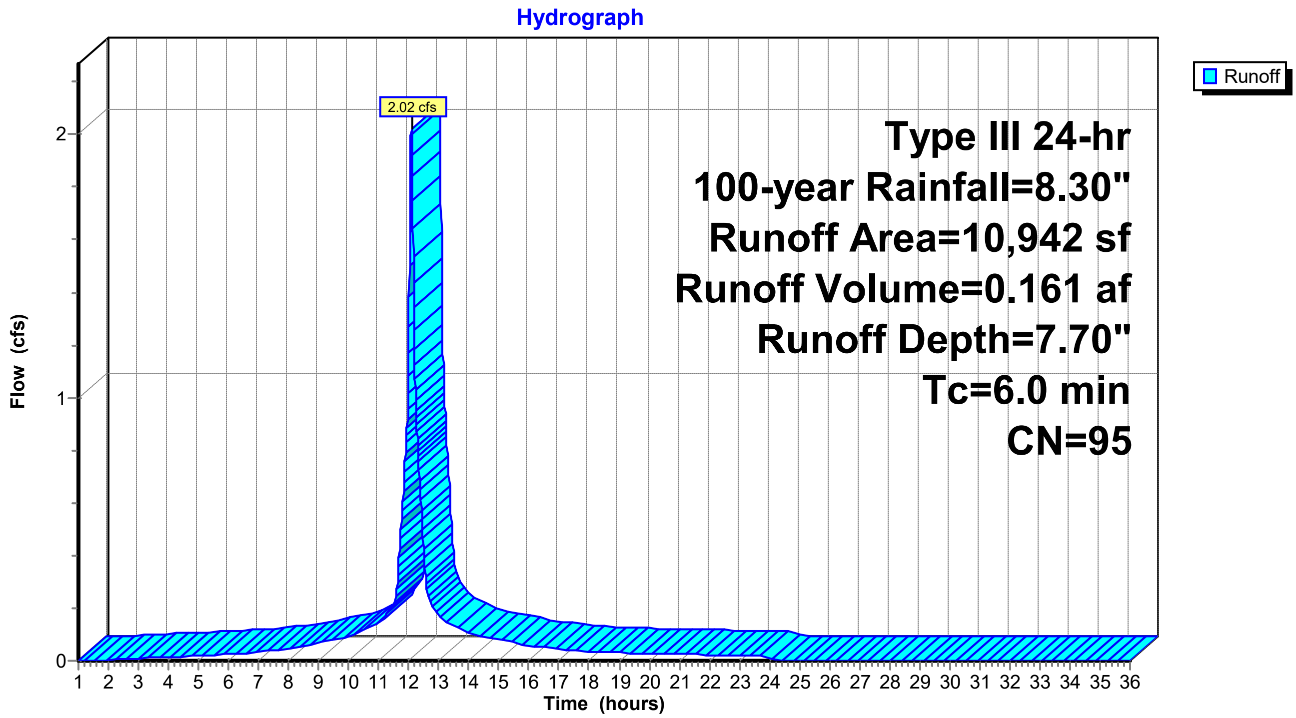
Runoff = 2.02 cfs @ 12.08 hrs, Volume= 0.161 af, Depth= 7.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942	95	Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

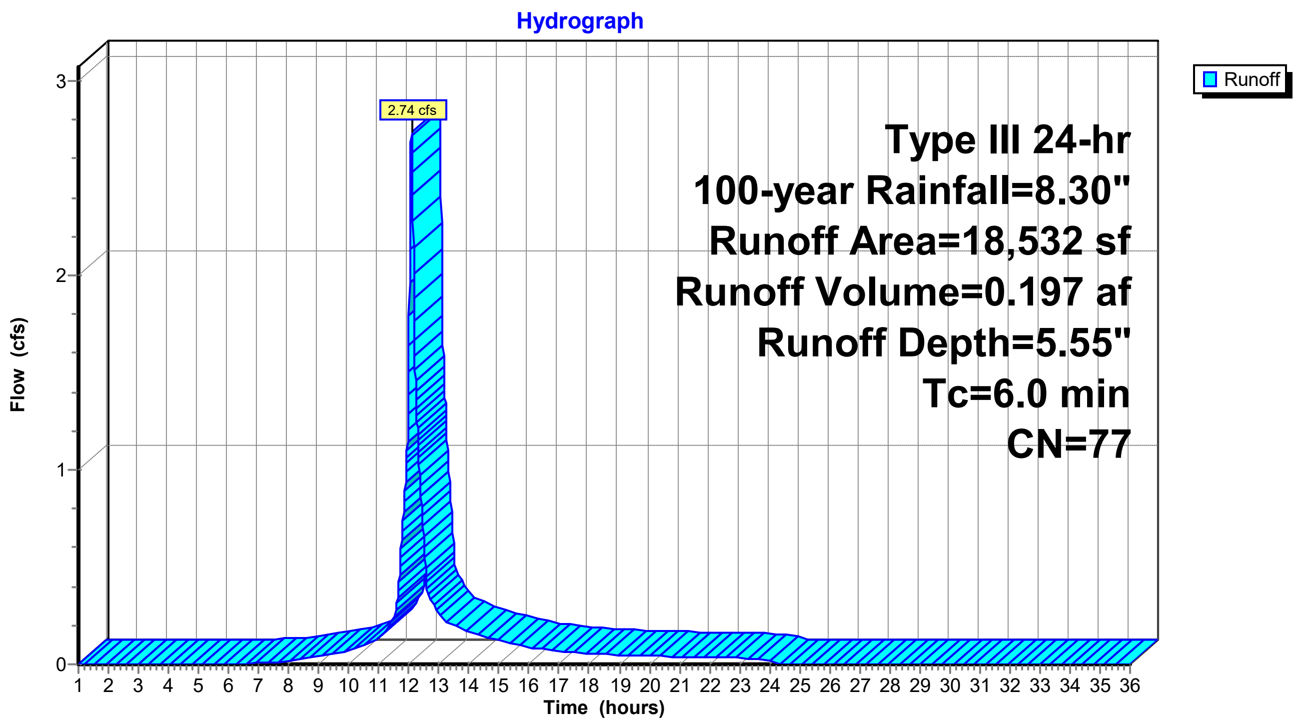
Runoff = 2.74 cfs @ 12.09 hrs, Volume= 0.197 af, Depth= 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532	77	Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 11S: Sub 11

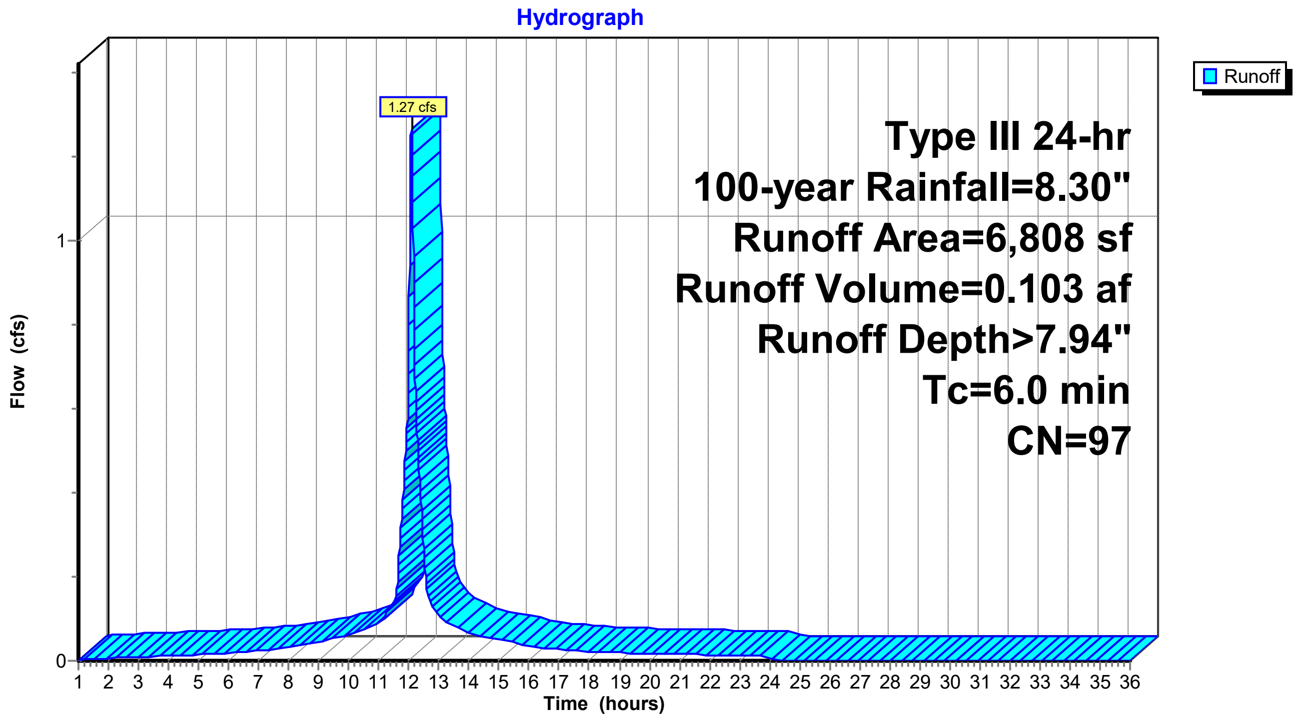
Runoff = 1.27 cfs @ 12.08 hrs, Volume= 0.103 af, Depth> 7.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808	97	Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 11S: Sub 11



Summary for Subcatchment 12S: Sub 12

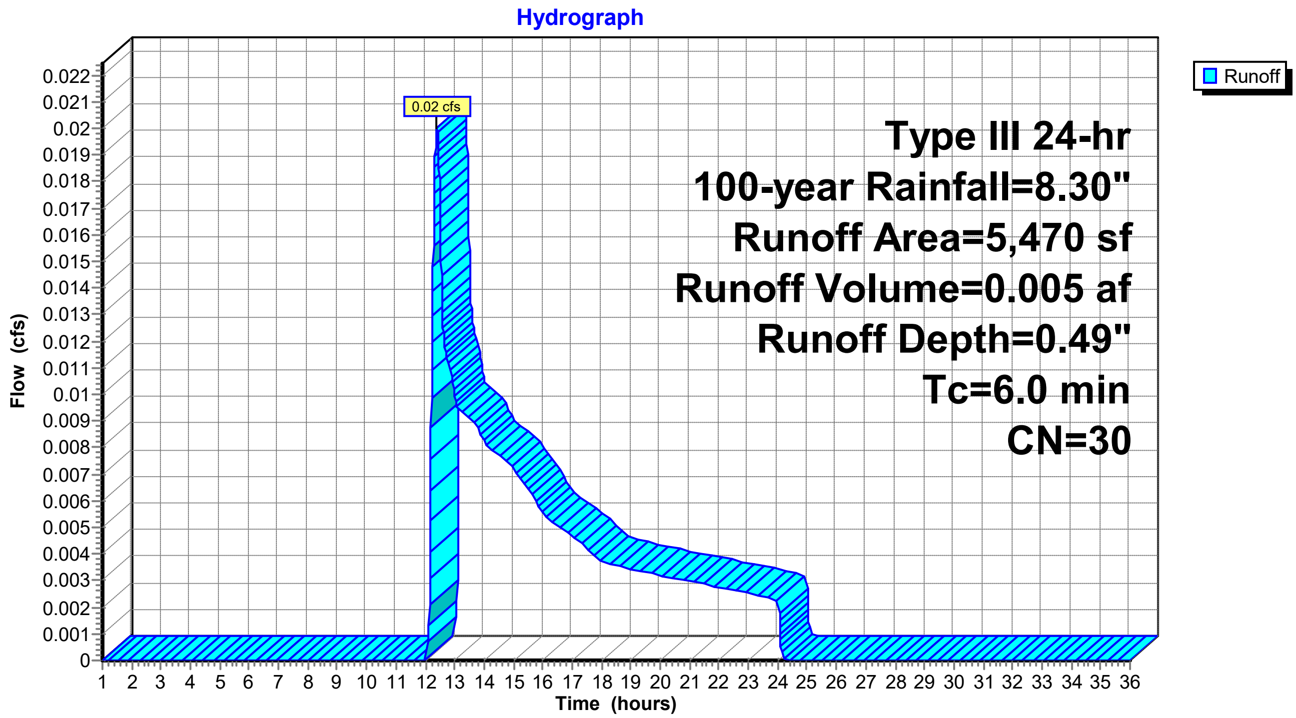
Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.005 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	5,470	30	Grass
	5,470		100.00% Pervious Area

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

Subcatchment 12S: Sub 12



Summary for Subcatchment 13S: Sub 13

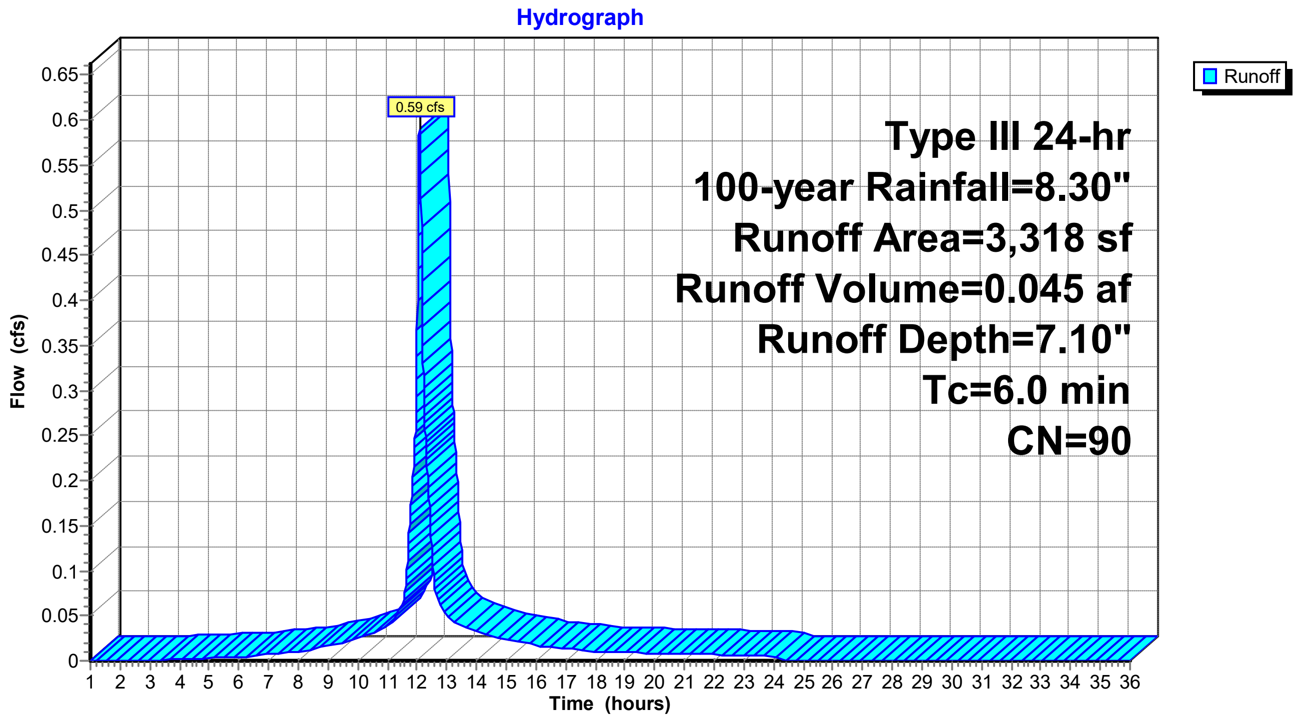
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.045 af, Depth= 7.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318	90	Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 13S: Sub 13



Summary for Subcatchment 14S: Sub 14

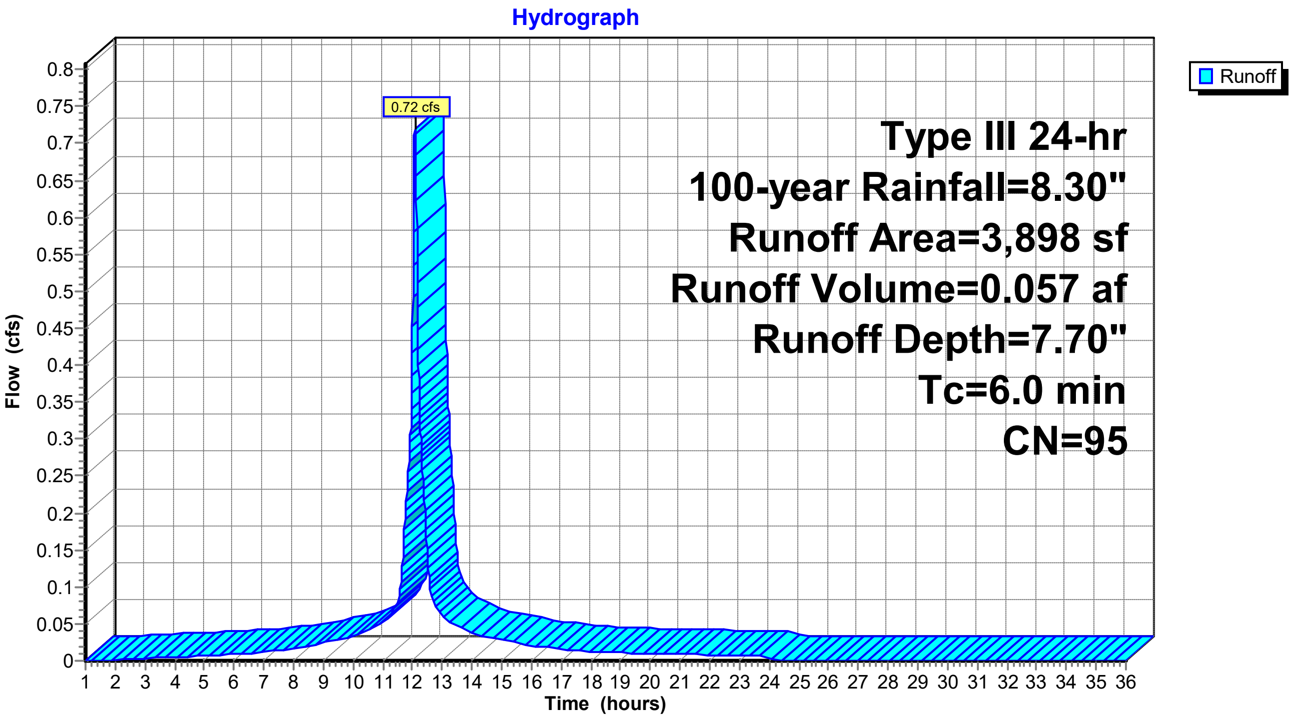
Runoff = 0.72 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 7.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898	95	Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 14S: Sub 14



Summary for Subcatchment 15S: Sub 15

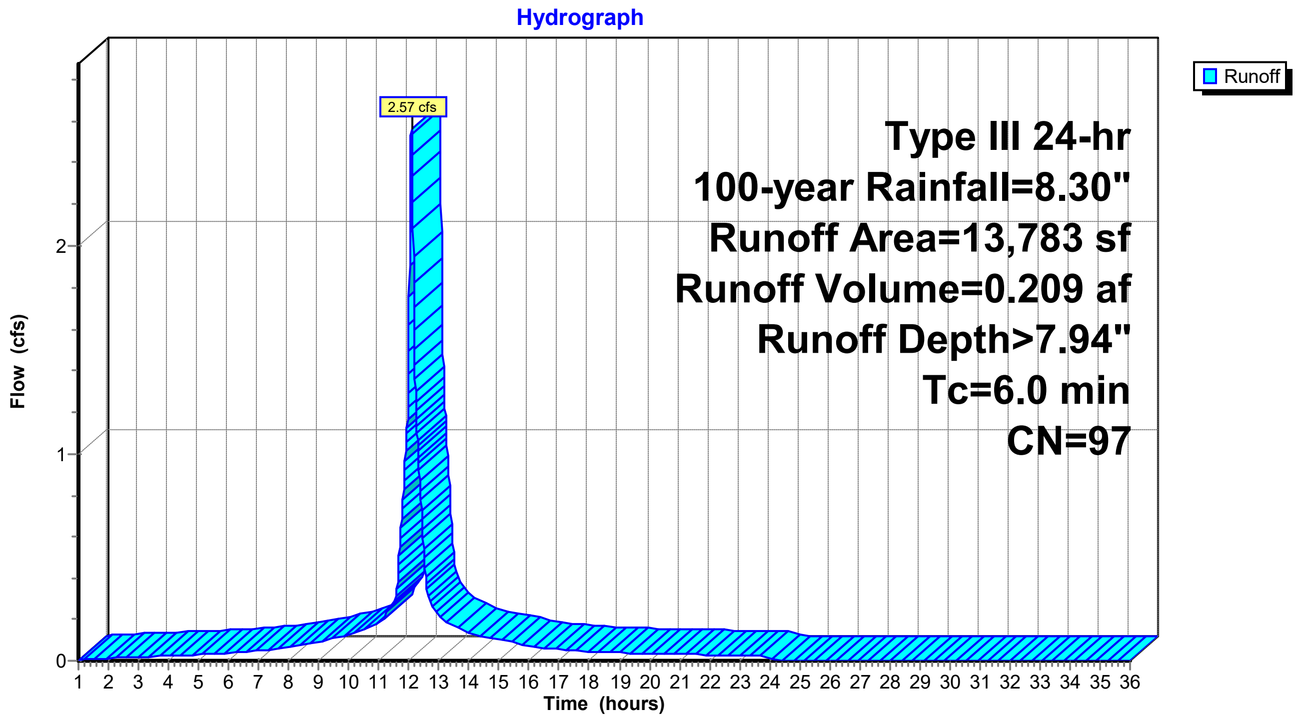
Runoff = 2.57 cfs @ 12.08 hrs, Volume= 0.209 af, Depth> 7.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783	97	Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 15S: Sub 15



Summary for Subcatchment 16S: Sub 16

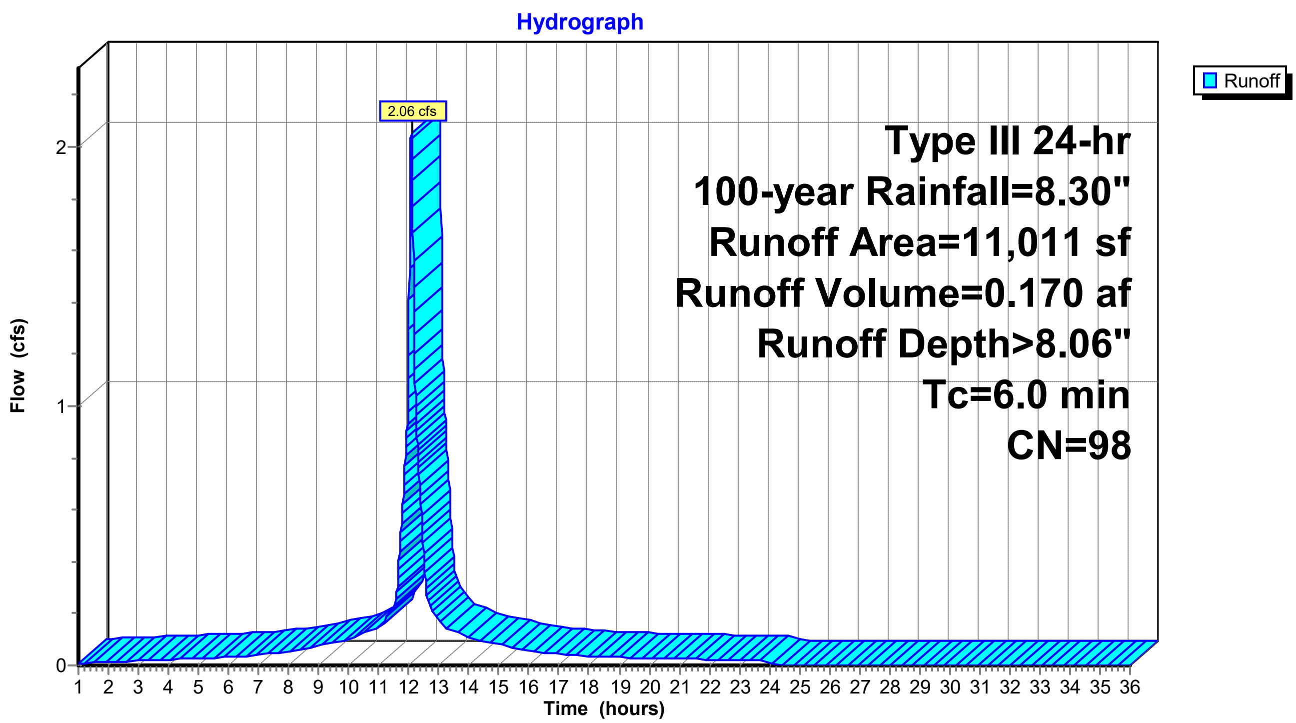
Runoff = 2.06 cfs @ 12.08 hrs, Volume= 0.170 af, Depth> 8.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 16S: Sub 16



Summary for Subcatchment 17S: Sub 17

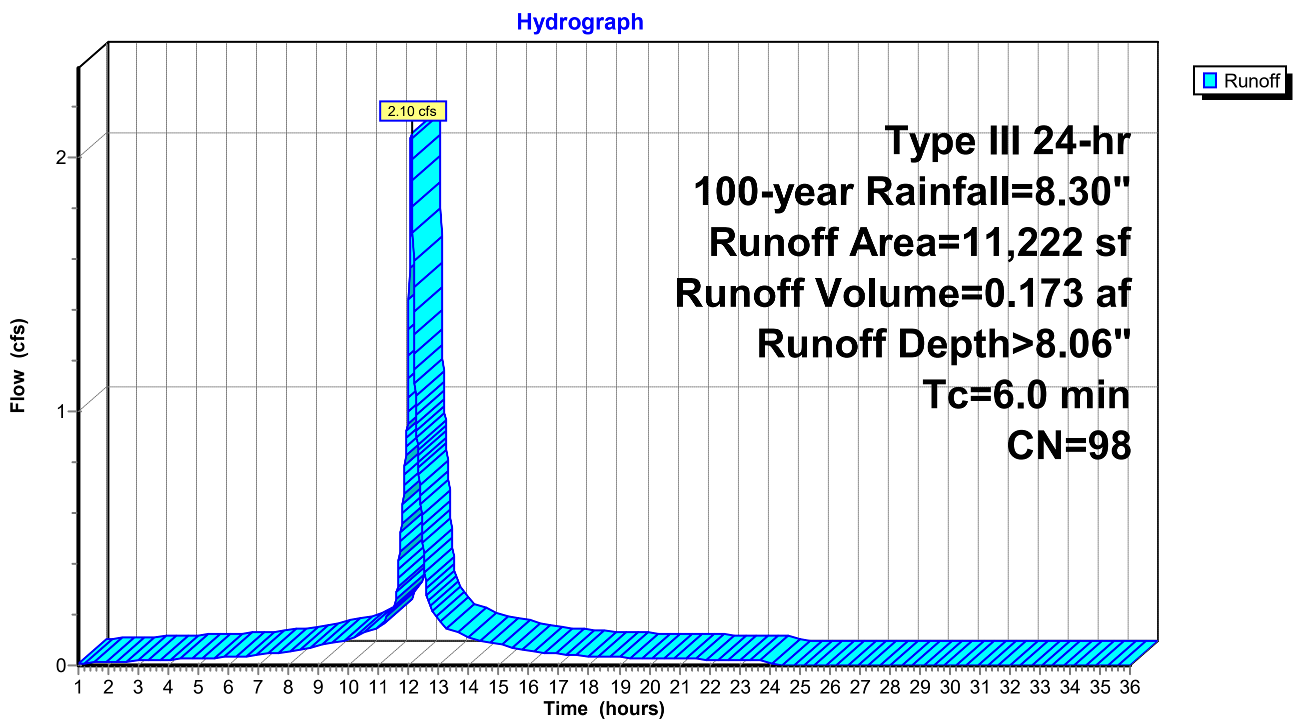
Runoff = 2.10 cfs @ 12.08 hrs, Volume= 0.173 af, Depth> 8.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 17S: Sub 17



Summary for Subcatchment 18S: Sub 18

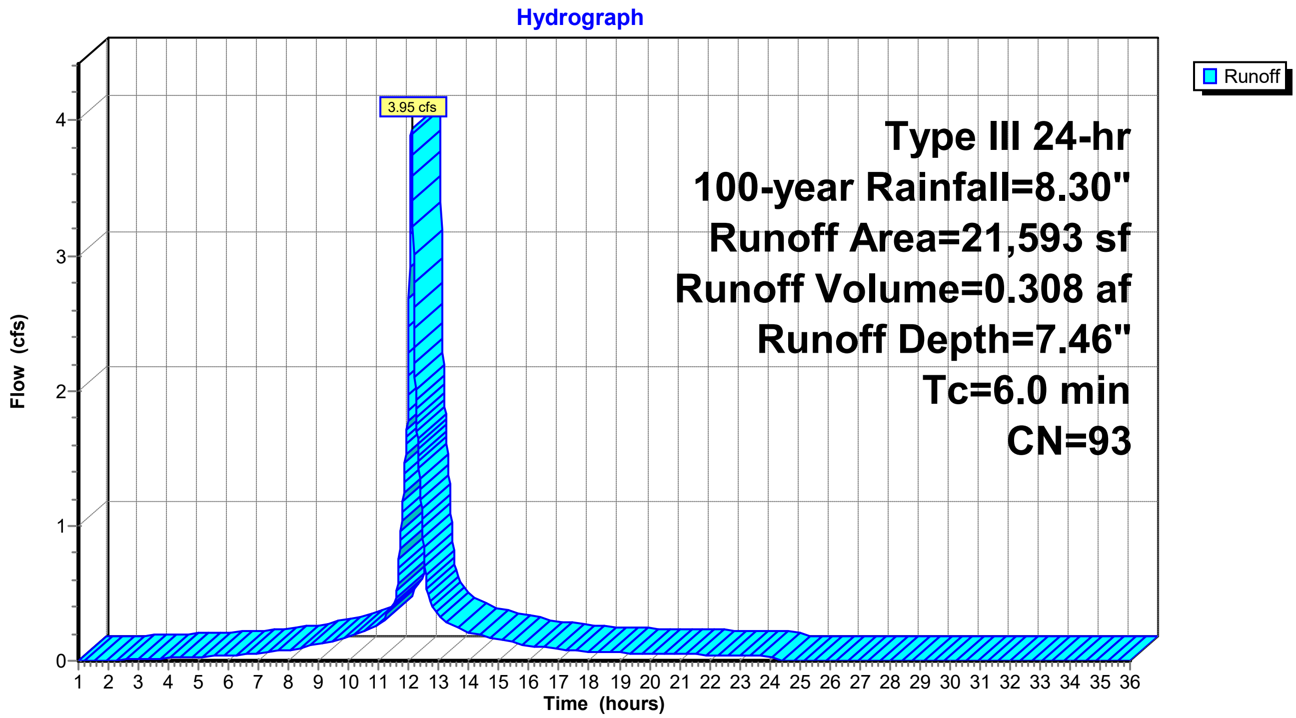
Runoff = 3.95 cfs @ 12.08 hrs, Volume= 0.308 af, Depth= 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	1,568	30	Grass
	20,025	98	Paved parking, HSG A
	21,593	93	Weighted Average
	1,568		7.26% Pervious Area
	20,025		92.74% Impervious Area

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

Subcatchment 18S: Sub 18



Summary for Subcatchment 19S: Sub 19

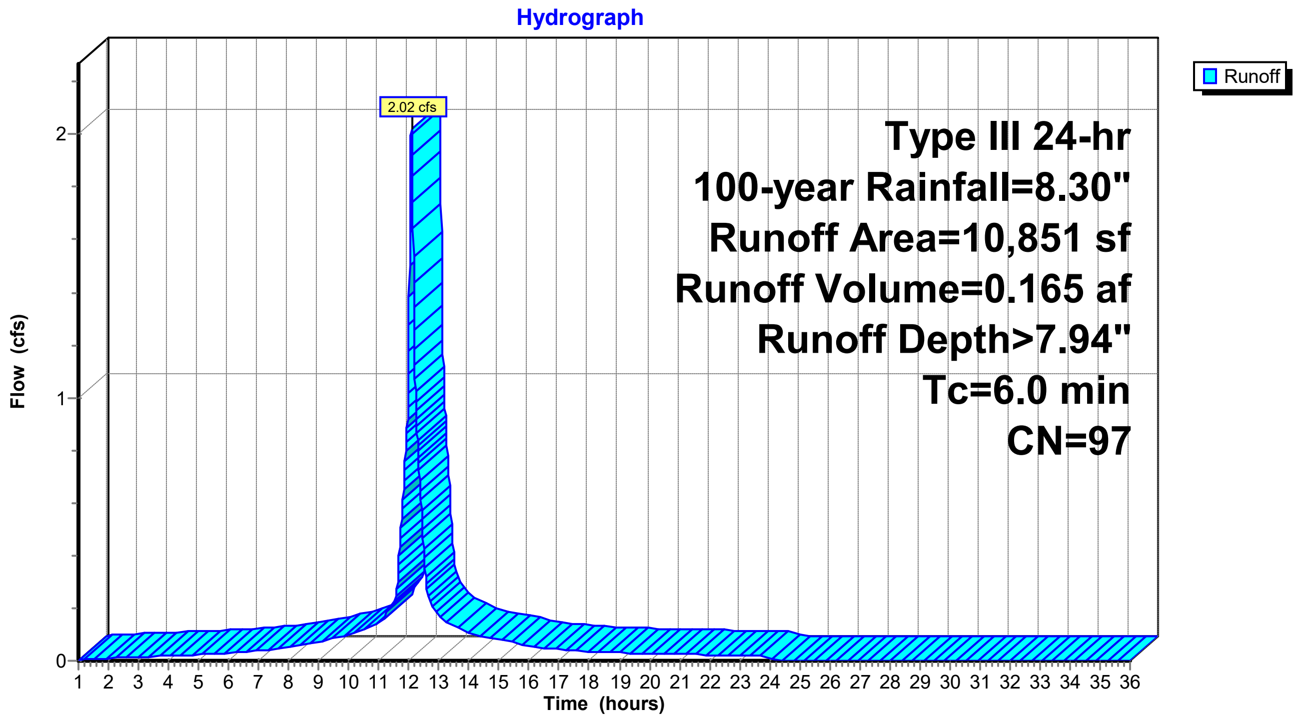
Runoff = 2.02 cfs @ 12.08 hrs, Volume= 0.165 af, Depth> 7.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851	97	Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 19S: Sub 19



Summary for Subcatchment 20S: Sub 20

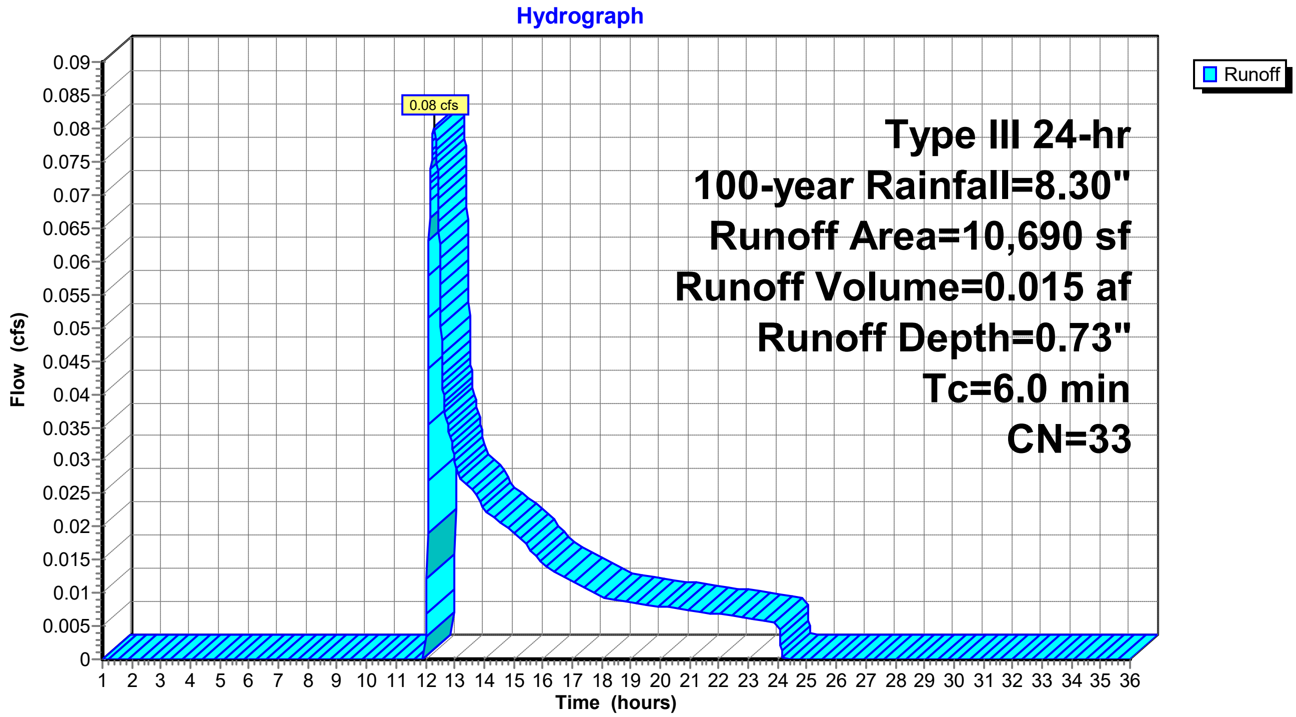
Runoff = 0.08 cfs @ 12.30 hrs, Volume= 0.015 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	5,866	30	Grass
	397	98	Paved parking, HSG A
*	4,427	30	Woods
	10,690	33	Weighted Average
	10,293		96.29% Pervious Area
	397		3.71% Impervious Area

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

Subcatchment 20S: Sub 20



Summary for Subcatchment 21S: Sub 21

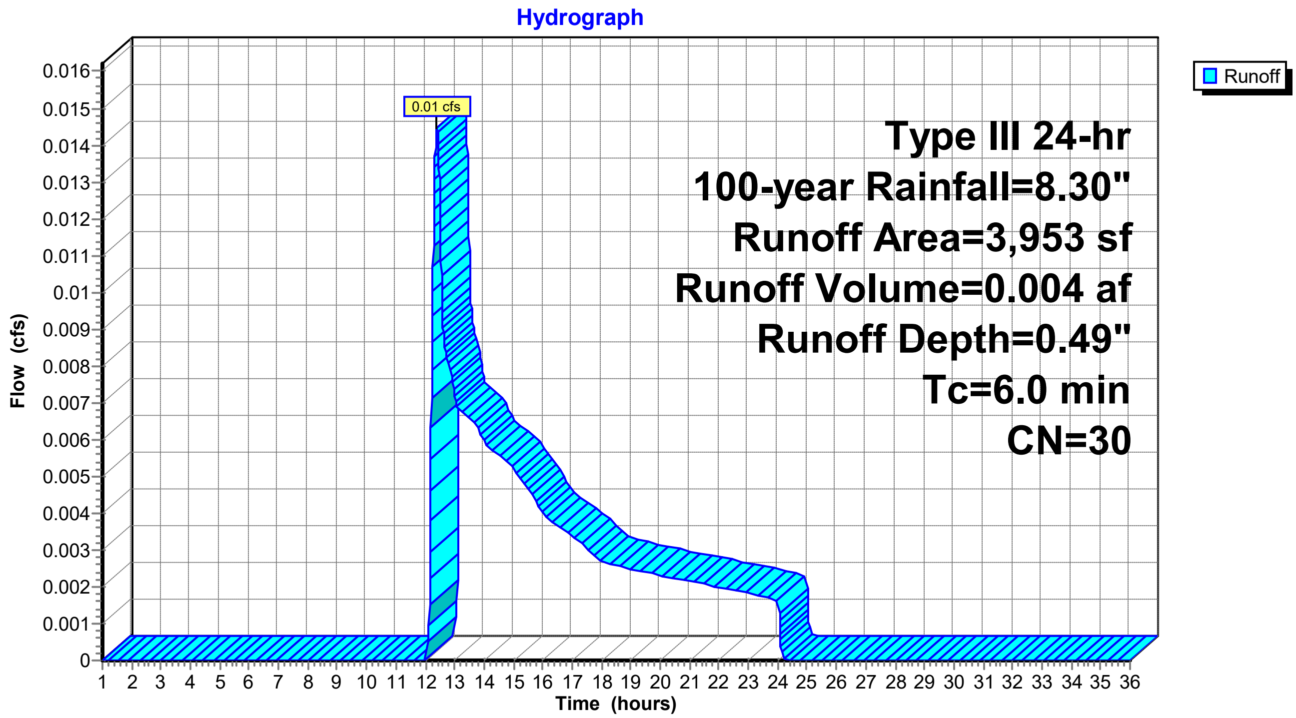
Runoff = 0.01 cfs @ 12.39 hrs, Volume= 0.004 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.30"

	Area (sf)	CN	Description
*	3,953	30	Grass
	3,953		100.00% Pervious Area

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

Subcatchment 21S: Sub 21



Summary for Pond 2P: Rain Garden

Inflow Area = 0.561 ac, 14.69% Impervious, Inflow Depth = 1.38" for 100-year event
Inflow = 0.66 cfs @ 12.11 hrs, Volume= 0.065 af
Outflow = 0.12 cfs @ 13.00 hrs, Volume= 0.055 af, Atten= 82%, Lag= 53.2 min
Primary = 0.12 cfs @ 13.00 hrs, Volume= 0.055 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 132.22' @ 13.00 hrs Surf.Area= 1,163 sf Storage= 871 cf

Plug-Flow detention time= 182.1 min calculated for 0.055 af (85% of inflow)
Center-of-Mass det. time= 115.8 min (1,018.6 - 902.8)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	5,119 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

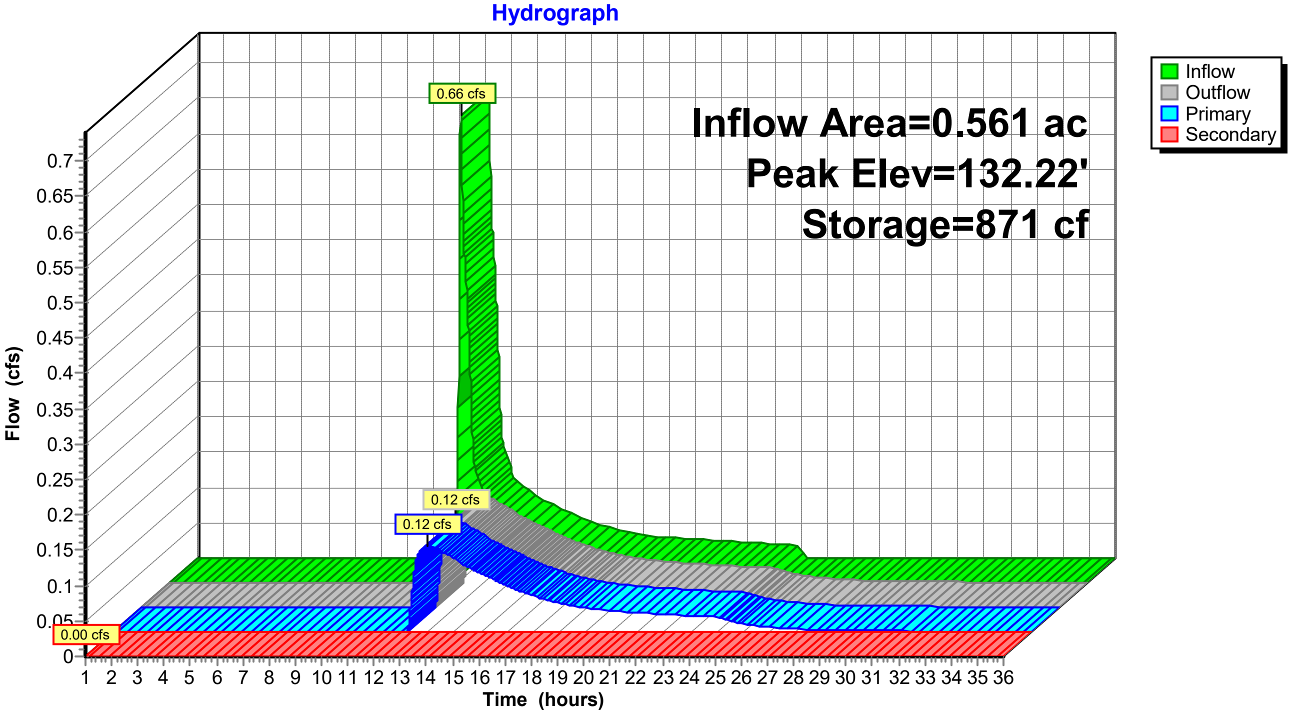
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
131.00	380	117.0	0	0	380
132.00	940	197.0	639	639	2,385
133.00	2,137	251.0	1,498	2,137	4,323
134.00	3,916	351.0	2,982	5,119	9,123

Device	Routing	Invert	Outlet Devices
#1	Secondary	132.95'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	131.70'	**12.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.70' / 130.87' S= 0.0098 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 13.00 hrs HW=132.22' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 0.12 cfs @ 0.43 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=131.00' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Rain Garden



Summary for Pond 3P: Rain Garden

Inflow Area = 0.496 ac, 92.74% Impervious, Inflow Depth = 7.46" for 100-year event
Inflow = 3.95 cfs @ 12.08 hrs, Volume= 0.308 af
Outflow = 3.92 cfs @ 12.09 hrs, Volume= 0.308 af, Atten= 1%, Lag= 0.6 min
Primary = 0.95 cfs @ 12.09 hrs, Volume= 0.233 af
Secondary = 2.97 cfs @ 12.09 hrs, Volume= 0.075 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 133.93' @ 12.09 hrs Surf.Area= 684 sf Storage= 367 cf

Plug-Flow detention time= 7.2 min calculated for 0.308 af (100% of inflow)
Center-of-Mass det. time= 7.2 min (771.7 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	133.00'	1,491 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

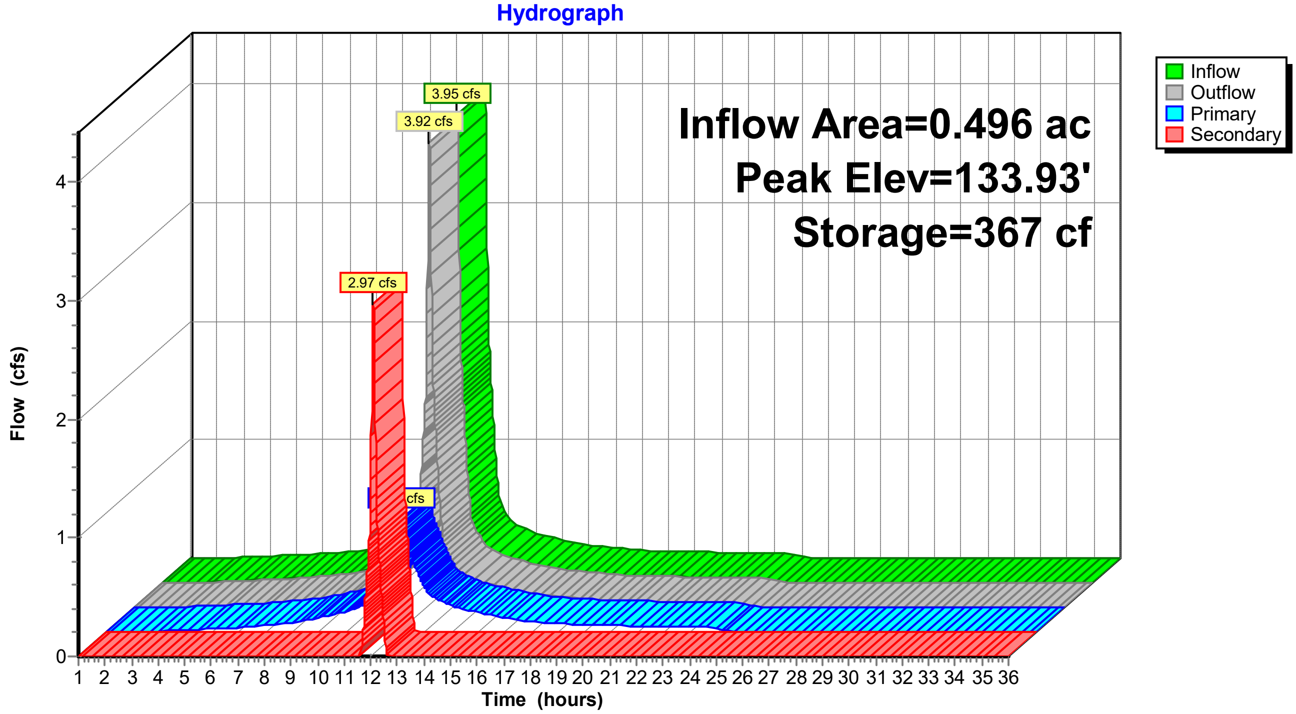
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.00	167	151.5	0	0	167
134.00	739	233.4	419	419	2,683
135.00	1,444	246.6	1,072	1,491	3,241

Device	Routing	Invert	Outlet Devices
#1	Secondary	133.69'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	133.00'	**18.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.00' / 129.45' S= 0.0403 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=0.95 cfs @ 12.09 hrs HW=133.93' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 0.95 cfs @ 1.18 fps)

Secondary OutFlow Max=2.97 cfs @ 12.09 hrs HW=133.93' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 2.97 cfs @ 1.59 fps)

Pond 3P: Rain Garden



Summary for Pond 4P: Infiltration Chambers

Inflow Area = 4.934 ac, 89.04% Impervious, Inflow Depth > 7.17" for 100-year event
Inflow = 37.27 cfs @ 12.08 hrs, Volume= 2.946 af
Outflow = 22.74 cfs @ 12.19 hrs, Volume= 2.853 af, Atten= 39%, Lag= 6.0 min
Discarded = 0.43 cfs @ 12.19 hrs, Volume= 0.212 af
Primary = 22.30 cfs @ 12.19 hrs, Volume= 2.641 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 132.43' @ 12.19 hrs Surf.Area= 7,446 sf Storage= 23,761 cf

Plug-Flow detention time= 65.0 min calculated for 2.853 af (97% of inflow)
Center-of-Mass det. time= 45.5 min (806.0 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	10,337 cf	**65.75'W x 113.25'L x 5.50'H Field A** 40,954 cf Overall - 15,112 cf Embedded = 25,842 cf x 40.0% Voids
#2A	128.25'	15,112 cf	**ADS_StormTech MC-3500 d +Cap** x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 9 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf
		25,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**24.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.65' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 4	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	128.65'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.43 cfs @ 12.19 hrs HW=132.43' (Free Discharge)
└─**4=Exfiltration** (Controls 0.43 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Passes < 3.63 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 0.80 cfs potential flow)

Primary OutFlow Max=22.30 cfs @ 12.19 hrs HW=132.43' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 22.30 cfs @ 7.10 fps)

Pond 4P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

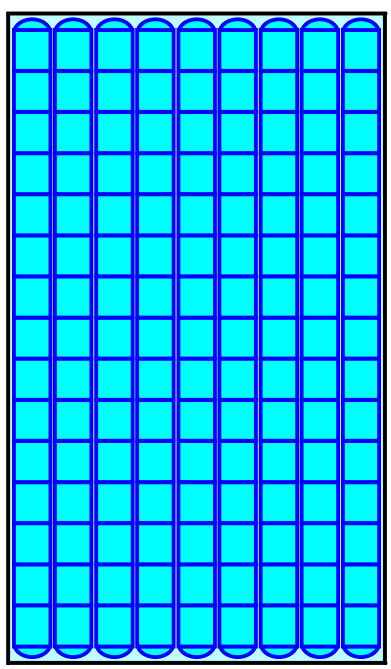
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

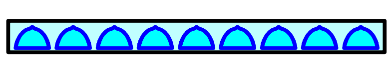
135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 15,111.7 cf Chamber Storage

40,954.0 cf Field - 15,111.7 cf Chambers = 25,842.3 cf Stone x 40.0% Voids = 10,336.9 cf Stone Storage

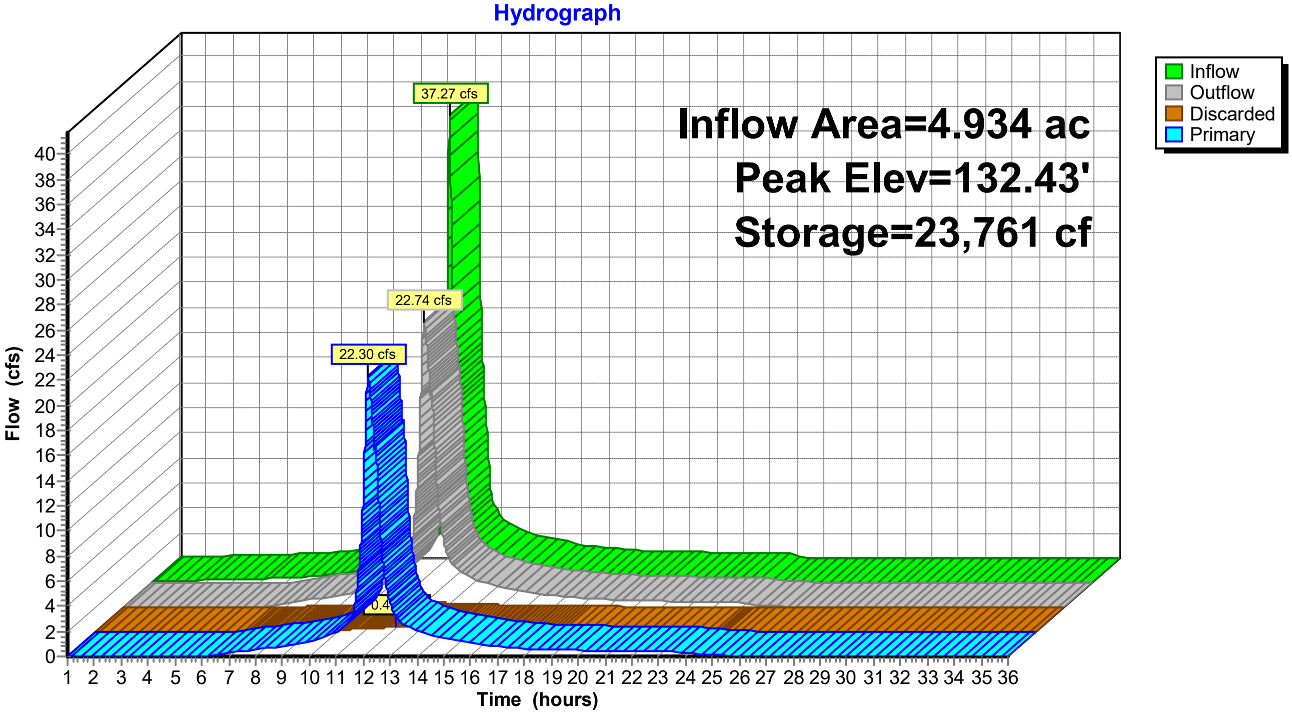
Chamber Storage + Stone Storage = 25,448.6 cf = 0.584 af
Overall Storage Efficiency = 62.1%
Overall System Size = 113.25' x 65.75' x 5.50'

135 Chambers
1,516.8 cy Field
957.1 cy Stone





Pond 4P: Infiltration Chambers

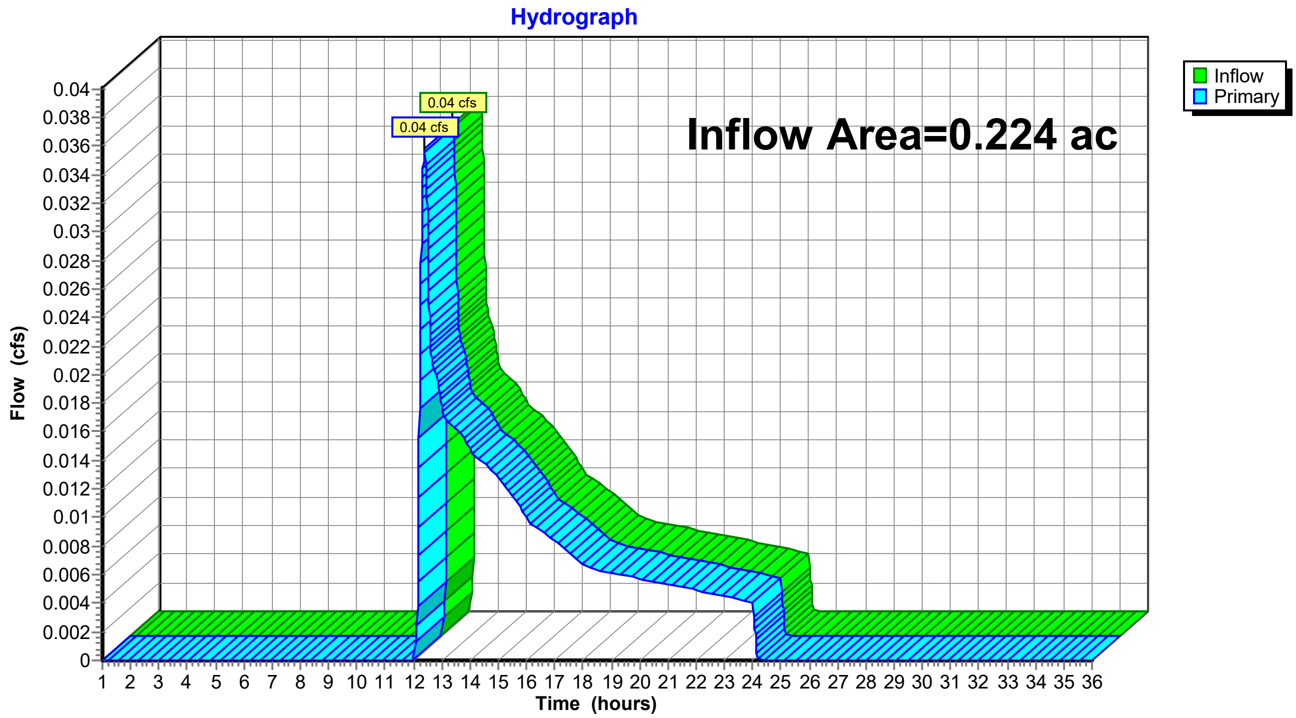


Summary for Link 1L: Leacing CB

Inflow Area = 0.224 ac, 0.00% Impervious, Inflow Depth = 0.49" for 100-year event
Inflow = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af
Primary = 0.04 cfs @ 12.39 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 1L: Leacing CB

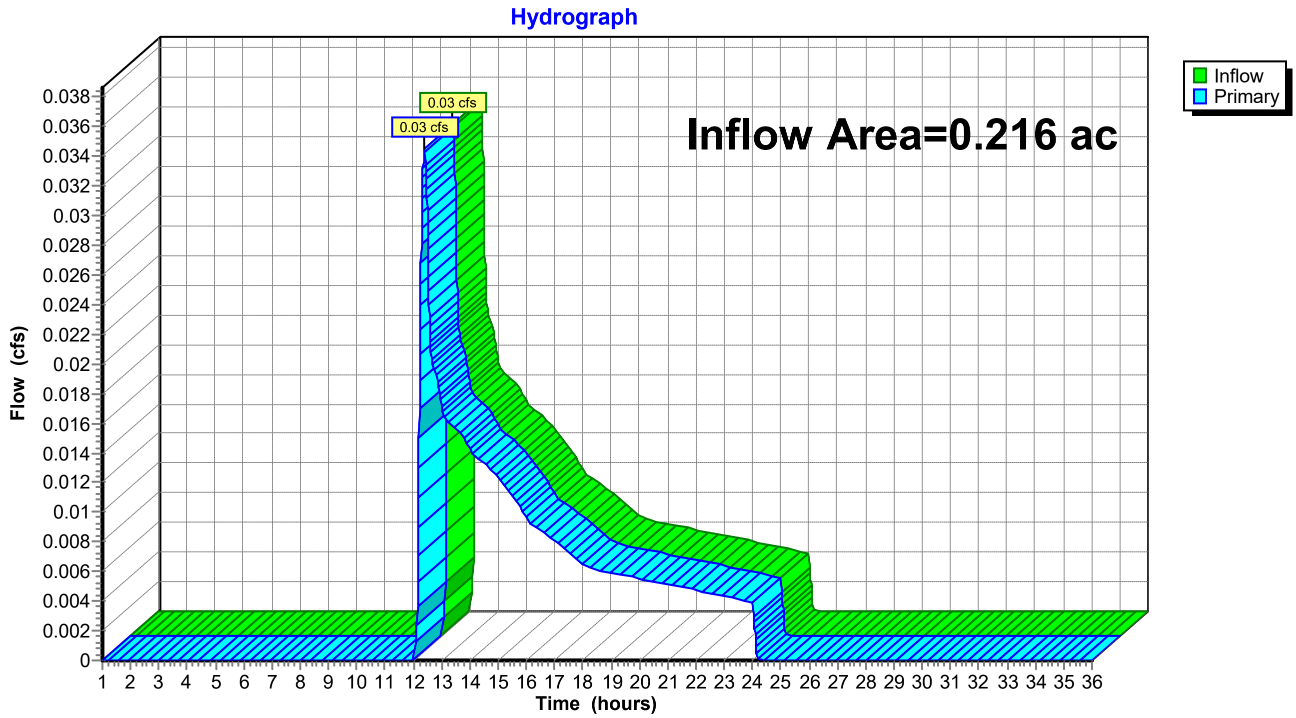


Summary for Link 2L: Isolated Wetlands

Inflow Area =	0.216 ac,	0.00% Impervious,	Inflow Depth = 0.49"	for 100-year event	
Inflow =	0.03 cfs @	12.39 hrs,	Volume=	0.009 af	
Primary =	0.03 cfs @	12.39 hrs,	Volume=	0.009 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 2L: Isolated Wetlands

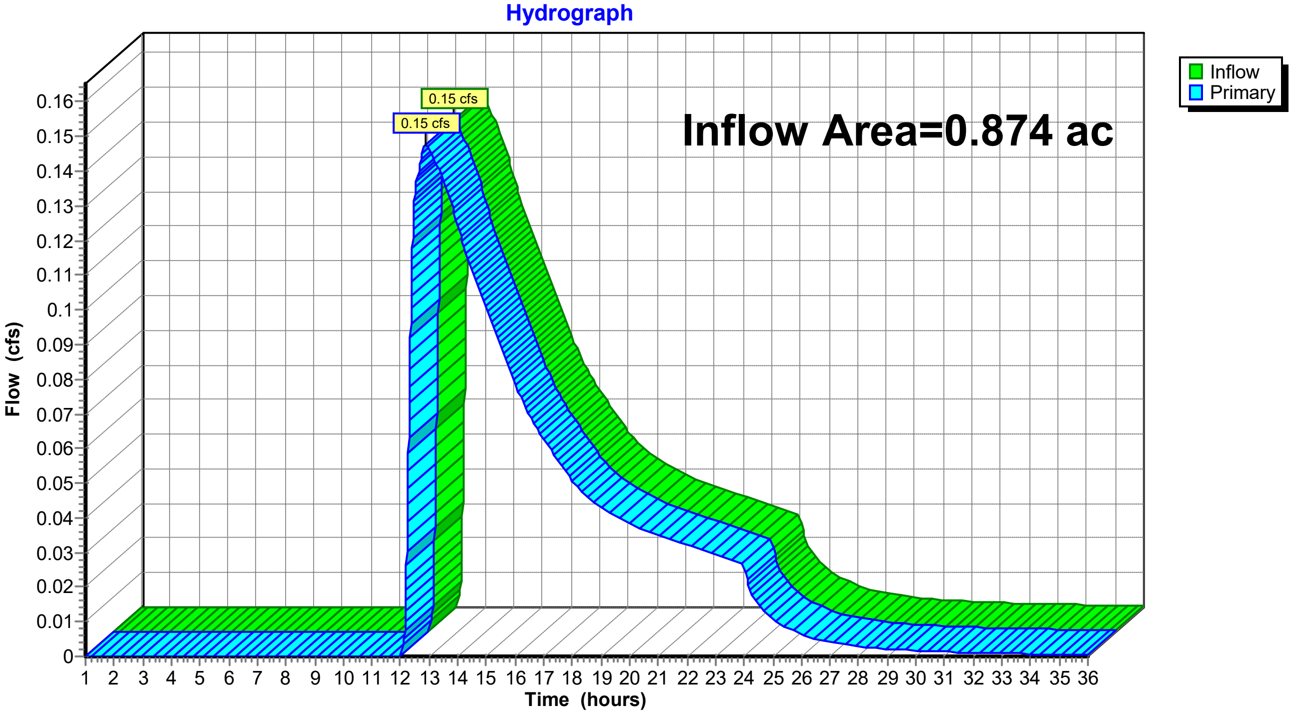


Summary for Link 3L: Spofford Pond Wetlands

Inflow Area = 0.874 ac, 9.43% Impervious, Inflow Depth > 0.93" for 100-year event
Inflow = 0.15 cfs @ 12.91 hrs, Volume= 0.068 af
Primary = 0.15 cfs @ 12.91 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 3L: Spofford Pond Wetlands

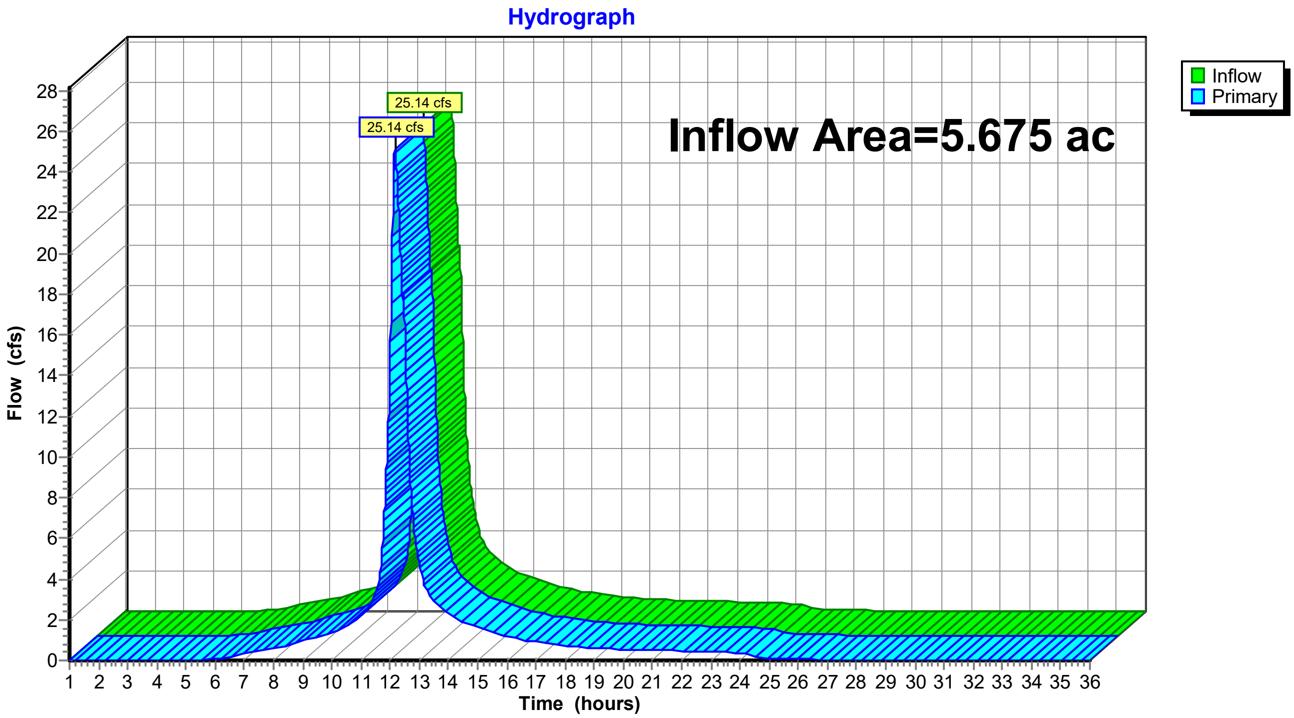


Summary for Link 4L: Vernal Pool Wetlands

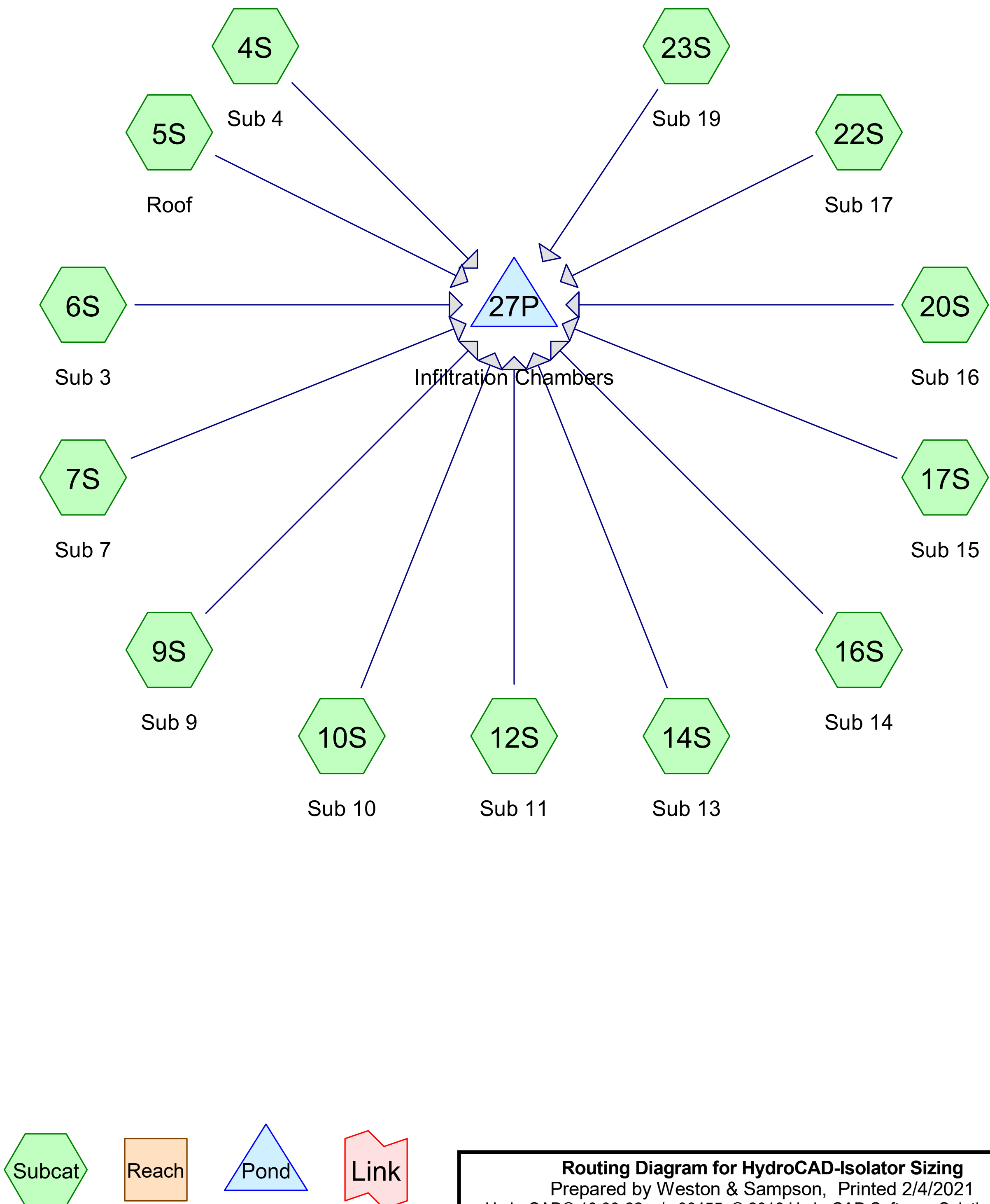
Inflow Area = 5.675 ac, 85.67% Impervious, Inflow Depth > 6.27" for 100-year event
Inflow = 25.14 cfs @ 12.16 hrs, Volume= 2.964 af
Primary = 25.14 cfs @ 12.16 hrs, Volume= 2.964 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Link 4L: Vernal Pool Wetlands



Attachment E - Calculations



Routing Diagram for HydroCAD-Isolator Sizing
Prepared by Weston & Sampson, Printed 2/4/2021
HydroCAD® 10.00-22 s/n 00455 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
15,617	30	Grass (4S, 6S, 9S, 10S, 12S, 14S, 16S, 17S, 23S)
103,418	98	Paved parking, HSG A (4S, 6S, 7S, 9S, 10S, 12S, 14S, 16S, 17S, 20S, 22S, 23S)
71,161	98	Roofs, HSG A (5S)
9,104	98	Turf (impervious) (6S)
894	30	Woods (6S)
2,484	30	Woods, Good, HSG A (4S, 10S)
202,678	**92**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
177,063	HSG A	4S, 5S, 6S, 7S, 9S, 10S, 12S, 14S, 16S, 17S, 20S, 22S, 23S
0	HSG B	
0	HSG C	
0	HSG D	
25,615	Other	4S, 6S, 9S, 10S, 12S, 14S, 16S, 17S, 23S
202,678		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchm Numbers
0	0	0	0	15,617	15,617	Grass	
103,418	0	0	0	0	103,418	Paved parking	
71,161	0	0	0	0	71,161	Roofs	
0	0	0	0	9,104	9,104	Turf (impervious)	
0	0	0	0	894	894	Woods	
2,484	0	0	0	0	2,484	Woods, Good	
177,063	**0**	**0**	**0**	**25,615**	**202,678**	**TOTAL AREA**	

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

Subcatchment 4S: Sub 4	Runoff Area=13,951 sf 62.30% Impervious Runoff Depth=0.49" Tc=6.0 min CN=WQ Runoff=0.18 cfs 573 cf
Subcatchment 5S: Roof	Runoff Area=71,161 sf 100.00% Impervious Runoff Depth=0.79" Tc=6.0 min CN=98 Runoff=1.45 cfs 4,690 cf
Subcatchment 6S: Sub 3	Runoff Area=24,730 sf 73.09% Impervious Runoff Depth=0.58" Tc=6.0 min CN=WQ Runoff=0.37 cfs 1,191 cf
Subcatchment 7S: Sub 7	Runoff Area=2,471 sf 100.00% Impervious Runoff Depth=0.79" Tc=6.0 min CN=98 Runoff=0.05 cfs 163 cf
Subcatchment 9S: Sub 9	Runoff Area=10,942 sf 96.30% Impervious Runoff Depth=0.76" Tc=6.0 min CN=WQ Runoff=0.22 cfs 694 cf
Subcatchment 10S: Sub 10	Runoff Area=18,532 sf 69.05% Impervious Runoff Depth=0.55" Tc=6.0 min CN=WQ Runoff=0.26 cfs 843 cf
Subcatchment 12S: Sub 11	Runoff Area=6,808 sf 98.43% Impervious Runoff Depth=0.78" Tc=6.0 min CN=WQ Runoff=0.14 cfs 442 cf
Subcatchment 14S: Sub 13	Runoff Area=3,318 sf 87.70% Impervious Runoff Depth=0.69" Tc=6.0 min CN=WQ Runoff=0.06 cfs 192 cf
Subcatchment 16S: Sub 14	Runoff Area=3,898 sf 96.02% Impervious Runoff Depth=0.76" Tc=6.0 min CN=WQ Runoff=0.08 cfs 247 cf
Subcatchment 17S: Sub 15	Runoff Area=13,783 sf 99.17% Impervious Runoff Depth=0.78" Tc=6.0 min CN=WQ Runoff=0.28 cfs 901 cf
Subcatchment 20S: Sub 16	Runoff Area=11,011 sf 100.00% Impervious Runoff Depth=0.79" Tc=6.0 min CN=98 Runoff=0.22 cfs 726 cf
Subcatchment 22S: Sub 17	Runoff Area=11,222 sf 100.00% Impervious Runoff Depth=0.79" Tc=6.0 min CN=98 Runoff=0.23 cfs 740 cf
Subcatchment 23S: Sub 19	Runoff Area=10,851 sf 98.57% Impervious Runoff Depth=0.78" Tc=6.0 min CN=WQ Runoff=0.22 cfs 705 cf
Pond 27P: Infiltration Chambers	Peak Elev=132.91' Storage=8,599 cf Inflow=3.75 cfs 12,106 cf Outflow=0.15 cfs 4,446 cf

Total Runoff Area = 202,678 sf Runoff Volume = 12,106 cf Average Runoff Depth = 0.72"
9.37% Pervious = 18,995 sf 90.63% Impervious = 183,683 sf

Summary for Subcatchment 4S: Sub 4

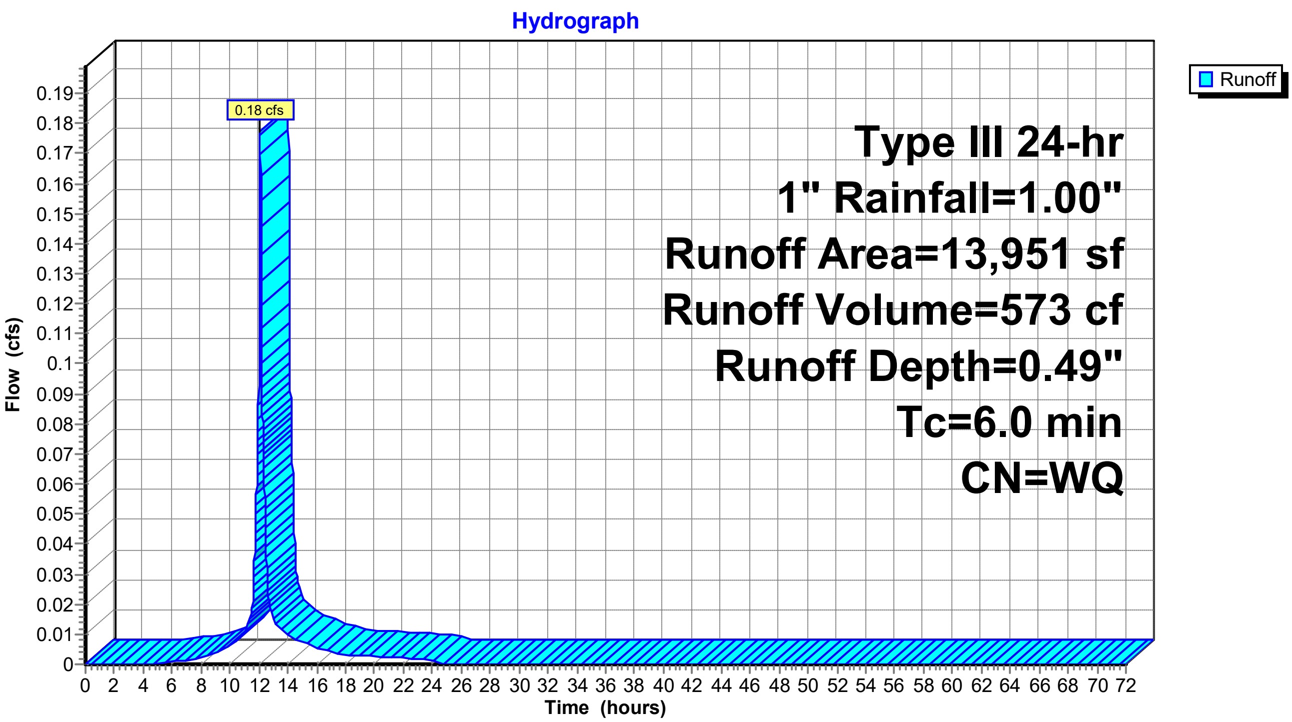
Runoff = 0.18 cfs @ 12.08 hrs, Volume= 573 cf, Depth= 0.49"

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

	Area (sf)	CN	Description
	8,691	98	Paved parking, HSG A
	2,060	30	Woods, Good, HSG A
*	3,200	30	Grass
	13,951		Weighted Average
	5,260		37.70% Pervious Area
	8,691		62.30% Impervious Area

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

Subcatchment 4S: Sub 4



Summary for Subcatchment 5S: Roof

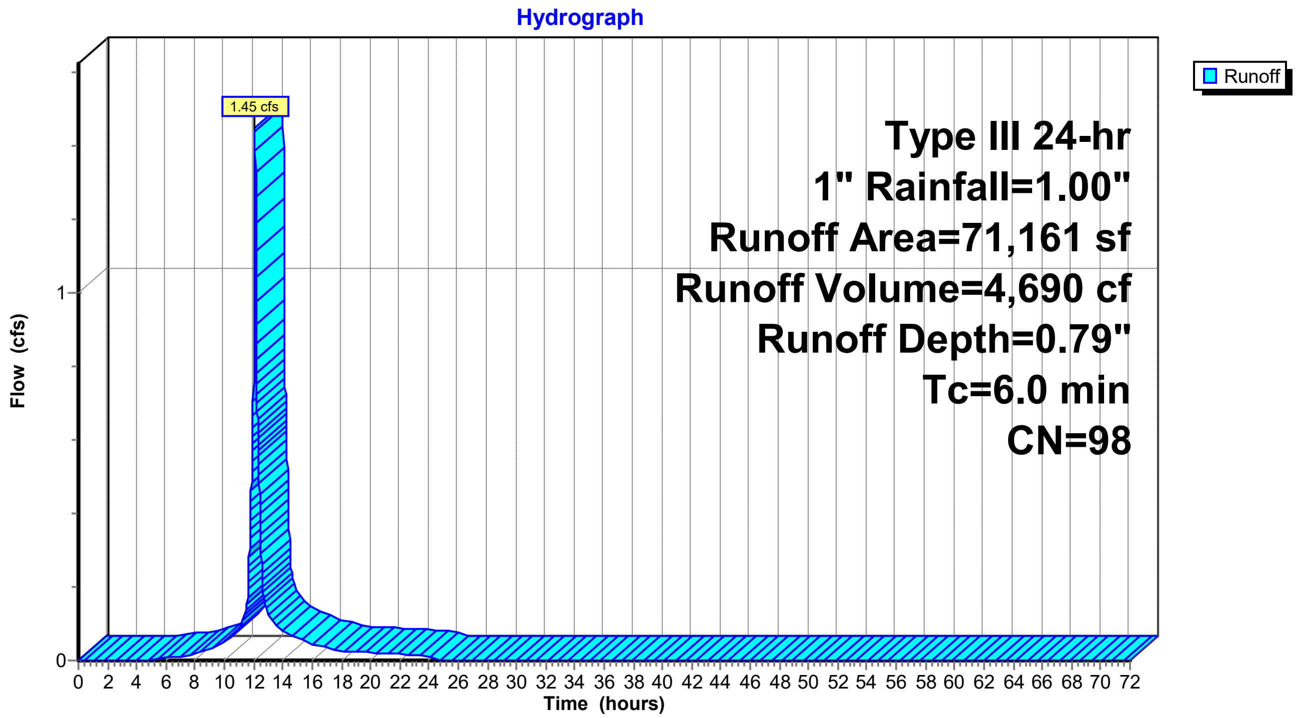
Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,690 cf, Depth= 0.79"

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

Area (sf)	CN	Description
71,161	98	Roofs, HSG A
71,161		100.00% Impervious Area

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

Subcatchment 5S: Roof



Summary for Subcatchment 6S: Sub 3

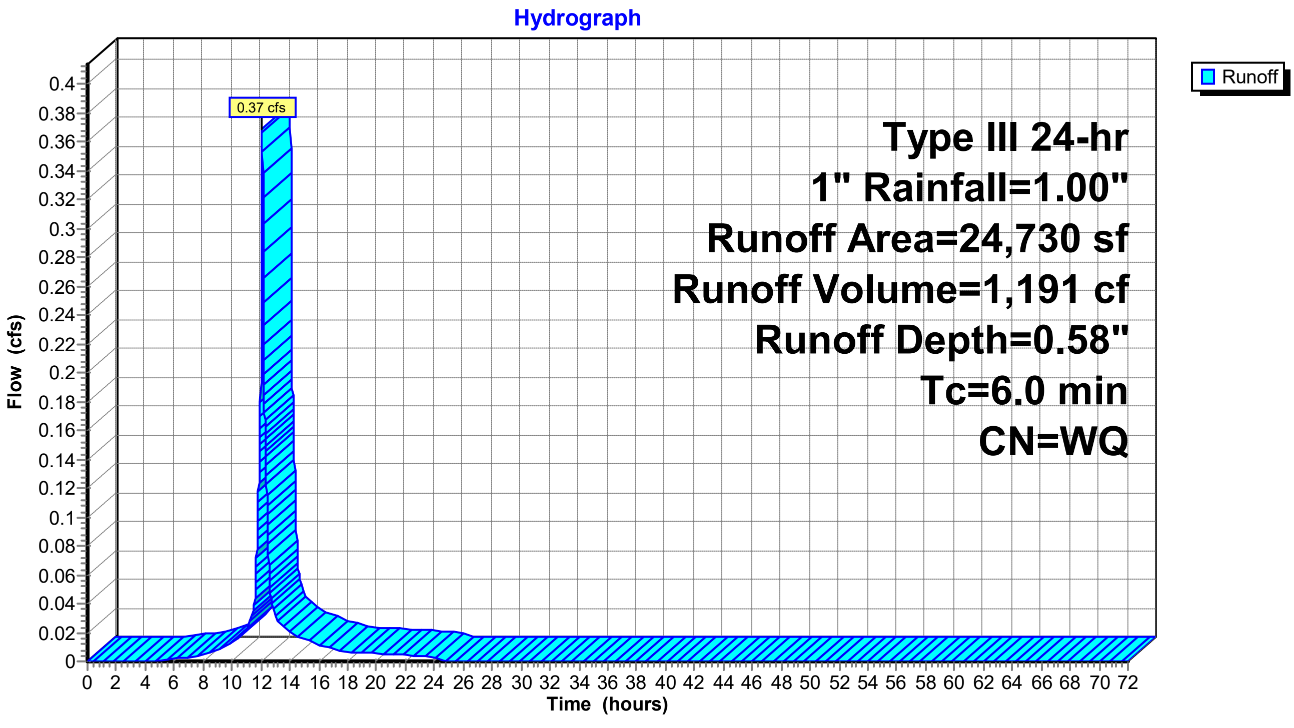
Runoff = 0.37 cfs @ 12.08 hrs, Volume= 1,191 cf, Depth= 0.58"

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

	Area (sf)	CN	Description
	8,972	98	Paved parking, HSG A
*	9,104	98	Turf (impervious)
*	5,760	30	Grass
*	894	30	Woods
	24,730		Weighted Average
	6,654		26.91% Pervious Area
	18,076		73.09% Impervious Area

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

Subcatchment 6S: Sub 3



Summary for Subcatchment 7S: Sub 7

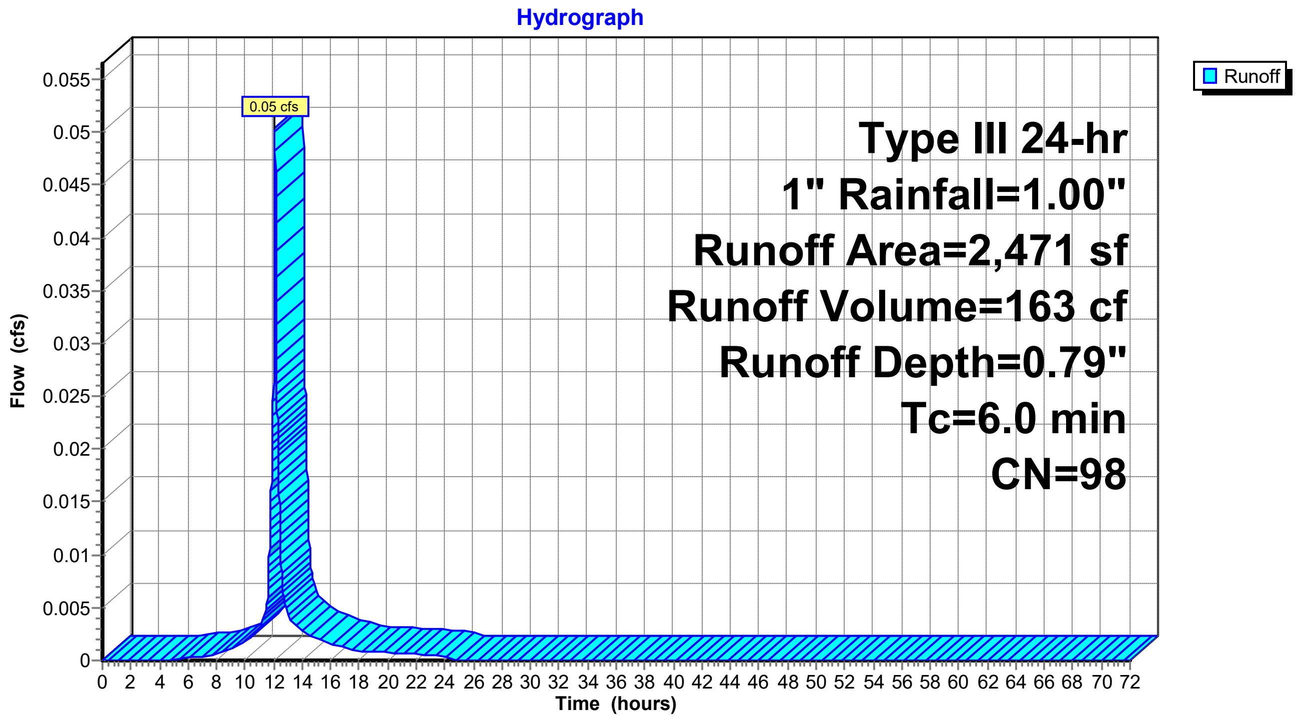
Runoff = 0.05 cfs @ 12.08 hrs, Volume= 163 cf, Depth= 0.79"

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

Area (sf)	CN	Description
2,471	98	Paved parking, HSG A
2,471		100.00% Impervious Area

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

Subcatchment 7S: Sub 7



Summary for Subcatchment 9S: Sub 9

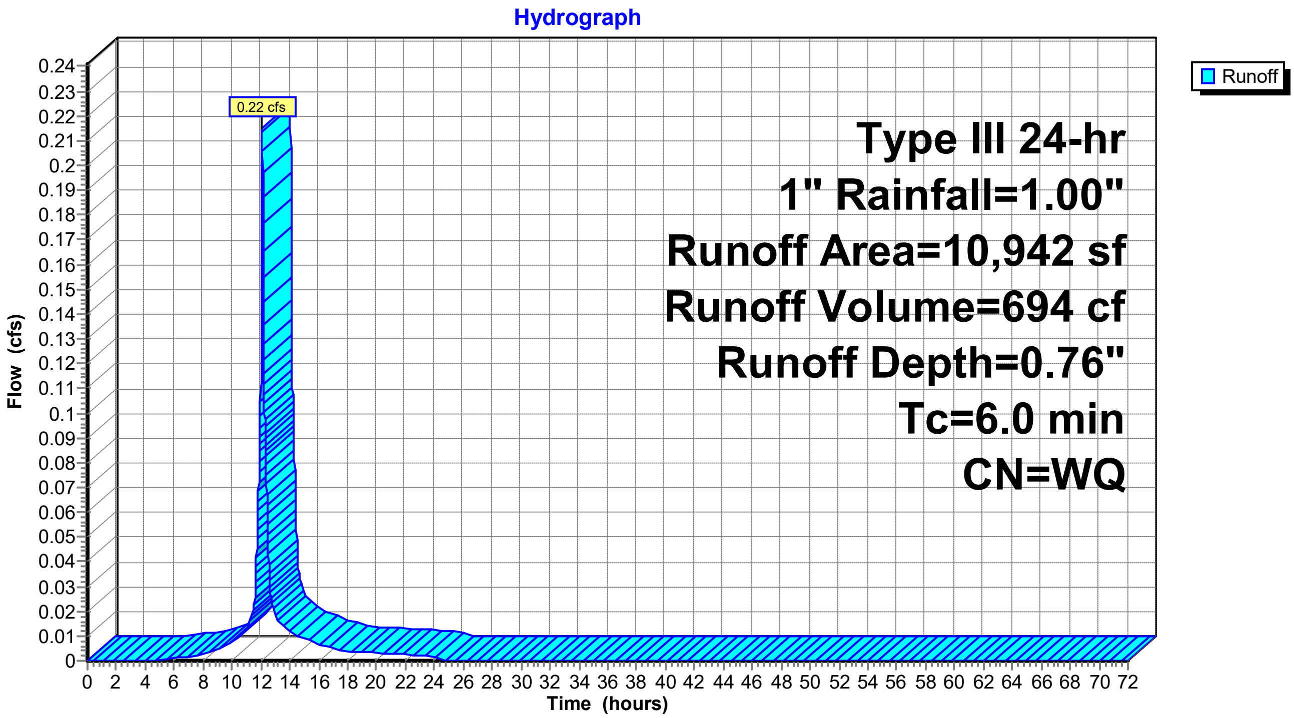
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 694 cf, Depth= 0.76"

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

	Area (sf)	CN	Description
	10,537	98	Paved parking, HSG A
*	405	30	Grass
	10,942		Weighted Average
	405		3.70% Pervious Area
	10,537		96.30% Impervious Area

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

Subcatchment 9S: Sub 9



Summary for Subcatchment 10S: Sub 10

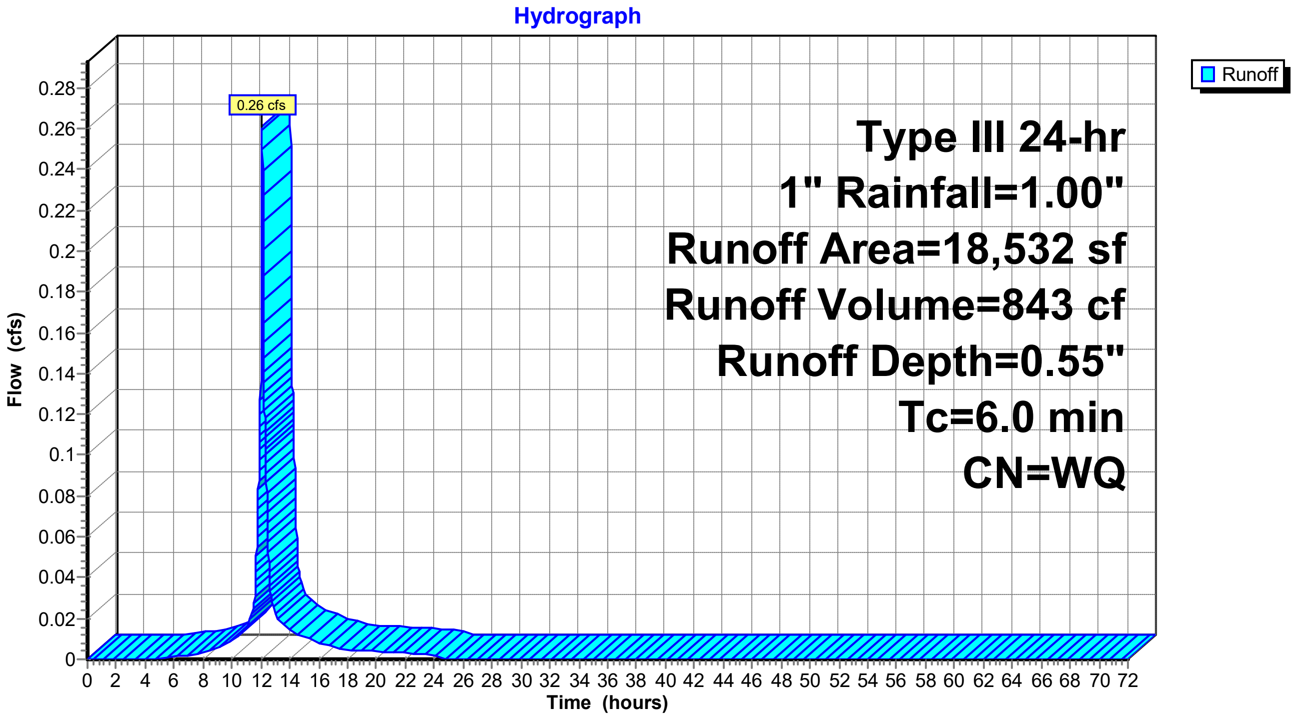
Runoff = 0.26 cfs @ 12.08 hrs, Volume= 843 cf, Depth= 0.55"

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

	Area (sf)	CN	Description
	12,796	98	Paved parking, HSG A
	424	30	Woods, Good, HSG A
*	5,312	30	Grass
	18,532		Weighted Average
	5,736		30.95% Pervious Area
	12,796		69.05% Impervious Area

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

Subcatchment 10S: Sub 10



Summary for Subcatchment 12S: Sub 11

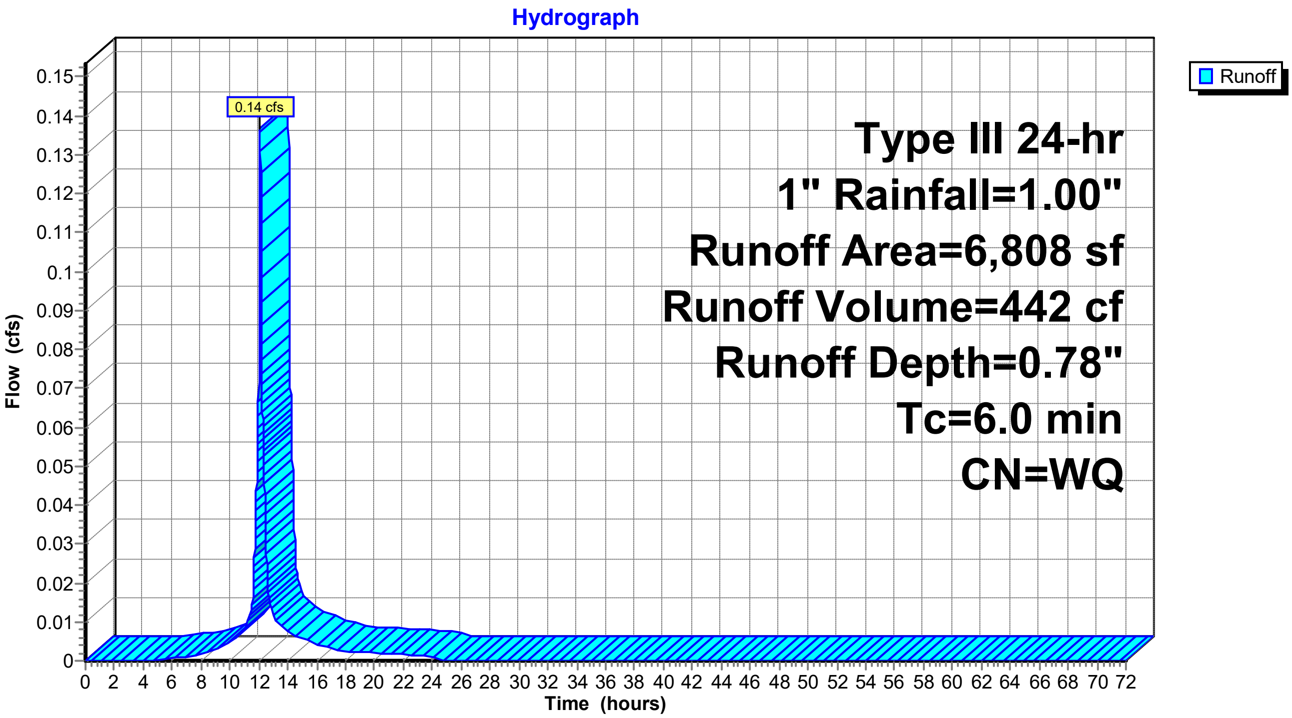
Runoff = 0.14 cfs @ 12.08 hrs, Volume= 442 cf, Depth= 0.78"

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

	Area (sf)	CN	Description
	6,701	98	Paved parking, HSG A
*	107	30	Grass
	6,808		Weighted Average
	107		1.57% Pervious Area
	6,701		98.43% Impervious Area

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

Subcatchment 12S: Sub 11



Summary for Subcatchment 14S: Sub 13

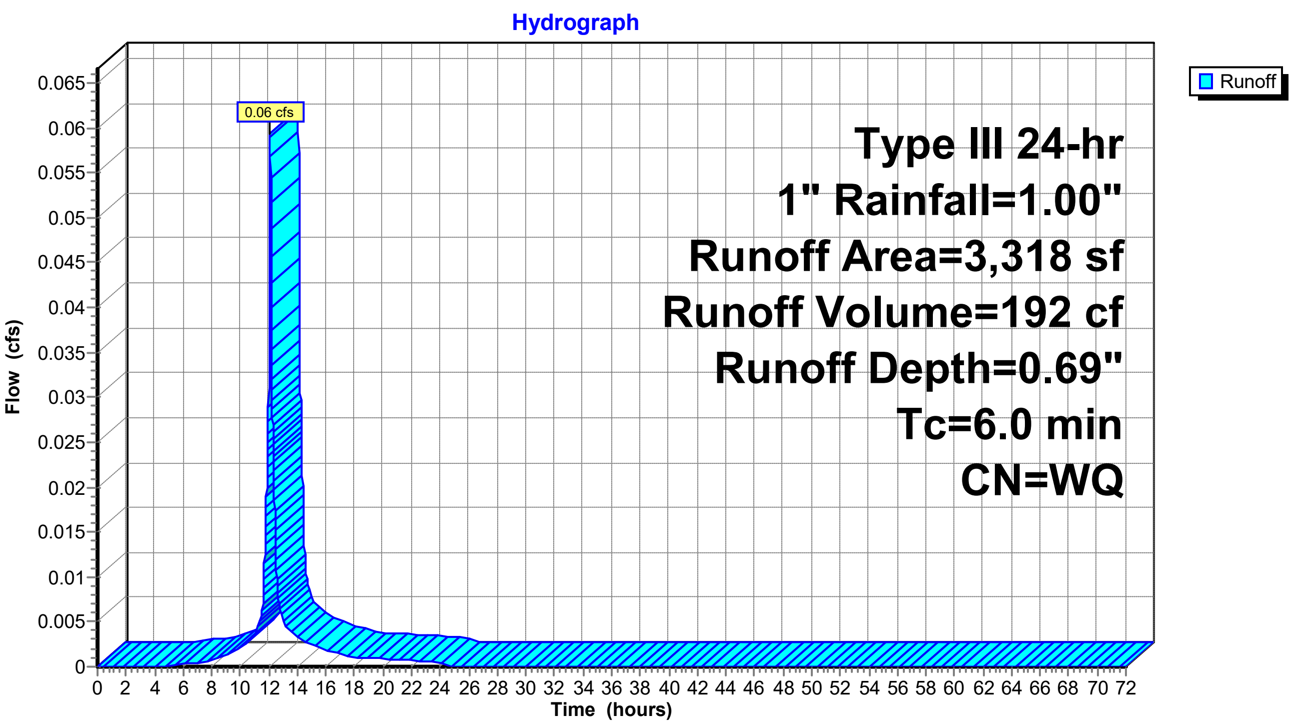
Runoff = 0.06 cfs @ 12.08 hrs, Volume= 192 cf, Depth= 0.69"

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

	Area (sf)	CN	Description
	2,910	98	Paved parking, HSG A
*	408	30	Grass
	3,318		Weighted Average
	408		12.30% Pervious Area
	2,910		87.70% Impervious Area

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

Subcatchment 14S: Sub 13



Summary for Subcatchment 16S: Sub 14

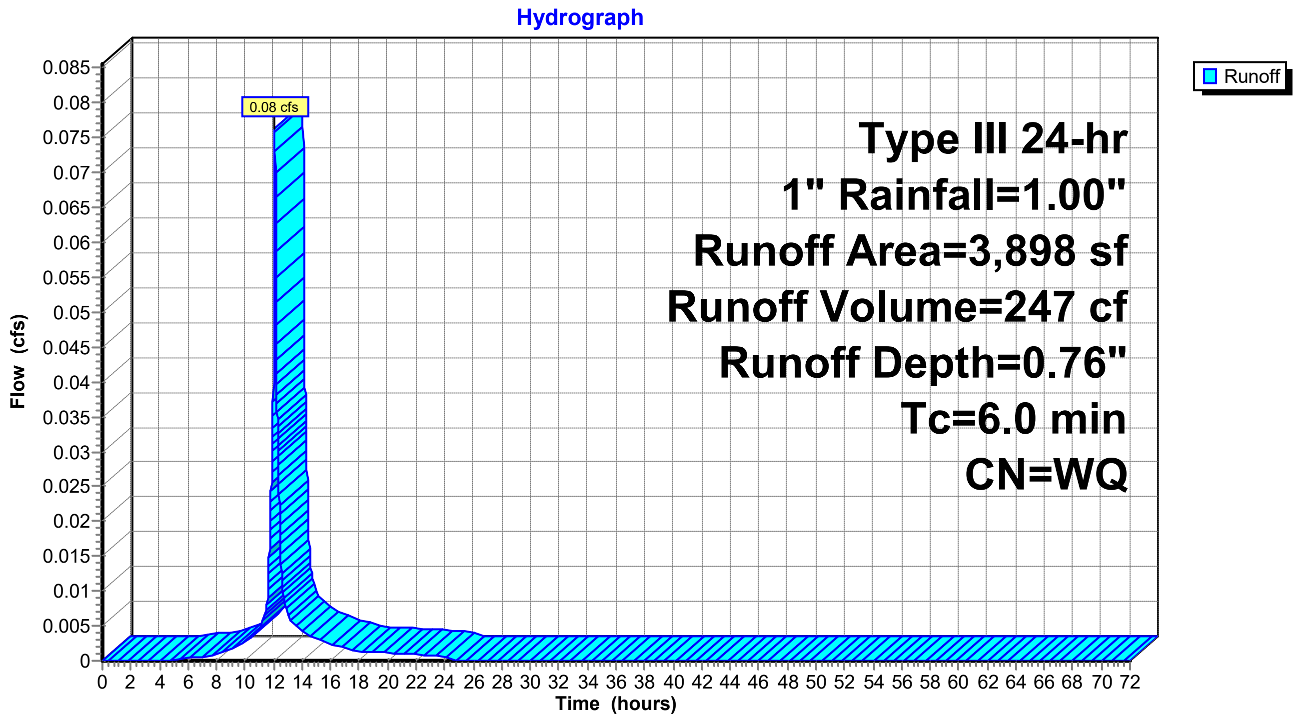
Runoff = 0.08 cfs @ 12.08 hrs, Volume= 247 cf, Depth= 0.76"

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

	Area (sf)	CN	Description
	3,743	98	Paved parking, HSG A
*	155	30	Grass
	3,898		Weighted Average
	155		3.98% Pervious Area
	3,743		96.02% Impervious Area

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

Subcatchment 16S: Sub 14



Summary for Subcatchment 17S: Sub 15

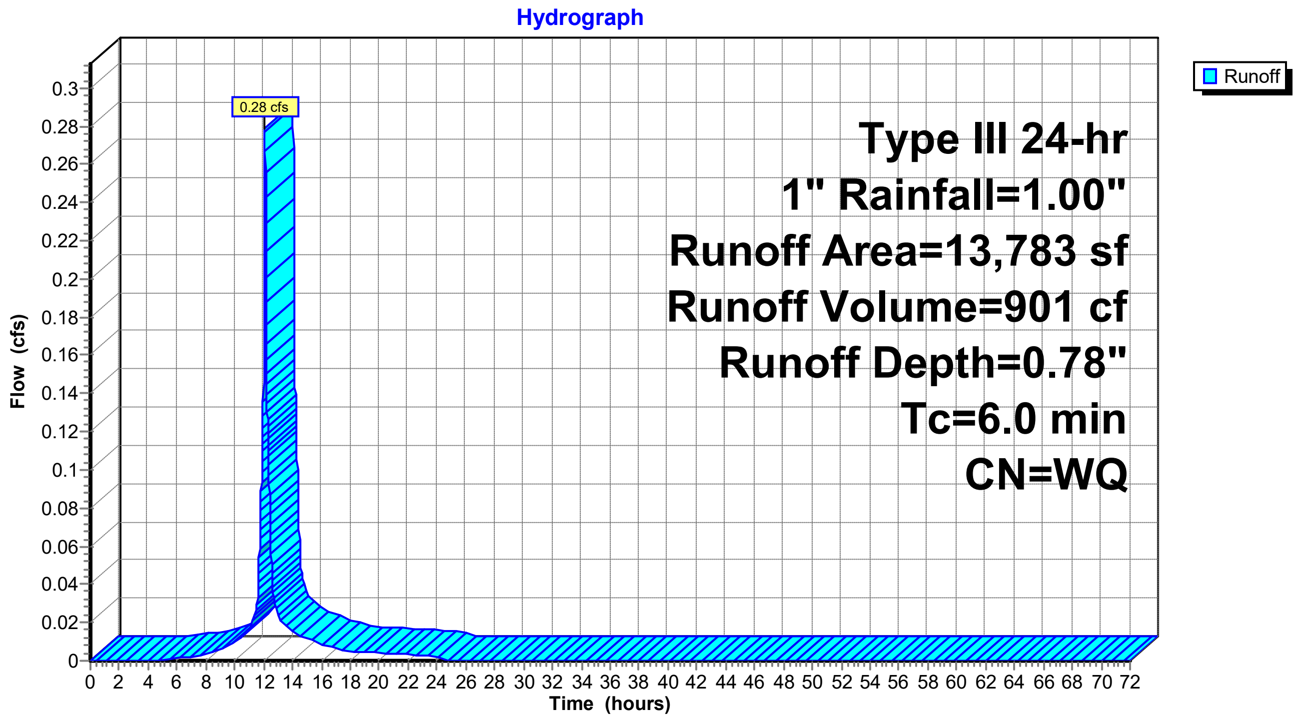
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 901 cf, Depth= 0.78"

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

	Area (sf)	CN	Description
	13,668	98	Paved parking, HSG A
*	115	30	Grass
	13,783		Weighted Average
	115		0.83% Pervious Area
	13,668		99.17% Impervious Area

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

Subcatchment 17S: Sub 15



Summary for Subcatchment 20S: Sub 16

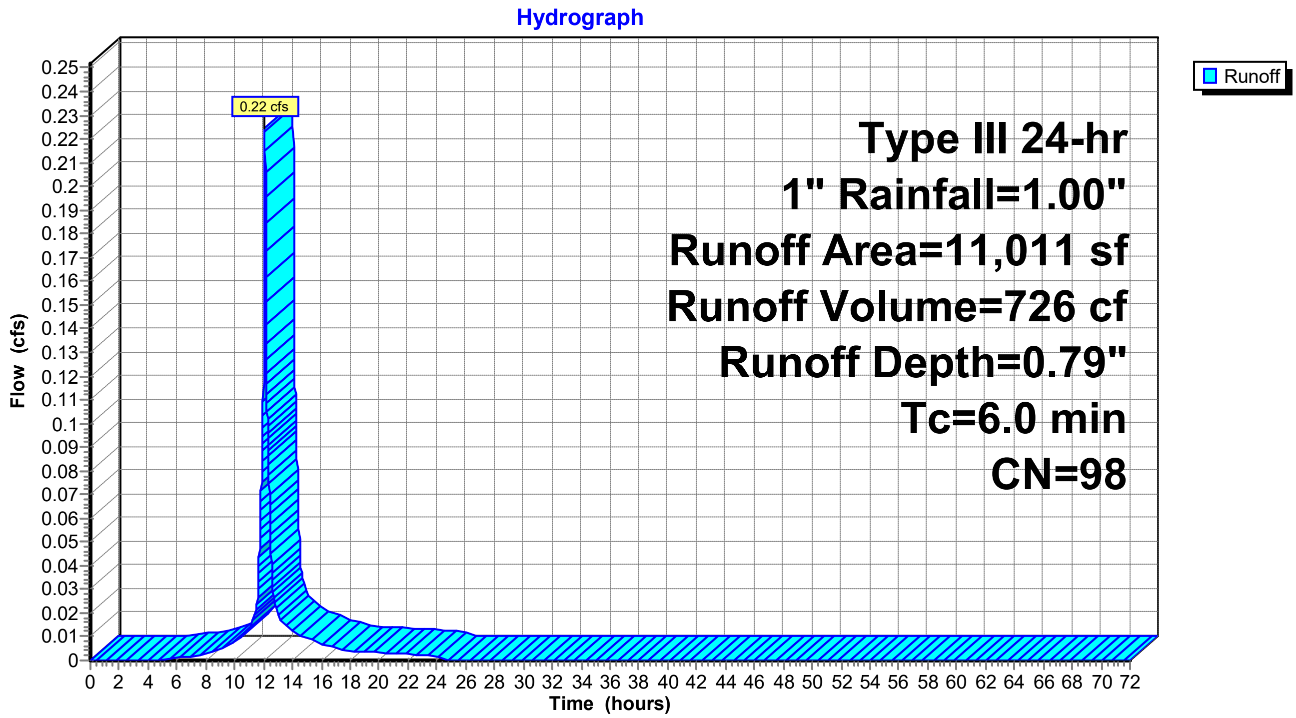
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 726 cf, Depth= 0.79"

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

Area (sf)	CN	Description
11,011	98	Paved parking, HSG A
11,011		100.00% Impervious Area

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

Subcatchment 20S: Sub 16



Summary for Subcatchment 22S: Sub 17

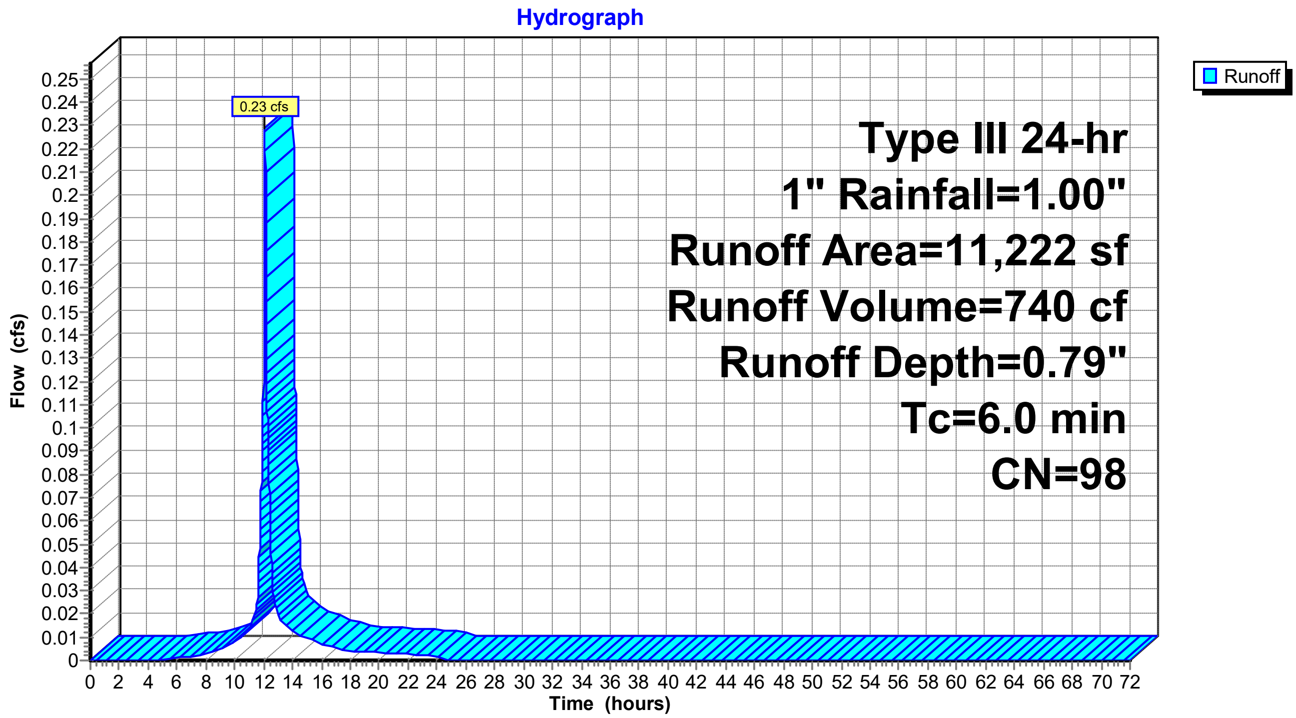
Runoff = 0.23 cfs @ 12.08 hrs, Volume= 740 cf, Depth= 0.79"

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

Area (sf)	CN	Description
11,222	98	Paved parking, HSG A
11,222		100.00% Impervious Area

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

Subcatchment 22S: Sub 17



Summary for Subcatchment 23S: Sub 19

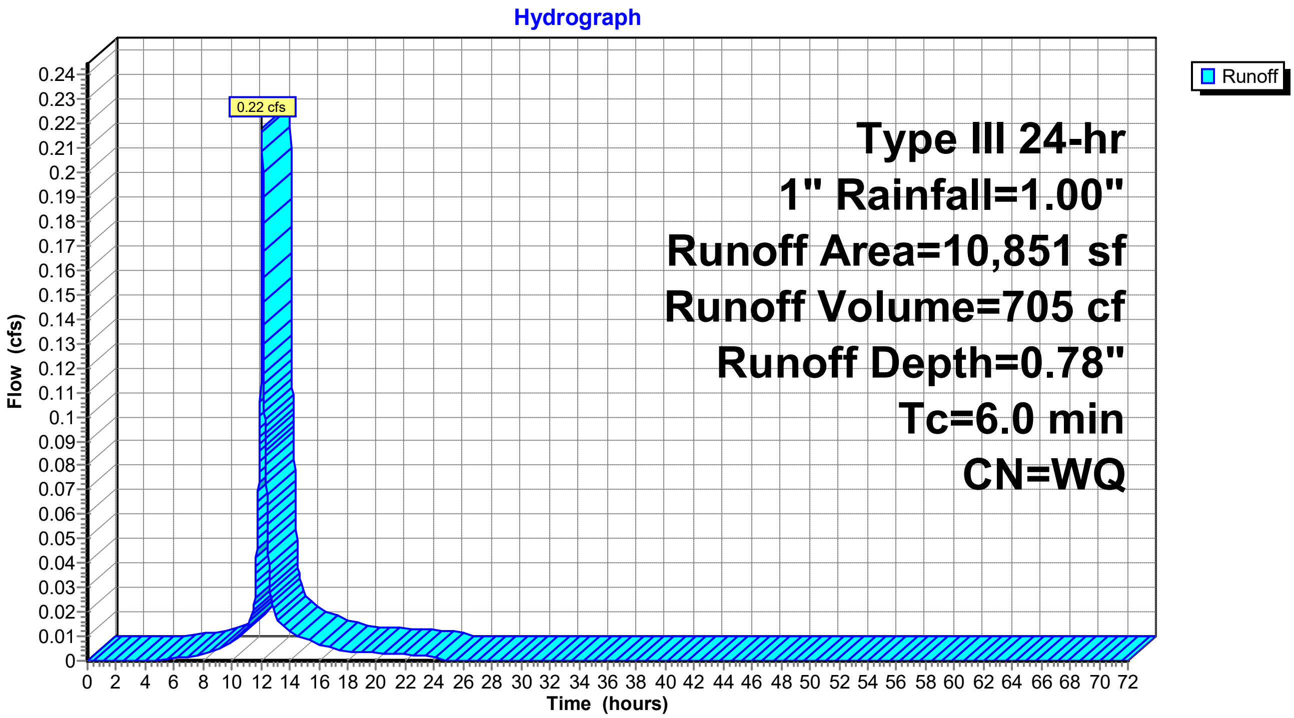
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 705 cf, Depth= 0.78"

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

	Area (sf)	CN	Description
*	155	30	Grass
	10,696	98	Paved parking, HSG A
	10,851		Weighted Average
	155		1.43% Pervious Area
	10,696		98.57% Impervious Area

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

Subcatchment 23S: Sub 19



Summary for Pond 27P: Infiltration Chambers

Inflow Area = 202,678 sf, 90.63% Impervious, Inflow Depth = 0.72" for 1" event
Inflow = 3.75 cfs @ 12.08 hrs, Volume= 12,106 cf
Outflow = 0.15 cfs @ 15.16 hrs, Volume= 4,446 cf, Atten= 96%, Lag= 184.6 min
Discarded = 0.15 cfs @ 15.16 hrs, Volume= 4,446 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 132.91' @ 15.16 hrs Surf.Area= 2,576 sf Storage= 8,599 cf

Plug-Flow detention time= 364.3 min calculated for 4,446 cf (37% of inflow)
Center-of-Mass det. time= 231.2 min (1,019.1 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	127.50'	3,653 cf	**22.75'W x 113.25'L x 5.50'H Field A** 14,170 cf Overall - 5,037 cf Embedded = 9,133 cf x 40.0% Voids
#2A	128.25'	5,037 cf	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		8,691 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	132.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	127.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.15 cfs @ 15.16 hrs HW=132.91' (Free Discharge)
└─**2=Exfiltration** (Controls 0.15 cfs)
  └─**1=Sharp-Crested Rectangular Weir** (Passes 0.15 cfs of 10.86 cfs potential flow)

Pond 27P: Infiltration Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

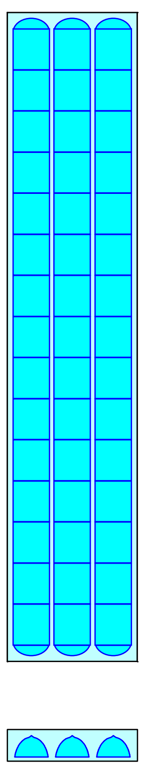
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

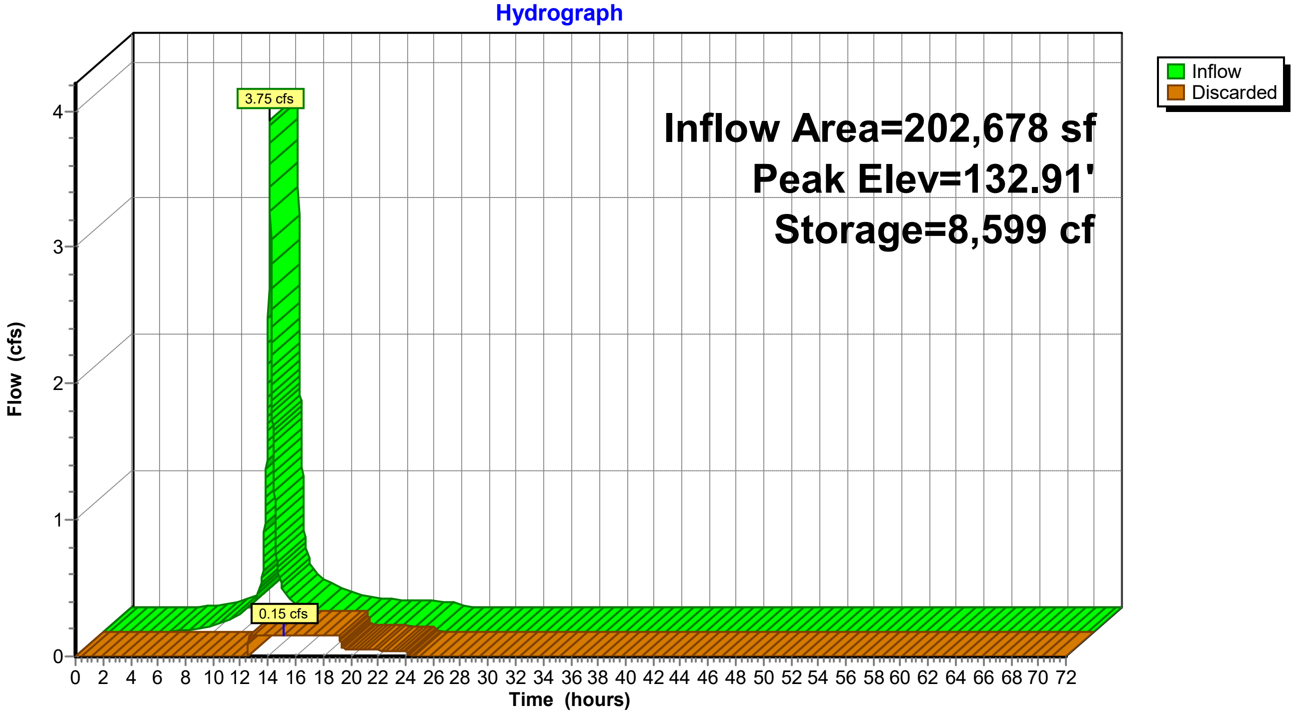
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone



Pond 27P: Infiltration Chambers



Project:	Spofford Pond School	Project Number:	ENG20-0865
Location:	Boxford, MA	Prepared By:	CTK
Client:	Town of Boxford	Date:	February 3, 2021

Standard 3: Recharge Calculations (Static Method)

Infiltration Chambers (4P)

Hydrologic Soils Group:	A	B	C	D		
Total Proposed Impervious Area (AC):	4.1590	0.0000	0.0000	0.0000	4.16	
Target Factor:	0.60	0.35	0.25	0.10		
Required Recharge Volume:	9,058	0	0	0	9,058	CF

Volume Below Lowest Outlet:	7,137	CF
Elevation of Lowest Invert:	129.08	

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate):	2.41	IN/HR
Bottom Area of Infiltration Basin:	6,975	SF
Drawdown Time:	5.1	HRS

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: Infiltraition Chamber Area

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Subsurface Infiltration Structure	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

Total TSS Removal = **80%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Spofford Pond School
Prepared By: Colleen T Kennedy
Date: 2/3/2021

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

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: Rain Garden

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Bioretention Area	**0.90**	**1.00**	**0.90**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**

Total TSS Removal = 90%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Spofford Pond School**
Prepared By: **Colleen T Kennedy**
Date: **2/3/2021**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

Boxford MA - Spofford Pond School
Water Quality Volume Calculation
February 3, 2021

Required Water Quality Storage
Proposed Paved Area sf x 1" x 1'/12"= Required WQ Storage CF

Location	Proposed Impervious Area (sqft)	Required WQ Storage (cf)	Provided WQ Storage (cf)	Description
Area 1	120,977	10,081	25,449	Infiltration Chambers

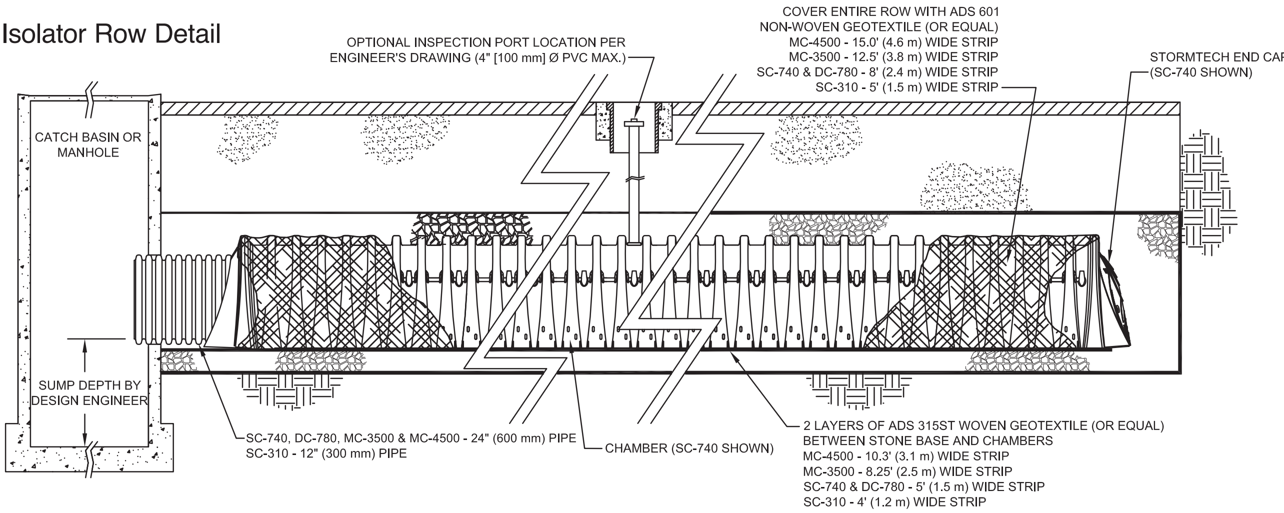
Existing Pavement Area = 91,621.27 sf
Existing Compacted Gravel Area = 19,409.91 sf
Total Existing Impervious = 111,031. 18 sf

Proposed Pavement Area = 120,976.83 sf

StormTech and Stormwater Quality

StormTech's patented Isolator™ Row is a row of chambers wrapped in a geotextile which filters the stormwater trapping pollutants in the row. The Isolator Row provides a way to inspect and maintain the system.

Isolator Row Detail



Note: For many applications, the non-woven geotextile over the DC-780, MC-3500 and MC-4500 Isolator Row chambers can be eliminated or substituted with the AASHTO Class 1 woven geotextile. Contact your StormTech representative for assistance.

Isolator Row Field Verification Testing at the University of New Hampshire Stormwater Center

- Field testing (TARP tier II protocol) of the Isolator Row has been ongoing since December 2006.
- Removal efficiencies for TSS have improved as the filter cake has built up on the bottom fabric of the Isolator Row.
- Current data shows a TSS removal efficiency which exceeds 80%.

Removal Efficiency Results:

- Total Suspended Solids = 80%
- Phosphorous = 49%
- Total Petroleum Hydrocarbons = 90%
- Zinc = 53%

This system achieves a removal efficiency of 80% for TSS which meets most municipal recommended levels for water quality treatment.

Inspection and Maintenance

The Isolator Row can be inspected through the upstream manhole or optional inspection port.

Maintenance is easily accomplished with the JetVac process.

The frequency of inspection and maintenance varies by location. Contact StormTech for assistance with inspection and maintenance scheduling.

Technical Memo

Pages: 3

To: Ed Pisowicz

From: Ken Sanok, P.E.

Cc: Engineering Department, Technical Services, StormTech Regional Product Managers

Date: 03/5/2010

Subject: Design Guidance for the Isolator Row Weir

Isolator Row

The Isolator Row is typically designed to treat the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. While the "first flush" will have the highest TSS, nutrient and hydrocarbon loading the unique design of the Isolator Row system continues to filter throughout the entire storm event. An upstream manhole/diversion structure not only provides access to the Isolator Row but typically includes a high flow weir such that the stormwater flow rates or volumes that exceed the capacity of the Isolator Row chambers overtop the weir and discharge through a manifold to the remainder of the chamber bed. There are several methods to divert the "first flush" into the Isolator Row (weirs, varying pipe inverts, etc.). This memo addresses the design of a weir for the Isolator Row diversion structure.

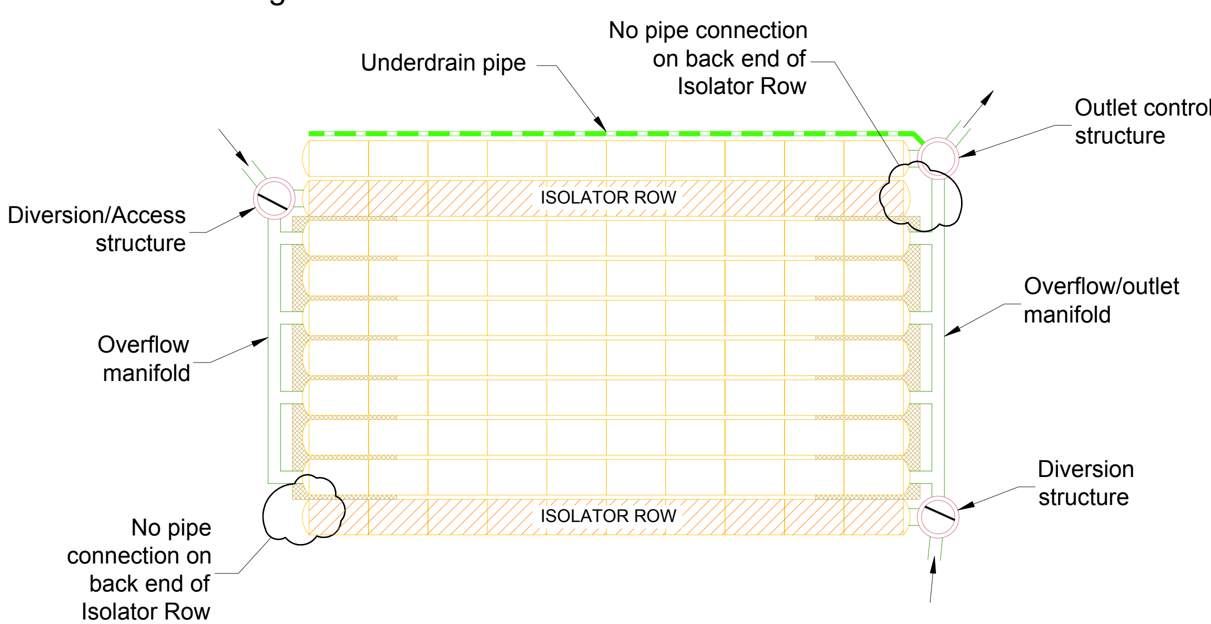


Figure 1 Typical StormTech Chamber Layout with Isolator Row

Structure Placement

The diversion/access structure must be placed directly in front of the Isolator Row and must be connected by a 24” pipe to the SC-740, DC-780 and MC-3500 chambers and a 12” pipe to the SC-310 chamber. The structure will typically have a weir installed and a minimum size of 48 inches is recommended to allow access to the Isolator Row. The design engineer may select a smaller size structure for shallow systems with low flow rates. The actual size of the structure will vary based on the weir design, pipe sizes, pipe angles and design flow rate.

Diversion Weir

The weir is situated to divert the runoff initially into the Isolator Row. The maximum weir crest elevation is determined by subtracting the head required to pass the peak flow from the maximum allowable water surface elevation. Typically the weir crest elevation ranges from the midpoint of the chamber up to the top of the chamber (see figure 2). The design of the weir is performed in several steps. The desired sized structure is drawn on the engineer’s plans with the pipe connections. A weir is drawn in and the length is determined. The design engineer then determines the allowable water surface elevation over the weir crest in the structure (typically it is set at the same elevation as the top of the stone above the chambers). The weir crest elevation is then estimated. Start by assuming the elevation of the weir crest is at the same elevation as the top of the chambers. Thus the approach head (H) is the distance from the weir crest to the allowable water surface elevation.

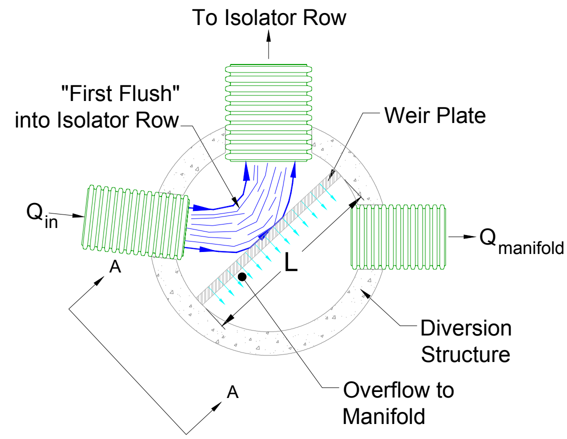


Figure 2A, Plan View of Diversion Structure

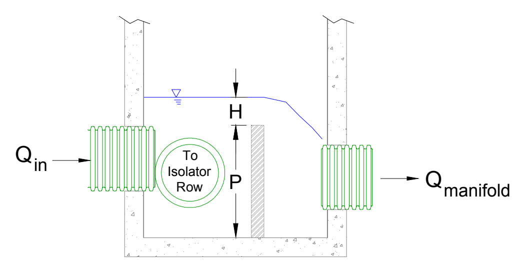


Figure 2B, Section A_A of Diversion Structure

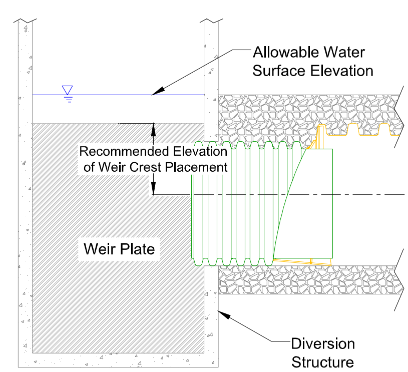


Figure 2C, Profile of Diversion Structure and Isolator Row

The equation of a sharp crested weir can be written as follows [1]:

$$Q = C\sqrt{2g}\,LH^{3/2}$$

$$C = 0.40 + 0.05\frac{H}{P}$$

Q = flow rate (cfs)
C = discharge coefficient
L = length of weir (ft)
H = approach head on the crest (ft)
P = height of crest above channel bottom (ft)
g = gravity (32.2 ft/s^2)

The flow over the weir can be calculated using these equations. This calculated flow is then compared to the design flow rate entering the structure. If this calculated flow is greater than the design flow rate then the weir is sufficient to pass the flows. If not, then the weir crest can be lowered and the calculations repeated. As mentioned previously StormTech recommends the weir crest be set between the top of the chamber and the midpoint of the chamber (see figure 2C). If the lowered crest cannot met the design flow rate a larger structure can be analyzed which allows for a longer weir crest.

Other Considerations

StormTech does not have any specifications for the material or structural design of the weir. It is the responsibility of the design engineer to ensure a material/design selected is adequate for the project design parameters. StormTech has found that aluminum weirs work well as the Isolator Row diversion weir.

Due to the confined nature of the structures it is possible that the weir will be suppressed and/or contracted. The design engineer must be aware of this and incorporate it into the design if deemed necessary.

[1] Cassidy, J.J, Chaudhry, M.H., and Roberson, J.A., Hydraulic Engineering, 1st ed., Houghton Mifflin, Boston, 1988

STATE OF MAINE
DEPARTMENT OF
ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

July 29, 2016

StormTech, A Division of ADS, Inc.
70 Inwood Road, Suite 3
Rocky Hill, CT 06067
ATTN: David Mailhot P.E.

Dear Mr. Mailhot,

This letter replaces the letter dated March 22, 2016. It includes a slight modification in section 1 to clarify sizing requirements.

The Stormtech Isolator Row was approved by the Department of Environmental Protection (Department) in September 2009 for use as a pre-treatment row before a subsurface underdrained filter system as described in Chapter 7.3 of Volume III of the Maine Stormwater Management Best Management Practice Manual. The sizing, installation, and maintenance criteria provided in this letter replace the ones given in Chapter 7.3 of Volume III of the Maine Stormwater Management BMP Manual. The Department still authorizes the use of the StormTech Isolator Row as a pre-treatment row meeting the requirements of the General Standards (Section 4.C.) of the Stormwater Management Rules (Chapter 500) provided the system is sized, installed, and maintained in accordance with the following provisions:

1. The number of chambers within the Isolator Row pre-treatment structure must treat, without overflowing, the one-year 24-hour peak flow from the structure's drainage area. To determine the number of chambers, the one-year peak flow rate must be divided by the specific flow rate of the chamber. The acceptable flow rate for each of the Isolator Row chamber sizes are as follow:

Chamber size	Flow Rate
SC-310	0.1 cfs
SC-740 or DC-780	0.2 cfs
MC-3500	0.3 cfs

   Additional pre-treatment rows may be added based on site conditions and chamber bed layout provided each row is provided with access manhole and control structures.
2. The Isolator Row must be part of a stormwater management system that conforms to all the requirements of Chapter 7.3 of the Stormwater Management Manual and be fitted with an overflow that bypasses the pretreatment Isolator Row only when the one-year 24-hour peak flow is exceeded, and discharges to a stable outlet or is directed to a detention system/structure that will provide necessary flood storage.
3. The Isolator Row shall be underlain with a bottom surface consisting of two layers of ADS 315 woven geotextile or equivalent; and be covered with one layer of ADS 601T non-woven geotextile or equivalent.
4. The Isolator Row does not provide for the removal of hydrocarbons and should be preceded by a device or practice that will serve this function if the area draining to the Isolator Row is

a likely source of hydrocarbons (i.e. parking lots, roads, drive-through commercial enterprises).

5. The Isolator Row must include an access at both ends for the removal of accumulated sediment and debris.
6. The first year of system maintenance must be provided by the manufacturer to ensure that the system is operating according to the established specifications.
7. Prior to construction, a five-year binding inspection and maintenance contract must be provided for review and approval by the Department, and must be renewed before contract expiration. The contract will be with a professional with knowledge of erosion and stormwater control, including a detailed working knowledge of the proposed system.
8. The overall stormwater management design must meet all Department criteria and sizing specifications and will be reviewed and approved by the Department prior to use.
9. Each project must be reviewed and approved by the manufacturer for proposed use, layout and sizing of the pre-treatment row and for conformance with their design specifications.
10. The pre-treatment row must be installed under the manufacturer's representative supervision.
11. This approval is conditional to on-the-ground experience confirming that the StormTech Isolator Row system's pollutant removal efficiency is appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if, with proper maintenance, pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. Questions concerning this decision should be directed to Marianne Hubert at (207) 215-6485 or Jeff Dennis at (207) 215-6376.

Sincerely,

Mark R Bergeron

Mark Bergeron, P.E.
Director
Bureau of Land Resources

Cc: Don Witherill, Maine DEP
Gregg Novick, Stormwater Compliance LLC
John Whitehouse, Advanced Drainage Systems, Inc.

Attachment F - Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan
Spofford Pond School
Boxford, MA

To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long Term Pollution Prevention Plan is provided to identify the proper procedures of practices for source control and pollution prevention.

Storage and Handling of Oil and other Hazardous Materials

Any hazardous materials that will be used ancillary to the school will be stored inside, or off site.

Spill Prevention/Response

Spill kits will be kept on site, and spills shall be cleaned up immediately. Spills of any hazardous material over 10 gallons will be reported to the Massachusetts Department of Environmental Protection within 24 hours.

Operation and Maintenance of Stormwater Control Structures

Included in Attachment H of this appendix is the Operation and Maintenance plan for this site, which includes street sweeping of the paved areas and periodic cleaning of stormwater structures. The town will be responsible for the implementation of the plan.

Landscaping

The landscaped areas will be maintained by the town. Use of fertilizers, herbicides, and pesticides shall be allowed for all vegetated areas on site. If kept on site, all chemicals shall be stored under cover. Any storage for fertilizers, herbicides and pesticides shall not be located within 100 feet of any wetland or within proximity to the stormwater management system where spills could enter the storm drain system.

Septic System

There will be no new onsite septic facilities. The sewer facilities currently in use for the existing building on site shall be retained.

Vehicle Washing

Vehicle washing shall not be performed on site. Vehicles can be rinsed with a high volume of water at low pressure. This is considered dust water by the DEP and accounts for what may be rinsed off of the vehicle when it rains. Pre-treatment BMP's downstream of these activities will include deep-sump hooded catch basins.

Non-Hazardous Waste Management/Good Housekeeping Practices

All non-hazardous waste shall be stored in designated trash or recycling containers onsite for periodic collection by the local trash collector. The town shall have maintenance staff who monitor the site for the accumulation of trash. Any trash that is seen onsite shall immediately be collected and placed into designated trash or recycling containers. The town's maintenance staff shall inspect the site once per week at minimum.

Prohibition of Illicit Discharges

Illicit discharges to the onsite stormwater management system shall be strictly prohibited. Illicit discharges are defined as any direct or indirect non-stormwater discharge to the onsite stormwater system. Requirements related to Illicit Discharges are further detailed in the attached Illicit Discharge Compliance Statement.

De-icing & Snow Disposal

The operation will utilize salt and sand to treat the paved surfaces of the site during snow and ice events. Snow will be temporarily stored within peripheral areas of the site and allowed to melt and drain back to onsite stormwater systems. When needed, snow shall be removed from the site and disposed of in accordance with all local, state and federal regulations. Snow storage shall be prohibited within all wetlands and wetland buffer zones.

Winter Sand/Salt Use & Storage

Any sand and/or salt to be used for de-icing purposes shall be stored inside or under cover and stabilized to prevent the discharge into nearby wetlands or waterbodies.

Emergency Contact Information

Owner/Operator:
Tri-Town School Union
Stephen Clifford
Director of Facilities
26 Middleton Road
Boxford, MA 01921

Engineer:
James Pearson, P.E.
Weston & Sampson, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900

Attachment G - Construction Period Pollution and Erosion and Sedimentation Control Plan

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

SECTION 1: Introduction

The project applicant, the Town of Boxford, proposes a redevelopment project at the Spofford Pond School located at 31 Spofford Road in Boxford to improve site access and traffic circulation. Site work will include, but is not limited to grading, drainage, paving and landscaping.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to ensure that onsite erosion is prevented and sediment is controlled to prevent it from leaving the site.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the WPA and Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. All pollution prevention and erosion control measures which are required on the site plans and in the SWPPP shall be followed along with the guidance in this document. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. All recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

In order to minimize disturbed areas all work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor shall not disturb native vegetation in the undisturbed wooded area without prior approval from the Engineer. The Contractor will be responsible to make sure that all workers know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the project

All construction areas adjacent to drainage features will be lined with compost filter tubes and silt fence. The tubes and silt fence will be inspected daily and accumulated silt will be removed as appropriate. In addition, any storage of material will require a second level of protection by surrounding the areas with another row of compost filter tubes. A stabilized construction entrance/exit is proposed so that equipment visiting the site can remove any accumulated dirt and mud from vehicles to prevent tracking the mud onto public roads.

2.3 Stabilize Soils

The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, mulching, the use of erosion control mats, or other protective measures shall be provided as specified.

The Contractor shall take account of the conditions of the soil where erosion control seeding will take place to ensure that materials used for re-vegetation are adaptive to the sediment control.

Following the completion of construction, embankment areas will be finished with topsoil and seed. Slopes in excess of 3H:1V will be stabilized with erosion matting to prevent erosion during the interim period in which vegetation is being established. The overland areas of the proposed construction staging areas will also be re-seeded.

2.4 Proper storage and cover of any stockpiles

The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project and shall require written approval of the Engineer.

Adequate measures for erosion and sediment control such as the placement of compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

2.5 Perimeter Controls and Sediment Barriers

Erosion control lines as described in Section 5 will be utilized to ensure that no sedimentation occurs outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

Storm drain inlets will be protected from sediment.

2.7 Retain Sediment On-Site

The Contractor will be responsible to monitor all erosion control measures. Whenever necessary the Contractor will clear all sediment from the compost filter tubes and silt fence that have been silted up during construction. Daily monitoring should be conducted using the attached Monitoring Form.

The following good housekeeping practices will be followed on-site during the construction project.

2.8 Material Handling and Waste Management

All materials stored on-site will be stored in a neat, orderly manner in appropriate containers. All materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

All waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site daily and disposed of properly. The contractor will be responsible for all waste removal. Manufacturer's recommendations for proper use and disposal will be followed for all materials. Sanitary waste will be collected from the portable units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor shall perform washout into contained areas designated for that purpose to prevent cement-laden water from leaving the site.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks on stored equipment do not contaminate the site, oil-absorbing mats will be placed under all equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Any petroleum products will be stored in tightly sealed containers that are clearly labeled.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the Work Area. Materials and equipment necessary for spill cleanup will be kept either in the Work Area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, goggles, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

All workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification is to the DEP. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
Tri-Town School Union
Stephen Clifford
Director of Facilities
26 Middleton Road
Boxford, MA 01921
978-887-0771

Engineer:
James Pearson, P.E.
Weston & Sampson, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Controls are shown on the project plans. A Stormwater Pollution Prevention Plan (SWPPP) will be required for this project in accordance with EPA regulations. The contractor shall refer to the SWPPP for additional requirements.

SECTION 6: Site Development Plans

A full set of site development plans are included with this submittal.

SECTION 7: Operation and Maintenance of Erosion Control

If there is a failure to the controls the Contractor, under the supervision of the Engineer, will be required to stop work until the failure is repaired.

Periodically throughout the work, whenever the Engineer deems it necessary, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction the erosion and sedimentation controls will be inspected daily. Once the Contractor is selected, an on site inspector will be selected to work closely with the Engineer to insure that all erosion and sedimentation controls are in place and working properly. An Inspection Form is included.

Inspection Form

Inspected By:______________________________ Date: ________Time:________

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site and entering the wetlands?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?
			Is there any evidence that sediment is entering subsurface stormwater chamber systems?

Specific location, current weather conditions, and action to be taken:

____

____

____

____

____

____

Other Comments:

____

____

____

Pending the actions noted above I certify that the site is in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature:________________________________Date: ______________________

Attachment H - Operations and Maintenance Plan

Spofford Pond School
Permanent BMP Inspection Checklist

☐ **Street Sweeping**

Frequency: Quarterly average, primarily in the spring and fall if using a high efficiency vacuum sweeper or regenerative air sweeper. Monthly, if using a mechanical rotary broom sweeper.

Location: Parking Areas, Driveways and Roadway

Inspected By: __________________ Date: _____________

Observations: ______________________________________
____
____

Actions Taken: ______________________________________
____
____

Instructions: Sweep all impervious areas, including parking lots, driveways, and roadways using high efficiency vacuum street sweeping machine, regenerative air sweeper, or mechanical rotary broom sweeper.
All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

☐ **Deep Sump Catch Basins & Outlet Control Structures**

Frequency: Inspect and clean deep sump catch basins and outlet control structures in March, June, September and December.

Structure Number: ______________________________________

Inspected By: __________________ Date: _____________

Observations: ______________________________________
____
____

Actions Taken: ______________________________________
____
____

Instructions: Clean units four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure. Open and close hood and check anti-siphon vent for clogging.

☐ **Subsurface Chamber System & Isolator Row**

Frequency: Inspect and clean chamber system and isolator row every six months for the first year and annually thereafter.

Structure Number: ______________________________

Inspected By: ______________ Date: __________

Observations: ______________________________
____
____

Actions Taken: ______________________________
____
____

Instructions: Clean the system whenever the depth of the deposits averages three inches in depth across the bottom of the chambers. Inspect chambers via manholes or inspection ports. Use reverse water jet to pull sediment back into manhole. Remove sediment, trash and debris as noted above.

☐ **Drain Manholes**

Frequency: Inspect and clean drain manholes in March, June, September and December.

Structure Number: ______________________________________

Inspected By: ___________________ Date: _____________

Observations: ______________________________________
____
____

Actions Taken: ______________________________________
____
____

Instructions: Clean units four times per year at a minimum, or whenever catch basins are inspected. Remove sediment and debris. All debris, and sediments should be disposed of in accordance with local, state, and federal regulations. Drain Manholes shall be cleaned with clamshell buckets or by hand tools where necessary.

☐ **Bioretention Area**

Frequency: Inspect and clean monthly. Perform seasonal landscaping maintenance twice a year.

Structure Number: ______________________________________

Inspected By: __________________ Date: _____________

Observations: ______________________________________
____
____

Actions Taken: ______________________________________
____
____

Instructions: Remove accumulated trash and debris. Remove sediment and re-mulch bare spots as needed in basin. Inspect pipe inlets for damage, erosion or blockage, remove blockage as needed, repair erosion where needed. Remove and replace dead vegetation and prune as needed. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. The Town of Boxford is the owner and operator of the system and is responsible for its upkeep and maintenance. This work will be funded on an annual basis through the owner's operating budget.

In the event the Owner sells the property, it is the Owner's responsibility to transfer this plan as well as the design plans, shop drawings, as-built plans, and past three years of operation and maintenance records to the new property owner.

3.0 BMP Description and Locations

3.1 Street Sweeping

Street sweeping consists of using a sweeper machine to clean impervious areas of accumulated sediment, debris, and trash at paved areas.

3.2 Deep Sump Catch Basins

Deep sump catch basins utilizing catch basin hoods will be located throughout the site and used as pre-treatment before entering the infiltration systems or other Town stormwater infrastructure. The deep sump catch basins are designed to remove trash, debris, hydrocarbons, and coarse sediment from the stormwater runoff.

3.3 Stormtech Isolator Row

The subsurface chamber systems will contain a Stormtech Isolator Row for TSS removal. The Isolator Row consists of Stormtech stormwater chambers wrapped in geotextile fabric.

3.4 Stormtech Subsurface Chamber System

The subsurface chamber systems use infiltration or detention to mitigate peak runoff rates from the site. The structure also significantly mitigates TSS.

3.5 Outlet Control Structure

The outlet control structures are used to control discharges from captured stormwater. They release the water in a controlled manner to control peak discharges.

3.6 Drain Manholes

Drain Manholes will be located throughout the site and used to convey and redirect stormwater collected from deep sump catch basins. They allow for access, connection points, and change-in-direction points in the underground drainage system.

3.7 Bioretention Areas

Bioretention areas mitigate peak runoff rates and filter stormwater to provide treatment, significantly reducing TSS as well as phosphorus, nitrogen and heavy metals.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Street Sweeping

Street sweeping shall be performed on all impervious surfaces on a quarterly average, with sweeping performed primarily in the spring and fall. Street sweeping shall be performed using a high efficiency vacuum street sweeping machine or a regenerative air sweeper. A mechanical rotary broom sweeper may be used if sweeping is performed on a monthly basis.

In the event of contamination by a spill or other means, all street sweeping cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, street sweeping cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.2 Deep Sump Catch Basins and Outlet Control Structures

Inspect and/or clean catch basin and outlet control structures at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. The structures should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. The site is considered a land use with a higher potential pollutant load, therefore if catch basins are found to be filled to capacity with sediment during a cleaning, the frequency of cleaning shall be increased. Catch basins and outlet control structures shall be cleaned with clamshell buckets or by hand tools where necessary. Catch basin hoods shall be inspected annually. Open and close the access hatch and flush or rod the anti-siphon device to ensure proper operation.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.3 Stormtech Isolator Row

Stormtech Isolator Rows shall be inspected every six months for the first year, then timed thereafter based upon the depth of sediment build up witnessed in the previous inspections. Inspection ports shall be located strategically throughout the isolator row system. When sediment is observed, the depth shall be recorded with a stadia rod, and when that average depth across the chambers reaches 3-inches, the system shall be cleaned out.

Cleaning is performed through the Jet-vac process whereby the chambers are washed with a high-pressure water system and the captured pollutants are then vacuumed out.

Refer to the attached Stormtech Isolator Row Operations and Maintenance document for additional information.

4.4 Stormtech Subsurface Chamber System

Stormtech subsurface chambers shall be inspected every three months for the first year, then timed thereafter based upon the depth of sediment build up witnessed in the previous inspections. Inspection ports shall be located strategically throughout the isolator row system. When sediment is observed, the depth shall be recorded with a stadia rod, and when that average depth across the isolator row reached 3-inches, the system shall be cleaned out.

Cleaning is performed through the Jet-vac process whereby the isolator chambers are washed with a high-pressure water system and the captured pollutants are then vacuumed out.

Refer to the attached Stormtech Operations and Maintenance document for additional information.

4.5 Drain Manholes

Inspect and/or clean drain manholes at least four times per year while inspecting the catch basins. Remove all accumulated sediments and debris, and dispose of in accordance with local, state, and federal regulations. Drain Manholes shall be cleaned with clamshell buckets or by hand tools where necessary.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, manhole cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.6 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed.

- A binder should be kept at the facility that contains all of the completed inspection forms and any other related materials.

- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.

- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the facility.

- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

4.7 Bioretention Areas

Premature failure of bioretention areas is a significant problem caused by lack of regular maintenance. Careful attention must be paid while plantings are being established and seasonal landscaping maintenance is required thereafter. Maintenance shall be conducted in accordance with the following schedule:

Activity	Time of Year	Frequency
Inspect & remove trash	Year round	Monthly
Mulch	Spring	Annually
Remove dead vegetation	Fall or Spring	Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace entire media & all vegetation	Late Spring/early Summer	As needed*

*Paying careful attention to pretreatment and operation & maintenance can extend the life of the soil media

Basin inspection should include checking for rilling and other signs of erosion. When encountered, repairs shall be made immediately. Debris and litter should be removed while inspecting for erosion.

Care must be taken to maintain the plants in the basin. Salt use must be restricted where runoff flows to the bioretention areas to maintain the plantings.

5 Public Safety Features

The onsite stormwater basins will be shielded from public access by fencing.

6 Stormwater Management System Owner/Responsible Party

The stormwater management system shall be owned and maintained by the following party or its future designee/assigns:

Boxford Department of Public Works
Chris Olbrot – DPW Director
7A Spofford Road
Boxford, MA 01921

This operation and Maintenance Plan will be recorded with the registry of deeds so that current and future owners are aware of the requirement for proper operation and maintenance of the onsite stormwater system.

7 General Good Housekeeping Practices

All non-hazardous waste shall be stored in designated trash or recycling containers onsite for periodic collection by the local trash collector. The owner shall have maintenance staff who monitor the site for the accumulation of trash. Any trash that is seen onsite shall immediately be collected and placed into designated trash or recycling containers. The owner's maintenance staff shall make an inspection of the site once per week at minimum.

8 Estimated Operations and Maintenance Budget

The estimated budget for annual operations and maintenance of this stormwater system is $10,000 per year.

Attachment I – Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

Section I – Purpose/Intent

The purpose of this document is to provide for the health, safety, and general welfare of the citizens of Massachusetts through the regulation of non-stormwater discharges into existing outstanding resource areas near the site to the maximum extent practicable, as required by federal and state law. This document establishes methods for controlling the introduction of pollutants into existing outstanding resource areas to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

Section II - Definitions

For the purposes of this statement, the following shall mean:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The federal Water Pollution Control Act (33 U.S.C § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity: Activities subject to the Massachusetts Erosion and Sedimentation Control Act or NPDES Construction Permits. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Connection: An illegal connection is defined as either of the following:

a. Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the outstanding resource area including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water, regardless of whether said drain or connection has been previously allowed, permitted, or approved by an authorized enforcement agency; or

b. Any pipe, open channel, drain or conveyance connected to the Town of Boxford storm water treatment system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Illicit Discharge: Any direct or indirect non-stormwater discharge to the Town of Boxford stormwater treatment system, except as exempted in Section III of this ordinance.

Industrial Activity: Activities subject to NPDES Industrial Permits as defined in 40CFR, Section 122.26 (b) (14).

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by MassDEP under authority delegated pursuant to 33 USC § 1342 (b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Town of Boxford Stormwater Treatment System: Any facility, owned or maintained by the Town of Boxford, designed or used for collecting and/or conveying stormwater, including but not limited to roads with drainage systems, Town of Boxford streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, infiltration, retention and detention basins, natural and man-made or altered drainage channels, reservoirs, and other drainage structures.

Non-Stormwater Discharge: Any discharge to the storm drain system that is not composed entirely of stormwater.

Person: Any individual, association, organization, partnership, firm, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, interstate body, or any other legal entity.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

Pollution: Contamination or other alteration of any water's physical, chemical, or biological properties by addition of any constituent including but not limited to a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Wastewater: Any water or other liquid discharged from a facility, that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products.

Section III - Prohibitions

Prohibition of Illicit Discharges:

No person shall throw, drain, or otherwise discharge, cause or allow others under its control to throw, drain, or otherwise discharge into the Town of Boxford stormwater treatment system or watercourses any materials, including but not limited to, any pollutants or waters containing any pollutants, other than stormwater. The commencement, conduct or continuance of any illicit discharge to the storm drain system is prohibited except as described as follows:

1. Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;

2. Discharges or flows from fire fighting, and other discharges specified in writing by the Town of Boxford as being necessary to protect public health and safety;

3. Dye testing is an allowable discharge, but requires notification to the Town of Boxford prior to the time of the test;

4. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for a discharge to the Town of Boxford stormwater treatment system.

Section IV - Industrial or Construction Activity Discharges

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town of Boxford prior to allowing discharges to the Town of Boxford stormwater treatment system.

Section V - Notification of Spills and Accidental Discharges

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility, activity, or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Boxford stormwater treatment system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Boxford in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Boxford within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

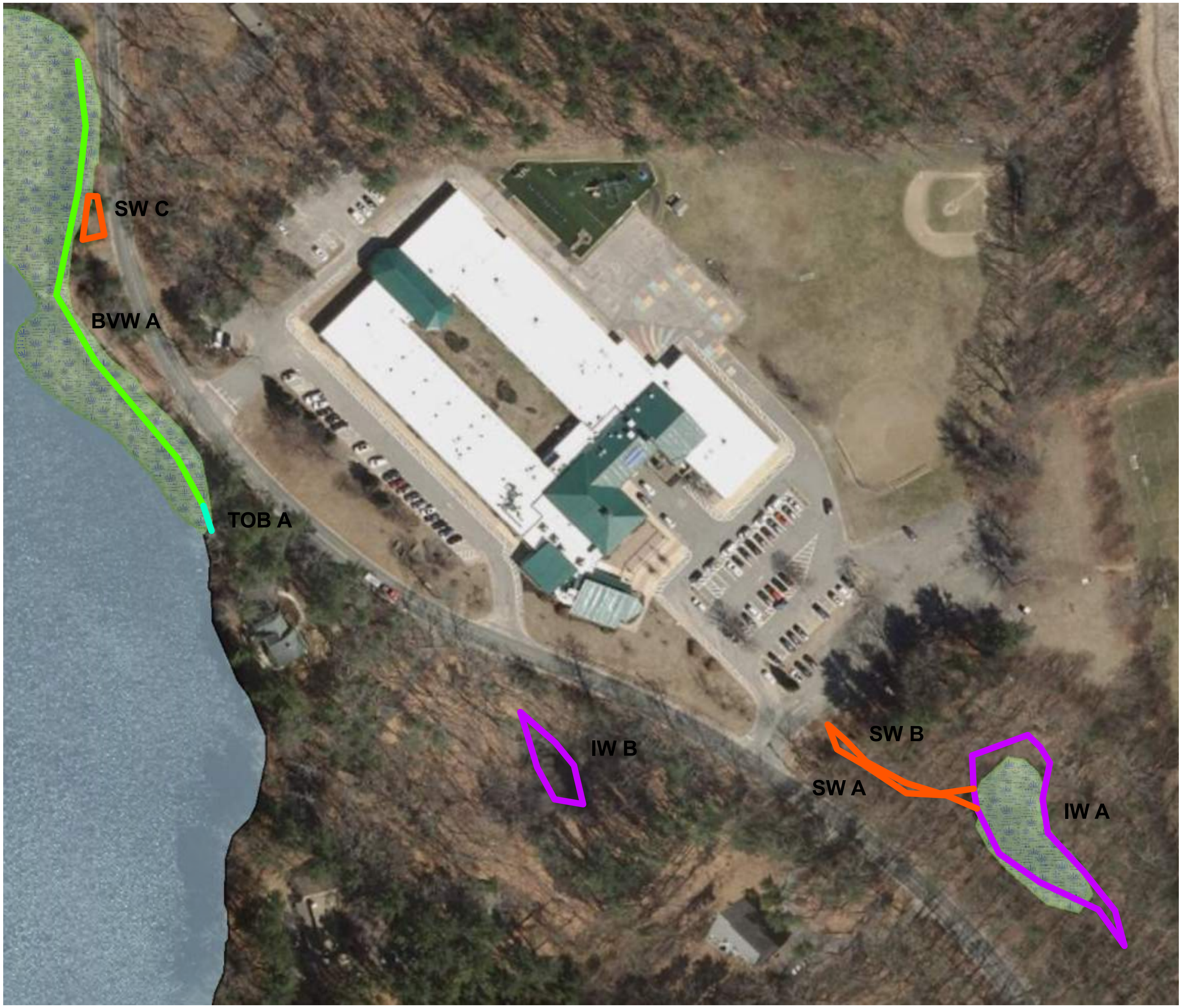
IN WITNESS WHEREOF the parties hereto have executed copies of this Agreement on the ______ day of ____________________, ______.

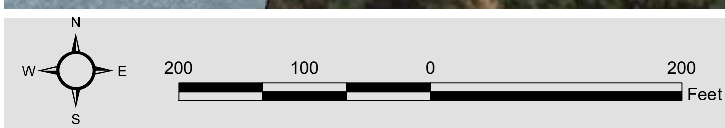
____

APPENDIX C

MAPS

Path: \\wse03.local\WSE\Projects\MA\Boxford MA\ENG20-0865 Cole and Spofford Schools Site\04 Design Services\16 Permitting\2.3.2021 NOI - Spofford Pond School\GIS\Maps\Wetland Flags.mxd **User:** Batchelder.Devin **Saved:** 2/2/2021 4:15:11 PM **Opened:** 2/2/2021 4:15:19 PM





Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Stormwater Conveyance
- Isolated Wetland
- Pond Bank
- Bordering Vegetated Wetlands
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune

FIGURE 1

Spofford Pond School
Boxford MA

Wetland Field Map

Weston & Sampson

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Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

Spofford Pond School
Boxford MA

USGS Topographic Map

Weston & Sampson

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National Flood Hazard Layer FIRMette

FEMA

71°1'22"W 42°41'59"N

71°0'45"W 42°41'33"N

0 250 500 1,000 1,500 2,000 Feet

Legend

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

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

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

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

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

OTHER FEATURES
- 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/2/2020 at 1:39 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Legend

Investigation Area

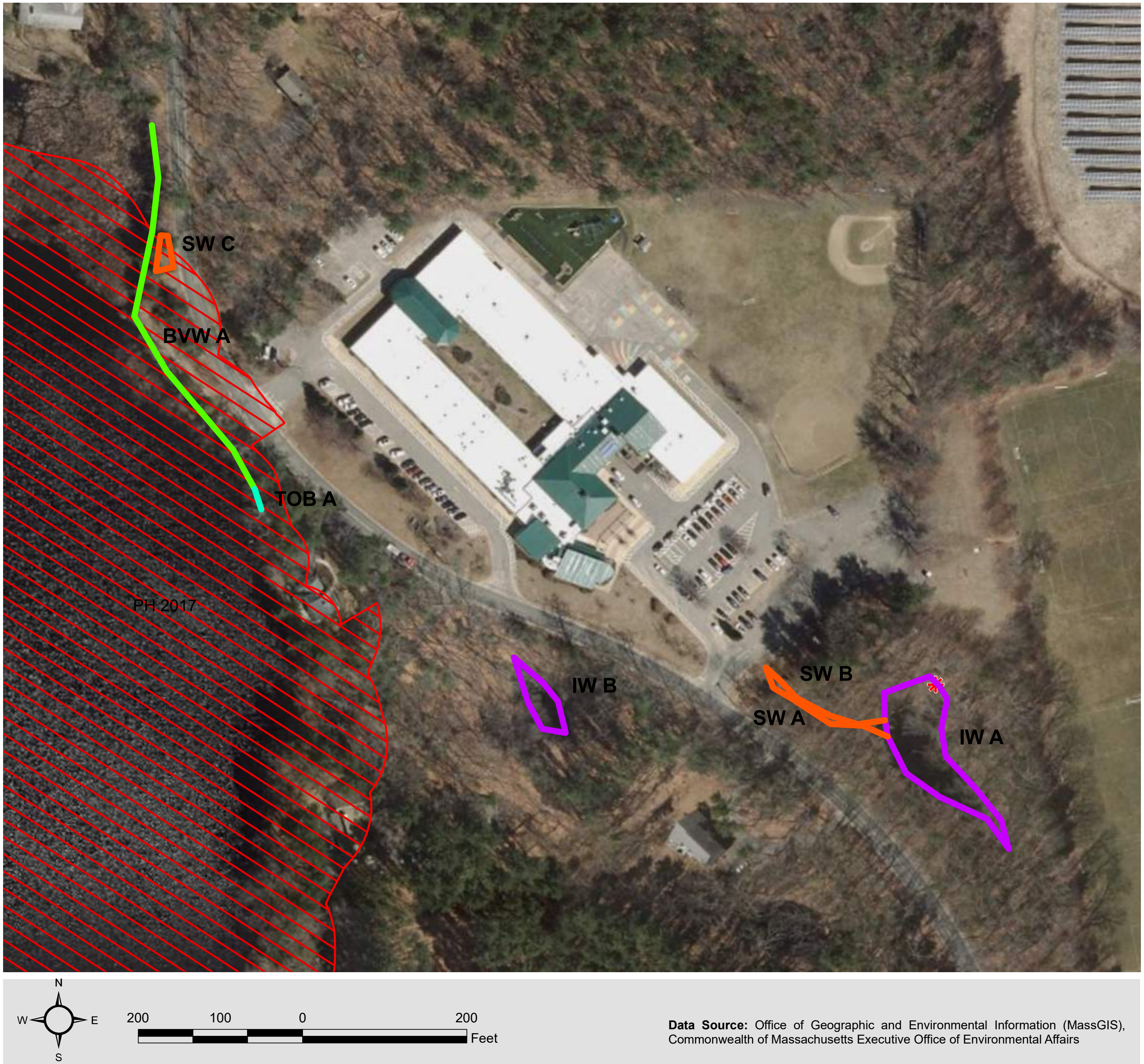
FIGURE 3

Spofford Pond School
Boxford MA

FEMA Map

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Boxford MA\ENG20-0865 Cole and Spofford Schools Site\04 Design Services\16 Permitting\2.3.2021 NOI - Spofford Pond School\GIS\Maps\Environmental Receptor.mxd **User:** Batchelder.Devin **Saved:** 2/2/2021 4:16:54 PM **Opened:** 2/2/2021 4:17:08 PM



Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Stormwater Conveyance
- Isolated Wetland
- Pond Bank
- Bordering Vegetated Wetlands

ACECs

- ACECs

NHESP Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

Outstanding Resource Waters

- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other

FIGURE 4

Spofford Pond School
Boxford MA

Environmental Resources Map

Weston & Sampson

APPENDIX D

CONTRACT SPECIFICATIONS

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via water, complete.

PART 2 - PRODUCTS

2.01 WATER:

A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

A. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.

B. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

https://westonandsampsonmy.sharepoint.com/personal/batchelder_devin_wseinc_com/Documents/Desktop/Boxford/SpoffordPond School/NOI/Appendix D Specs/SECTION 01562-Dust Control.docx

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to cross-country areas, river and stream crossings, and construction in and adjacent to wetlands, unless otherwise specifically stated.

C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00890, PERMITS.

D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 RELATED WORK:

A. Section 01562, DUST CONTROL

B. Section 02230, CLEARING AND GRUBBING

C. Section 02240, DEWATERING

D. Section 02252, SUPPORT OF EXCAVATION

1.03 SUBMITTALS:

A. The Contractor shall submit details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 STRAW WATTLES:

A. Straw Wattles shall consist of a 100% biodegradable exterior jute or coir netting with 100% wheat straw interior filling as manufactured by GEI Works, Sebastian, Florida (Phone: 772-646-0597; website: www.erosionpollution.com), or approved equal.

2.02 CATCH BASIN PROTECTION:

A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas. Total easement widths shall be limited to the widths shown.

B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.

C. Excavated materials shall not be permanently placed or temporarily stored in areas designated as wetlands. Temporary storage areas for excavated material shall be as required by the Engineer.

3.05 PROTECTING AND MINIMIZING EXPOSED AREAS:

A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided as specified.

B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Engineer.

3.06 LOCATION OF STORAGE AREAS:

A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled straw around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

C. There shall be no storage of equipment or materials in areas designated as wetlands.

D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

E. Storage areas in cross-country locations shall be restored to pre-construction conditions with the planting of native species of trees and shrubs.

3.07 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under the provisions of Section 02230, CLEARING AND GRUBBING.

D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.08 CLEARING AND GRUBBING:

A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer. Removal of mature trees (4 inches or greater DBH) will not be allowed on temporary easements.

B. The Contractor shall not remove trees in the Owner's temporary easements without permission of the Engineer.

3.09 CATCH BASIN PROTECTION:

A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins are to be protected, each catch basin sump shall be cleaned of all debris and protected. The Contractor shall properly dispose of all debris at no additional cost to the Owner.

B. All catch basin protection shall be removed by the Contractor after construction is complete.

3.10 STRAW WATTLES:

A. The wattles will be placed in a shallow trench (2-3 inches deep) and staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

B. The wattles shall be regularly inspected and before and after every forecasted major weather event. All deposited sediment shall be removed and not allowed to accumulate to the top of the wattles. Wattles damaged during construction shall be repaired or replaced as required by the Engineer at no additional cost to the Owner.

C. The Contractor shall remove all wattles after construction is completed.

END OF SECTION

SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

1.02 RELATED WORK:

A. Section 00700 GENERAL CONDITIONS

B. Section 01110 CONTROL OF WORK AND MATERIALS

C. Section 01140 SPECIAL PROVISIONS

D. Section 01570 ENVIRONMENTAL PROTECTION

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.

B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.

C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

A. On or before completion of the work, the Contractor shall, unless otherwise specifically required or permitted in writing, tear down and remove all temporary buildings and structures it built; shall remove all temporary works, tools and machinery or other construction equipment it furnished; shall remove all rubbish from any grounds which it has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by its operations in a neat and satisfactory condition.

3.04 RESTORATION OF DAMAGED PROPERTY:

A. The Contractor shall restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.05 FINAL CLEANUP:

A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

Https://westonandsampsonmy.sharepoint.com/personal/batchelder_devin_wseinc_com/Documents/Desktop/Boxford/Spofford Pond School/NOI/Appendix D Specs/SECTION 01740-Cleaning Up.docx

APPENDIX E

ABUTTERS LIST

Notification to Abutters Under the Massachusetts Wetlands Protection Act

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

A. The name of the applicant is: Town of Boxford
28 Middleton Road
Boxford, MA 01921

B. The name of the owner is: Same as above

C. The applicant has filed a Notice of Intent with the Boxford Conservation Commission seeking permission to alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40). The Work includes the reconstruction of a small section of East Belcher Road.

D. The address of the lot(s) where the activity is proposed: 31 Spofford Rd, Boxford, MA 01921

E. Copies of the Notice of Intent may be examined by contacting the Boxford Conservation Commission at 7A Spofford Road Boxford, MA 01921, (978) 887-6000 ext.181 between the hours of 8:30 AM and 2:00 PM on Monday – Thursday. For more information call the Boxford Conservation Commission at (978) 887-6000 ext.181.

F. Information regarding the project, date, time and place of the public hearing may be obtained from Weston & Sampson Engineers, by contacting Devin Batchelder at 978-532-1900 ext. 2117 between the hours of 8:00 – 5:00 on the following days of the week: Monday – Friday or the Boxford Conservation Commission at ((978) 887-6000 ext.181. between the hours of 8:30 AM and 2:00 PM on Monday – Thursday.

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days prior to the hearing date in the Tri Town Transcript Newspaper.

NOTE: Notice of the meeting of the Conservation Commission, including its date, time and place will be posted in the Town Hall not less than forty-eight (48) hours in advance of the meeting.

NOTE: You also may contact your local Conservation Commission or the Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act.

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, Devin Batchelder, hereby certify under the Pains and Penalties of Perjury that on February 4, 2021 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 has been filed under the Massachusetts Wetlands Protection Act by the Town of Boxford with the Boxford Conservation Commission on February 4, 2021 for the Spofford Pond School site improvements project.

The completed notification and a list of the abutters to whom it was given and their addresses, are attached to this Affidavit of Service.

Name: Devin Batchelder
Title: Environmental Scientist
Organization: Weston & Sampson Engineers, Inc

February 4, 2021
DATE

UNITED STATES POSTAL SERVICE ®

Certificate of Mailing — Firm (Domestic)

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post OfficeTM	Affix Stamp Here *Postmark with Date of Receipt.*
Weston & Sampson Engineers Attn: Devin Batchelder 55 Walkers Brook Dr, Suite 100 Reading, MA 01867	9	9	READING, MA 01867-9998 FEB - 4 202 USPS
	Postmaster, per *(name of receiving employee)* ENG20-0865		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1	MALBON LUKE G MALBON LINDA J 50 SPOFFORD RD BOXFORD. MA 01921				
2	MEYER, JOHN MEYER, MEGAN 38 SPOFFORD RD BOXFORD, MA 01921				
3	CARBERRY WAYNE A & JANET A TE C/O LINDA LUCY 32 SPOFFORD RD BOXFORD, MA 01921				
4	TOWN OF BOXFORD 7A SPOFFORD RD BOXFORD, MA 01921				
5	ERKSON EDWARD C JT MARSHA M ERKSON 47 SPOFFORD RD BOXFORD, MA 01921				
6	MAHONEY ROBERT J MAHONEY TARA L 22 SPOFFORD RD BOXFORD, MA 01921				

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Weston & Sampson Engineers Attn: Devin Batchelder 55 Walkers Brook Dr, suite 100 Reading, MA 01867	9	9	READING, MA 01867-9998 FEB - 4 202_ USPS
	Postmaster, per *(name of receiving employee)* ENG20-0865		

	USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1		GIALLOMBARDO ROBERT J TE GIALLOMBARDO SUSAN R 12 SPOFFORD RD BOXFORD, MA 01921				
2		ROSEN PAMELA B 10 SPOFFORD RD BOXFORD, MA 01921				
3		TOWN OF BOXFORD 7 SPOFFORD RD BOXFORD, MA 01921				
4						
5						
6						

15-01-04 - 31 SPOFFORD RD, BOXFORD ABUTTERS LIST
CONSERVATION 250'

Map/Lot	Location	Owner	Owner 2	Owner Address	Owner City/Town	Owner State	Zip Code
15-01-01	50 SPOFFORD RD	MALBON LUKE G	MALBON LINDA J	50 SPOFFORD RD	BOXFORD	MA	01921
15-01-02	38 SPOFFORD RD	MEYER, JOHN	MEYER, MEGAN	38 SPOFFORD RD	BOXFORD	MA	01921
15-01-03	32 SPOFFORD RD	CARBERRY WAYNE A & JANET A TE	C/O LINDA LUCY	32 SPOFFORD RD	BOXFORD	MA	01921
15-01-04	31 SPOFFORD RD	TOWN OF BOXFORD		7A SPOFFORD RD	BOXFORD	MA	01921
15-01-05	47 SPOFFORD RD	ERKSON EDWARD C JT	MARSHA M ERKSON	47 SPOFFORD RD	BOXFORD	MA	01921
15-01-08	22 SPOFFORD RD	MAHONEY ROBERT J	MAHONEY TARA L	22 SPOFFORD RD	BOXFORD	MA	01921
19-01-01	12 SPOFFORD RD	GIALLOMBARDO ROBERT J TE	GIALLOMBARDO SUSAN R	12 SPOFFORD RD	BOXFORD	MA	01921
19-01-02-A	10 SPOFFORD RD	ROSEN PAMELA B		10 SPOFFORD RD	BOXFORD	MA	01921
19-03-28	7 SPOFFORD RD	TOWN OF BOXFORD		7 SPOFFORD RD	BOXFORD	MA	01921

Kristin Hanlon

CERTIFIED COPY
01/20/21

APPENDIX F

WETLAND DELINEATION REPORT

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Wetland Delineation Report

October 2020

Boxford, Massachusetts
Project # 2190356

Spofford Pond School
Boxford, MA

Wetland Delineation Conducted By:
Devin Batchelder, CWS on 10/12/2020

Delineation Report Reviewed By:
Mel Higgins, PWS

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FIGURES

APPENDICES

1.0 SITE DESCRIPTION

On October 12, 2020, the presence of wetland resources was investigated near the Spofford Pond School in Boxford, MA. This investigation area is a school within a residential area. Please see Figure 1 (Wetlands Field Map) and Figure 2 (USGS Topographic Map) of this report for the investigation area.

Wetland resource areas including, a bordering vegetated wetland, two isolated vegetated wetlands, lake bank and two stormwater wetlands, were identified and flagged in the field using pink flagging by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) and the US Army Corps of Engineers methodology. A further description of these wetland resource areas are presented in the following sections.

2.0 DELINEATION OF WETLAND RESOURCES

2.1 Site Observations

The Weston & Sampson wetland scientist, trained in the ACOE Wetland Delineation Manual and Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetland Protection Act guidance document, observed the following protected wetland resources at the site:

- Bordering Vegetated Wetlands (BVW)
- Isolated Vegetated Wetland (IW)
- Bank – Lake
- Stormwater Wetlands/Drainage Channels

Field data were recorded on US Army Corps of Engineers (ACOE) Wetland Determination Data Forms. See Appendix A for completed data forms and Appendix B for site photographs.

2.2 Wetland Delineation Methodology

Wetland delineation assessment was conducted in accordance to the Massachusetts Wetland Protection Act Regulations (310 CMR 10.55(2)(c)), Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Protection Act (March 1995), and ACOE Wetland Manual (Technical Report Y-87-1).

The bordering vegetated wetlands (BVW) delineation methodology included the characterization of vegetation, soil any hydrologic conditions in both wetland and upland areas to identify the transitional area, which was used as the wetland limit. Pink flags with distinct flag numbers are left in the field to show wetland resource area limits.

Vegetation, hydrology and soils are assessed in both wetland and upland areas to accurately place the wetland limits at each site. The percentage of vegetative species was estimated by creating sample plots. Sample plot radius for trees, saplings, shrubs, groundcover and woody vine strata was 30', 15', 15', 5' and 30', respectively. After creating the sample plot areas, the percent basal area coverage of each species within the monitoring plot was recorded. Using these field observations, the percent dominance of each species within its stratum was calculated. The 50/20 Rule was then used to determine dominance. Dominant species were considered the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceeds 50% of the total dominance measure (basal area) for the stratum, plus any additional species comprising 20% or more of the total dominance measure for the stratum. Once the dominant species were determined, they were treated equally to determine the presence of hydrophytic vegetation. If the number of dominant species with a Wetland Indicator Status of FAC (excluding FAC-), FACW or OBL is greater than, or equal to, the number of remaining dominant species, the area was considered a jurisdictional wetland resource area based on vegetation.

A soil sample from each wetland sample plot is also taken. Each soil sample goes to a depth of at least 12-24 inches. The soil is characterized to determine if the soil sample is considered a hydric (wetland) soil. Soil samples, including mottles, are characterized based on color using Munsell Soil-Color charts as a color reference.

The general area is then assessed for hydrologic conditions, including, but not limited to, site inundation, depth to free water, depth of soil saturation, water marks, drift lines, sediment deposits, water stained leaves.

2.3 Bordering Vegetated Wetlands (BVW)

A single BVW series was delineated at the site. This BVW is located adjacent to Spofford Pond. The limit of the BVW resource areas were determined by locating the transitional area between wetland and upland vegetation, soils and hydrologic conditions. Wetland flags left in the field included:

- BVW-A1 through BVW-A7 (BVW “A” Series)

Dominant vegetation within the wetland resource area included common buttonbush (*Cephalanthus occidentalis*), coastal sweetpepperbush (*Clethra alnifolia*), purple loosestrife (*Lythrum salicaria*), broadleaf cattail (*Typha latifolia*), and eastern marsh fern (*Thelypteris palustris*) species that generally thrive in wet conditions. Soils within the BVW’s were composed of a thick organic layer. Other indicators of wetland hydrology included surface water, highwater table and saturation.

Dominant upland vegetation in the area included eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), northern red oak (*Quercus rubra*) and rare clubmoss (*Lycopodium obscurum*). Soils within the upland were composed of fine sandy loam, with no evidence of mottling or hydrology within the top 12 inches.

A 100-foot buffer zone is associated with the BVW resource area.

2.4 Isolated Vegetated Wetland (IW)

Two Isolated Vegetated Wetlands (IW) were delineated at the site. The limit of the IW resource area was determined by locating the transitional area between wetland and upland vegetation, soils and hydrologic conditions. Vegetation, hydrology and soils were assessed in the same manner as described above for identifying BVW. Wetland flags left in the field included:

- IW-A1 through IW-A14 connect (Isolated Wetland 1)
- IW-B1 through IW-B5 connect (Isolated Wetland 2)

Dominant vegetation within the IWs included coastal sweetpepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), jewelweed (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), climbing nightshade (*Solanum dulcamara*) and eastern marsh fern (*Thelypteris palustris*), species that commonly thrive in hydric conditions. Soils within the IW were composed of a thick organic layer underlain by fine sandy loam. No other indicators of wetland hydrology were observed.

Dominant upland vegetation adjacent to the IWs included eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), northern red oak (*Quercus rubra*) and rare clubmoss (*Lycopodium obscurum*). Soils within the upland were composed of fine sandy loam, with no evidence of mottling or hydrology within the top 12 inches.

The definition of “Large Isolated Wetlands” under the Boxford Wetlands Protection Bylaw is “Isolated wetlands 5,000 square feet or larger”. Based on the GPS information collected in the field, Isolated Wetland 1 is 10,343 square feet (SF) in size which meets the criteria for a Large Isolated Wetland. Additionally, Isolated Wetland 1 is identified as a MassWildlife's Natural Heritage & Endangered Species Program (NHESP) Certified Vernal Pool based on MassGIS. Based on the GPS information collected in the field Isolated Wetland 2 is 2275 SF in size which does not meet the criteria for a Large Isolated Wetland.

The Massachusetts Wetland Protection Act does not protect isolated vegetated wetlands however, certain individual communities have chosen to extend protections to these isolated wetlands within their local bylaws including the Town of Boxford. Per the Boxford Wetlands Protection Bylaw, freshwater wetlands and large isolated wetlands (greater than 5,000 square feet) are jurisdictional whether or not they border surface water. The Boxford Conservation Commission has placed a buffer zone of 100-feet around these freshwater wetlands and large isolated wetlands. As a result, the Town of Boxford Conservation Commission has jurisdiction over all projects within 100-feet of freshwater wetlands and Large Isolated Wetlands such as Isolated Wetland 1.

2.5 Bank

Water bodies, including perennial streams, intermittent streams, ponds and lakes, have banks which are protected by the Massachusetts Wetland Protection Act. Bank is a wetland resource area defined by 310 CMR 10.54(2)(a) as “the potion of land surface which normally abuts and confines a water body. It occurs between a waterbody and a vegetated bordering wetland and adjacent floodplain, or, in absence of these, it occurs between a waterbody and an upland.” Vegetated banks provide valuable functions such as flood control, stormwater prevention, fisheries protection, and water quality protection. The limit of this resource area is identified by Top of Bank (TOB) which is located at the first observable break in slope or the Mean Annual Flood Level (MAFL), whichever is lower. TOB is easily identified in the field so that indicator was utilized for this wetland delineation.

Lake Bank

Despite the name Spofford Pond is classified as a lake. According to the Massachusetts Wetland Protection Act a lake is defined as “any open body of fresh water with a surface area of ten acres or more, and shall include great ponds.” (310 CMR 10.04). Great Ponds are defined in 310 CMR 9.02 as “any pond which contained more than ten acres in its natural state … prior to any alteration by damming or other human activity”. Spofford Pond is included on the Massachusetts state list of Great Ponds, as a result Spofford Pond is considered a Lake. Wetland flags left in the field included:

- TOB-A1 through TOB-A2 (Lake Bank “A” Series)

The Lake Bank A Series is associated with the east side of the lake adjacent to the dam and the Lake Bank B Series is associated with the west side of the lake adjacent to the dam.

Banks are subject to a 100ft buffer under the Massachusetts Wetland Protection Act per 310 CMR 10.02(2)(b).

2.6 Stormwater Wetlands/Drainage Channels

Two stormwater wetlands were identified within the investigation area. Flags left in the field included:

- SW-A1 through SW-A5 connect (Stormwater Wetland 1)
- SW-B1 through SW-B5 connect (Stormwater Wetland 1)
- SW-C1 through SW-C4 connect (Stormwater Wetland 2)

Stormwater Wetland 1 is a drainage channel that originates from a culvert beneath the parking lot on the southeast side of the Spofford Pond school and discharges into Isolated Wetland 1. Stormwater Wetland 2 is a basin located immediately north of the Spofford Pond boat launch.

These stormwater management systems appear well maintained and consequently are considered non-jurisdictional per 310 CMR 10.02 (2)(C) which states:

> *Notwithstanding the provisions of 310 CMR 10.02(1) and (2)(a) and (b), stormwater management systems designed, constructed, installed, operated, maintained, and/or improved as defined in 310 CMR 10.04 in accordance with the Stormwater Management Standards as provided in the Stormwater Management Policy (1996) or 310 CMR 10.05(6)(k) through (q) do not by themselves constitute Areas Subject to Protection under M.G.L. c. 131, § 40 or Buffer Zone provided that:*
>
> 1. *the system was designed, constructed, installed, and/or improved as defined in 310 CMR 10.04 on or after November 18, 1996; and*
> 2. *if the system was constructed in an Area Subject to Protection under M.G.L. c. 131, § 40 or Buffer Zone, the system was designed, constructed, and installed in accordance with all applicable provisions in 310 CMR 10.00.*

2.7 Other Protected Areas

Weston & Sampson created environmental resources maps (see Figure 4) of the site to determine the presence of other protected areas. The data source of these map layers was the Massachusetts Geographic Information System (MassGIS). These areas included:

- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified and Potential Vernal Pools
- Areas of Critical Environmental Concern (ACEC)
- Outstanding Resource Waters (ORW)

Wetland resources identified in the field were also added to these maps. Based on the MassGIS information, portions of the site are located along the outer limit of NHESP Priority Habitat of Rare Species. Additionally, Isolated Wetland 1 is identified on MassGIS as a NHESP Certified Vernal Pool. The Boxford Conservation Commission has placed a buffer zone of 100-feet around vernal pools as part of the Boxford Wetlands Protection Bylaw. As a result, the Town of Boxford Conservation Commission has jurisdiction over all projects within 100-feet of Isolated Wetland 1.

FEMA Flood Insurance Rate Maps (FIRM) were created online from the FEMA website to determine if there is a 100-year flood zone at the site. See Figure 3 for FIRM map. Based on FEMA flood maps Spofford Pond and portions of the BVW within the investigation area are located within the 100-year floodplain. The Boxford Conservation Commission has placed a buffer zone of 100-feet around the 100-year floodplain as part of the Boxford Wetlands Protection Bylaw. As a result, the Town of Boxford Conservation Commission has jurisdiction over all projects within 100-feet of the 100-year floodplain.

3.0 SUMMARY

On October 12, 2020, the presence of wetland resources was investigated near the Spofford Pond School in Boxford, MA. A single bordering vegetated wetland, two isolated vegetated wetlands, lake bank and two stormwater wetlands, were identified and flagged at the site.

Additional environmental mapping was conducted using MassGIS data layers and FEMA FIRM mapping. This additional mapping indicates that there is a NHESP Certified Vernal Pool within the investigation area (Isolated Wetland 1). Additionally, portions of the investigation areas are located within/adjacent to NHESP Priority Habitats of Rare Species and the 100-year flood zone.

As part of the Boxford Wetlands Protection Bylaw the community has chosen to extend protections in the form of a buffer zone around freshwater wetlands and large isolated wetlands (greater than 5,000 square feet) are jurisdictional whether or not they border surface water, as well as vernal pools and the 100-year floodplain. As a result, the Town of Boxford Conservation Commission has jurisdiction over all projects within 100-feet of freshwater wetlands and large isolated wetlands (greater than 5,000 square feet) are jurisdictional whether or not they border surface water, as well as vernal pools and the 100-year floodplain.

This Wetlands Delineation Report has been reviewed and approved by a Professional Wetland Scientist PWS.

4.0 REFERENCES

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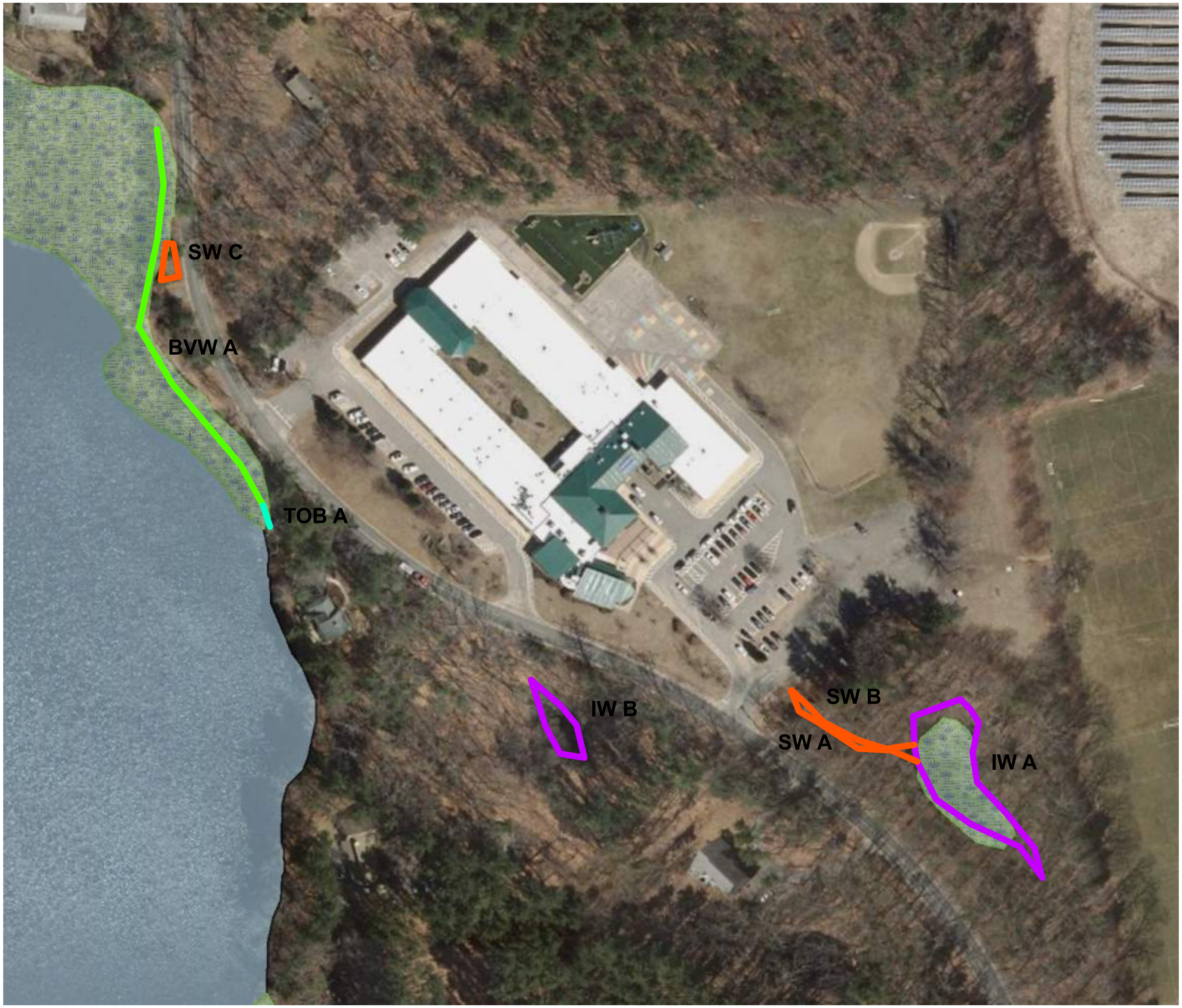
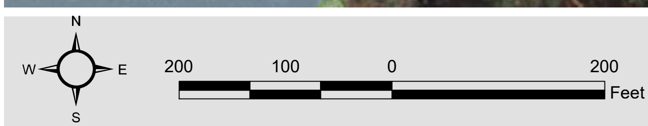




Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Stormwater Wetland
- Isolated Wetland
- Pond Bank
- Bordering Vegetated Wetlands
- Perennial Stream
- Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune

FIGURE 1

Spofford Pond School
Boxford MA

Wetland Field Map

Weston & Sampson

<BOL>Path:</BOL> C:\Users\batchelder.devin\OneDrive - WESTON & SAMPSON ENGINEERS, Inc\Desktop\Boxford\GIS\Maps\Locus.mxd <BOL>User:</BOL> Batchelder.Devin <BOL>Saved:</BOL> 12/2/2020 1:35:20 PM <BOL>Opened:</BOL> 12/2/2020 1:35:59 PM

N
W E
S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

Spofford Pond School
Boxford MA

USGS Topographic Map

Weston & Sampson

<BOL>Path:</BOL> C:\Users\batchelder.devin\OneDrive - WESTON & SAMPSON ENGINEERS, Inc\Desktop\Boxford\GIS\Maps\FEMA Template.mxd <BOL>User:</BOL> Batchelder.Devin <BOL>Saved:</BOL> 12/2/2020 1:41:22 PM <BOL>Opened:</BOL> 12/2/2020 1:41:33 PM

National Flood Hazard Layer FIRMette

FEMA

71°1'22"W 42°41'59"N

71°0'45"W 42°41'33"N

0 250 500 1,000 1,500 2,000 Feet

Legend

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

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/2/2020 at 1:39 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Legend

Investigation Area

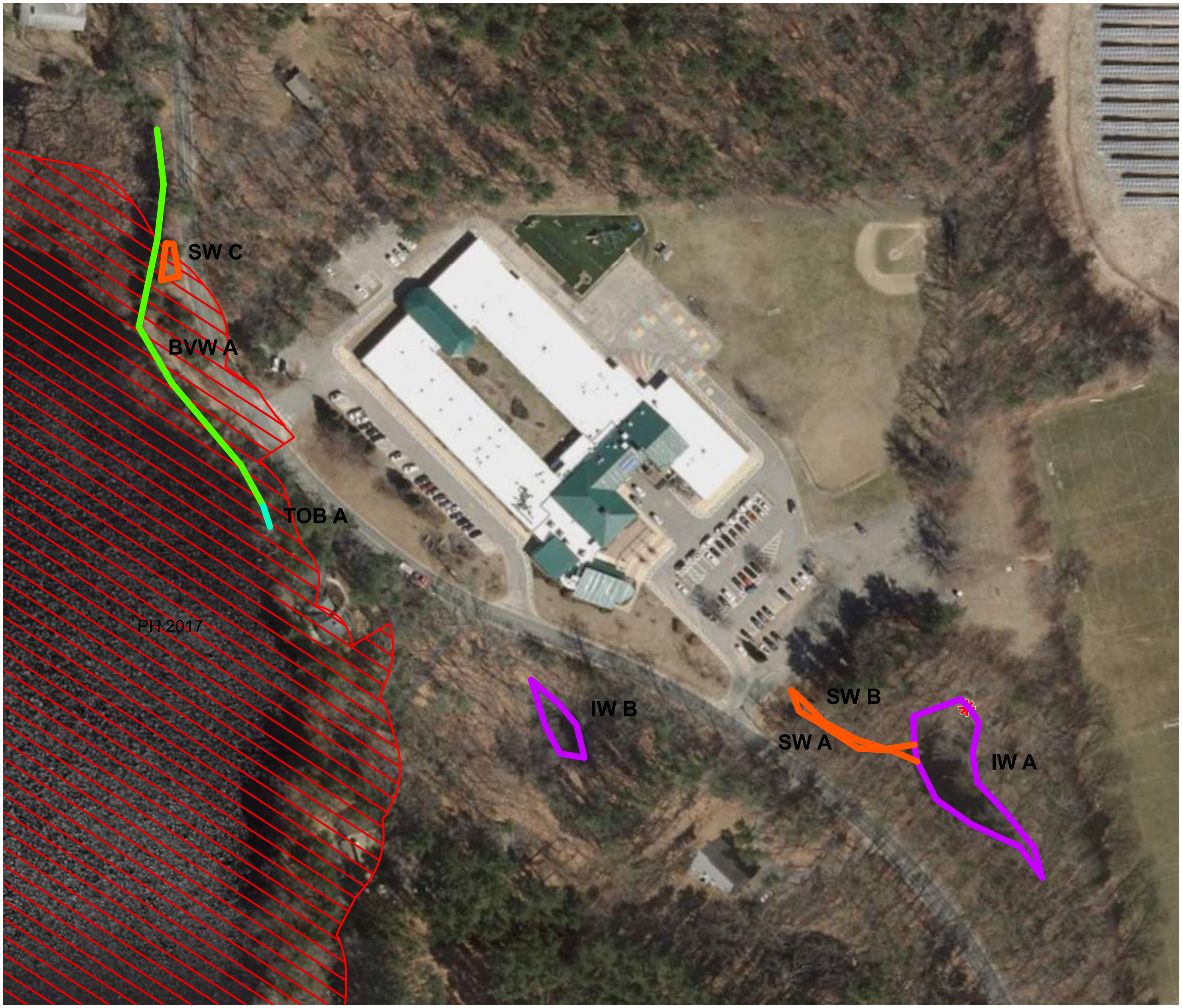
FIGURE 3

Spofford Pond School
Boxford MA

FEMA Map

Weston & Sampson

<BOL>Path:</BOL> C:\Users\batchelder.devin\OneDrive - WESTON & SAMPSON ENGINEERS, Inc\Desktop\Boxford\GIS\Maps\Environmental Receptor.mxd <BOL>User:</BOL> Batchelder.Devin <BOL>Saved:</BOL> 12/2/2020 1:26:09 PM <BOL>Opened:</BOL> 12/2/2020 1:26:13 PM



N W E S

200 100 0 200 Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Stormwater Wetland
Isolated Wetland
Pond Bank
Bordering Vegetated Wetlands

ACECs

ACECs

NHESP Habitats

NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
NHESP Certified Vernal Pools
NHESP Potential Vernal Pools

Outstanding Resource Waters

Public Water Supply Contributor
ORW for ACEC
ORW for both Water Supply and Other

FIGURE 4

Spofford Pond School
Boxford MA

Environmental Resources Map

Weston & Sampson

APPENDIX A

ACOE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: BVW-A3 UP

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'51.93"N Long: 71° 1'9.43"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ______
Water Table Present?	Yes ___	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ______

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: BVW-A3 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. eastern white pine (Pinus strobus)	25	Yes	FACU
2. red maple (Acer rubrum)	20	Yes	FAC
3. northern red oak (Quercus rubra)	15	Yes	FACU
4.			
5.			
6.			
7.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. eastern white pine (Pinus strobus)	5	Yes	FACU
2. red maple (Acer rubrum)	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size: 5')			
1. rare clubmoss (Lycopodium obscurum)	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	75 (A)		275 (B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-A3 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR3/2	100					FSL	
4-12	10YR4/6	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: BVW-A3 WET

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'51.93"N Long: 71° 1'9.43"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______
Hydric Soil Present?	Yes X	No ______
Wetland Hydrology Present?	Yes X	No ______

Is the Sampled Area within a Wetland? **Yes** X **No** ______

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	___ Water-Stained Leaves (B9)	
X High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ______	Depth (inches): 0"
Water Table Present?	Yes X	No ______	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes X	No ______	Depth (inches): 0"

Wetland Hydrology Present? Yes X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: BVW-A3 WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. common buttonbush (Cephalanthus occidentalis)	20	Yes	OBL
2. coastal sweetpepperbush (Clethra alnifolia)	20	Yes	FAC
3. purple loosestrife (Lythrum salicaria)	10	Yes	OBL
4.			
5.			
6.			
7.			
	50 = Total Cover		
Herb Stratum (Plot size: 5')			
1. broadleaf cattail (Typha latifolia)	50	Yes	OBL
2. eastern marsh fern (Thelypteris palustris)	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-A3 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-24	10YR2/1	100					Organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes X **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: IW-A13 UP

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'44.59"N Long: 71° 0'56.68"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: IW-A13 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. eastern white pine (Pinus strobus)	15	Yes	FACU
2. red maple (Acer rubrum)	15	Yes	FAC
3. northern red oak (Quercus rubra)	10	Yes	FACU
4.			
5.			
6.			
7.			
	40 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. eastern white pine (Pinus strobus)	5	Yes	FACU
2. red maple (Acer rubrum)	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	50 (A)		180 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: IW-A13 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR3/2	100					FSL	
6-12	2.5Y4/4	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: IW-A13 WET

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'44.59"N Long: 71° 0'56.68"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
X Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: IW-A13 WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. coastal sweetpepperbush (Clethra alnifolia)	5	Yes	FAC
2. highbush blueberry (Vaccinium corymbosum)	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		
Herb Stratum (Plot size: 5')			
1. jewelweed (Impatiens capensis)	50	Yes	FACW
2. sensitive fern (Onoclea sensibilis)	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation
X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: IW-A13 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR2/1	100					Organic	
10-16	2.5Y4/2	90	10YR4/6	10	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: IW-B1 UP

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'45.18"N Long: 71° 1'2.88"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: IW-B1 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (Acer rubrum)	25	Yes	FAC
2. northern red oak (Quercus rubra)	15	Yes	FACU
3. eastern white pine (Pinus strobus)	10	Yes	FACU
4.			
5.			
6.			
7.			
	50 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. red maple (Acer rubrum)	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 5')			
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	30	x 3 = 90
FACU species	25	x 4 = 100
UPL species	0	x 5 = 0
Column Totals:	55 (A)	190 (B)

Prevalence Index = B/A = 3.45

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: IW-B1 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR3/2	100					FSL	
6-12	10YR4/6	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spofford Pond School City/County: Boxford Sampling Date: 10/12/2020

Applicant/Owner: ______ State: MA Sampling Point: IW-B1 WET

Investigator(s): Devin Batchelder Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 8-15% Lat: 42°41'45.14"N Long: 71° 1'2.74"W Datum: ______

Soil Map Unit Name: Hinckley loamy sand NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 3"
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0"

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: IW-B1 WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. coastal sweetpepperbush (Clethra alnifolia)	20	Yes	FAC
2. highbush blueberry (Vaccinium corymbosum)	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	40 = Total Cover		
Herb Stratum (Plot size: 5')			
1. climbing nightshade (Solanum dulcamara)	20	Yes	FAC
2. eastern marsh fern (Thelypteris palustris)	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: IW-B1 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR2/1	100					Organic	
12-16	2.5Y4/2	90	10YR4/6	10	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

APPENDIX B

Site Photographs

Photo 1: Spofford Pond School

Photo 2: Bordering Vegetated Wetland Identified By BVW A Flag Series

Photo 3: Isolated Wetland Identified By IW A Flag Series

Photo 4: Isolated Wetland Identified By IW A Flag Series


Photo 5: Wetland Soils Observed On Site


Photo 6: Stormwater Wetland Identified By SW A & B Flag Series


Photo 7: Stormwater Wetland Identified By SW C Flag Series

APPENDIX G

PHOTOS

Photo 1: Spofford Pond School

Photo 2: Bordering Vegetated Wetland Identified By BVW A Flag Series

Photo 3: Isolated Wetland Identified By IW A Flag Series

Photo 4: Isolated Wetland Identified By IW A Flag Series

Photo 5: Wetland Soils Observed On Site

Photo 6: Stormwater Wetland Identified By SW A & B Flag Series


Photo 7: Stormwater Wetland Identified By SW C Flag Series

APPENDIX H

SWPPP

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

Spofford Pond School
31 Spofford Road
Boxford, MA 01921

SWPPP Prepared For:

Town of Boxford

SWPPP Prepared By:

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867

SWPPP Preparation Date:

01/27/2021

Estimated Project Dates:

Project Start Date: Summer 2021

Project Completion Date: Fall 2021

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

To be determined

Subcontractor(s):

To be determined

Emergency 24-Hour Contact:

contractor to be determined

1.2 Stormwater Team

Stormwater Team		
Name and/or position, and contact	Responsibilities	I Have Read the CGP and Understand the Applicable Requirements
Contractor to be determined		☐ Yes Date:
James Pearson, PE 978-977-0110 pearsonj@wseinc.com	Engineering Consultant	☒ Yes Date1/03/2021

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: Spofford Pond School
Project Street/Location: 31 Spofford Road
Town: Boxford
State: Massachusetts
ZIP Code: 01921
County or Similar Subdivision: Essex County

Project Latitude/Longitude

Latitude:
42°41'49.26"N (degrees, minutes, seconds)

Longitude:
71° 1'2.53"W" W (degrees, minutes, seconds)

Latitude/longitude data source: ArcGIS

☐ Map ☐ GPS ☒ Other (please specify): ___ArcGIS______________________________

Horizontal Reference Datum:

☐ NAD 27 ☒ NAD 83 ☐ WGS 84

Additional Project Information

Are you requesting permit coverage as a "federal operator" as defined in Appendix A of the 2017 CGP? ☐ Yes ☒ No

Is the project/site located on Indian country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property:

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency *(e.g., natural disaster, extreme flooding conditions)*, information substantiating its occurrence *(e.g., state disaster declaration)*, and a description of the construction necessary to reestablish effective public services:

2.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?	☒ Yes ☐ No
Are there any waters of the U.S. within 50 feet of your project's earth disturbances?	☐ Yes ☒ No

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:								
Point of Discharge ID	Name of receiving water:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
[001]	Spofford Pond MA92060	☐ Yes ☒ No		☐ Yes ☒ No			☐ Yes ☒ No	
[002]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☒ No	
[003]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	
[004]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	
[005]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	
[006]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	

2.3 Nature of the Construction Activities

General Description of Project

Provide a general description of the nature of your construction activities, including the age dates of past renovations for structures that are undergoing demolition:

The Town of Boxford is seeking to replace and redesign the existing bituminous parking areas, sidewalks, and perimeter landscaped areas on the school property as well as will update current storm water drainage. These proposed improvements will allow for the correction of deficiencies identified by the MAAB.

Before work begins, sedimentation and erosion control devices will be placed at the site to minimize sediment migration off-site into any neighboring resource areas. This will include security fencing with dust screen, straw wattles and catch basin protection.

Work will begin prior to the 2021-2022 calendar school year.

Size of Construction Site

Size of Property	~12 acres
Total Area Expected to be Disturbed by Construction Activities	6 acres
Maximum Area Expected to be Disturbed at Any One Time	.1 acres

Type of Construction Site *(check all that apply)*:

☐ Single-Family Residential ☐ Multi-Family Residential ☒ Commercial ☐ Industrial

☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other ______________________

Will there be demolition of any structure built or renovated before January 1, 1980?	☐ Yes	☒ No	
If yes, do any of the structures being demolished have at least 10,000 square feet of floor space?	☐ Yes	☐ No	☒ N/A
Was the pre-development land use used for agriculture (see Appendix A for definition of "agricultural land")?	☐ Yes	☒ No	

Pollutant-Generating Activities

List and describe all pollutant-generating activities and indicate for each activity the type of pollutant that will be generated. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

Pollutant-Generating Activity (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	**Pollutants or Pollutant Constituents** (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Cleared and graded areas	Soil erosion
Construction area	Vehicle fluids, solvents
Portable toilets	Sewage
Fuel tanks	Fuel oil, gasoline and other fuels
Staging areas	Soil erosion, fuel oil, gasoline, vehicle fluids, antifreeze/coolant, hydraulic oil/fluids
Waste storage in containers	Construction demolition debris, trash
Dewatering operations	Soil erosion, sediment

Construction Support Activities *(only provide if applicable)*
Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas):

All support activities will be within the already defined limits of work as shown on the plans accompanying this SWPPP.

Contact information for construction support activity:

Contractor to be determined

2.4 Sequence and Estimated Dates of Construction Activities

Sequence and Dates of Construction	
Clearing and Grubbing	July 2021
Initial Rough Grading	August 2021
Grading/Building Construction/Utilities	*September-December 2021*
Final Grading, Retaining Walls, Paving	January-April 2022
Final Site Stabilization and Landscaping	May 2022
Final Punch List	June 2022

2.5 Authorized Non-Stormwater Discharges

List of Authorized Non-Stormwater Discharges Present at the Site

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	☐ Yes ☒ No
Fire hydrant flushings	☒ Yes ☐ No
Landscape irrigation	☒ Yes ☐ No
Waters used to wash vehicles and equipment	☐ Yes ☒ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushings	☒ Yes ☐ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☐ Yes ☒ No
Pavement wash waters	☐ Yes ☒ No
Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
Uncontaminated, non-turbid discharges of ground water or spring water	☐ Yes ☒ No
Foundation or footing drains	☒ Yes ☐ No
Construction dewatering water	☒ Yes ☐ No

Water will be used to control dust throughout the extent of the work area during construction.

2.6 Site Maps

Site Map features are shown on the attached SWPPP Plans. As applicable to the project, the following features are shown on these maps:

- Boundaries of the property and of the locations where construction will occur, including:
  - ✓ Locations where earth-disturbing activities will occur, noting any phasing of construction activities;
  - ✓ Approximate slopes before and after major grading activities;
  - ✓ Designated points on the site where vehicles will exit onto paved roads;
  - ✓ Locations of structures and other impervious surfaces upon completion of construction; and
- Locations of all surface waters, including wetlands, that exists on or near site.
- The boundary lines of any natural buffer areas.
- Topography of the site, existing vegetative cover (e.g., forest, pasture, pavement, structures),
- Stormwater and allowable non-stormwater discharge locations, including:
  - ✓ Locations of any storm drain inlets on the site and in the immediate vicinity of the site; and
  - ✓ Locations where stormwater or allowable non-stormwater will be discharged to surface waters (including wetlands).
- Locations of stormwater control measures.

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 Endangered Species Protection

Eligibility Criterion

Under which criterion listed in Appendix D are you eligible for coverage under this permit?

☒ **Criterion A**: No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of this permit, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion A should identify the USFWS and NMFS information sources used. Attaching aerial image(s) of the site to your NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers. Check the applicable source(s) of information you relied upon:

☐ Specific communication with staff of the USFWS and/or NMFS.

☒ Species list from USFWS and/or NMFS. See the CGP ESA webpage, Step 2 for available websites. NHESP mapping as provided by MassDEP. SeeAppendix K for NHESP mapping.

☐ **Criterion B:** Eligibility requirements met by another operator under the 2017 CGP. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2017 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2017CGP operator's notification of authorization under this permit. If your certification is based on another 2017 CGP operator's certification under criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in criterion C in your NOI form.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion B should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.

- ✓ Provide the 9-digit NPDES ID number from the other operator's NOI under the 2017 CGP: __ __ __ __ __ __ __ __ __
- ✓ Authorization date of the other 2017 CGP operator:
- ✓ Eligibility criterion of the other 2017 CGP operator: ☐A ☐C ☐D ☐E ☐F
- ✓ Provide a brief summary of the basis the other operator used for selecting criterion A, C, D, E, or F:

☐ **Criterion C:** Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat. ESA-listed species and/or designated critical habitat(s) under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to EPA that your site's discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in Appendix D of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion C should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

☐ **Criterion D**: Coordination with USFWS and/or NMFS has successfully concluded.
Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site's discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion D should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional office(s) providing that coordination, and the date that coordination concluded.

- ✓ Agency coordinated with: ☐USFWS ☐ NMFS
- ✓ Field/regional office(s) providing coordination:
- ✓ Date coordination concluded:
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding coordination activities.

☐ **Criterion E:** ESA Section 7 consultation has successfully concluded. Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, Indicate the result of the consultation:

☐ Biological opinion from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or

☐ Written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion E should identify the federal action agency(ies) involved, the field office/regional office(s) providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the consultation was completed.

- ✓ Federal agency(ies) involved:
- ✓ Field/regional office(s) providing consultation:
- ✓ Tracking numbers associated with consultation:
- ✓ Date consultation completed:
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation.

☐ **Criterion F:** Issuance of section 10 permit. Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion F should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional office(s) providing permit(s), any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the permit was granted.

- ✓ Agency providing section 10 permit: ☐USFWS ☐NMFS
- ✓ Field/regional office(s) providing permit:
- ✓ Tracking numbers associated with consultation:
- ✓ Date permit granted:
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service.

3.2 Historic Preservation

Appendix E, Step 1

Do you plan on installing any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

☐ Dike

☐ Berm

☒ Catch Basin

☐ Pond

☐ Stormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)

☐ Culvert

☒ Other type of ground-disturbing stormwater control: rain garden, subsurface stormwater storage chambers

Appendix E, Step 2

If you answered yes in Step 1, have prior surveys or evaluations conducted on the site already determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties? ☐ YES ☒ NO

- If yes, no further documentation is required for Section 3.2 of the Template.
- If no, proceed to Appendix E, Step 3.

Appendix E, Step 3

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☐ YES ☒ NO

If yes, provide documentation of the basis for your determination.

If no, proceed to Appendix E, Step 4.

Appendix E, Step 4

If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☐ YES ☒ NO

If no, no further documentation is required for Section 3.2 of the Template.

If yes, describe the nature of their response:

☐ Written indication that no historic properties will be affected by the installation of stormwater controls.

☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions.

☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls.

☐ Other:

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Do you plan to install any of the following controls? Check all that apply below.

None of the following controls are planned to be installed as part of the project.

☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

SECTION 4: EROSION AND SEDIMENT CONTROLS

In accordance with Parts 2.2 and 7.2.6 of the CGP, this section describes the erosion and sediment controls that will be installed and maintained at the site.

4.1 Natural Buffers or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? ☐ YES ☒ NO

(Note: If no, no further documentation is required for Part 4.1 in the SWPPP Template. Continue on to Part 4.2.)

Check the compliance alternative that you have chosen:

☐ (i) I will provide and maintain a 50-foot undisturbed natural buffer.

☐ (ii) I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

☐ (iii) It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

☐ I qualify for one of the exceptions in Part 2.2.1.b. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

Buffer Exceptions

Which of the following exceptions to the buffer requirements applies to your site?

☐ There is no discharge of stormwater to the water of the U.S. that is located 50 feet from my construction disturbances.

☐ No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.

☐ For a "linear construction sites" (defined in Appendix A), site constraints (e.g., limited right-of-way) make it infeasible to meet any of the CGP Part 2.2.1.a compliance alternatives.

☐ The project qualifies as "small residential lot" construction (defined in Appendix A) (see Appendix G, Part G.3.2).

- ☐ For Alternative 1:
- ☐ For Alternative 2:

☐ Buffer disturbances are authorized under a CWA Section 404 permit.

☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail

4.2 Perimeter Controls

General
In accordance with Part 2.2.3 and 7.2.6.b.ii of the CGP, sediment controls will be installed along those perimeter areas of the site that will receive stormwater from earth-disturbing activities and will be maintained.

Specific Perimeter Controls

Straw Wattles	
Description: Straw wattles shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to ¼" diameter. The mesh material will either photo degrade within one year or be made of nylon with a life expectancy of 24 months. The wattle shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The wattle will have a minimum diameter of 12-inches.	
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
Design Specifications	See project plans

Silt fence	
Description: The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a mesh backing, and stapled to preweathered oak posts installed as shown on the drawings. The oak posts shall be 1-1/4-inches by 1-1/4-inches (Minimum Dimension) by 48-inches and shall be tapered. The bottom edge of the silt fence shall be buried as shown on the drawings.	
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
Design Specifications	See project plans

Straw bales	
Description: Straw bales shall consist of certified seed free stems of agricultural grain and cereal crops and shall be free of grasses and legumes. Standard bales shall be 14-inches high, 18-inches wide and 36- to 40-inches long tied with polypropylene twine and weigh within 5 percent of 7 lbs. per cubic ft.	
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
Design Specifications	See project plans

4.3 Sediment Track-Out

General
In accordance with Part 2.2.4 and 7.2.6.b.ii of the CGP, the track-out of sediment onto off-site streets, other paved areas, and sidewalks from the vehicles exiting the construction site will be minimized.

Specific Track-Out Controls

Entrance/exit points
Description: Vehicle use will be restricted to properly designed entrance/exit points.

Maintenance Requirements	At a minimum, where sediment has been tracked-out from the site onto the surface of off-site streets, other paved areas, and sidewalks, deposited sediment will be removed by the end of the same work day in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day. You must remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water.
Design Specifications	See project plans

Stabilized Temporary Construction Entrance	
Description: 2-inch crushed stone placed at a depth of at least 8-inches over geotextile fabric	
Maintenance Requirements	To be inspected daily, the contractor will sediment or other materials tracked onto the street, as well as maintaining the entrance.
Design Specifications	See project plans

4.4 Stockpiled Sediment or Soil

General
In accordance with Parts 2.2.5 and 7.2.6 of the CGP, stormwater controls and other measures will be taken to minimize the discharge of sediment or soil particles from stockpiled sediment or soil. In addition, controls and procedures will be used to minimize exposure resulting from adding to or removing materials from the pile.

Specific Stockpile Controls

Maintenance Requirements

- Soil and/or sediment accumulated on pavement or other impervious surfaces will not be swept into any stormwater conveyance (unless it is connected to a sediment basin, sediment track, or similarly effective control), storm drain inlet, or surface water.
- Any stockpile slopes greater than or equal to 2.5:1 shall be protected with erosion control blanket.
- Silt fence and coir facine will be placed at the downgradient perimeter of stockpiles.

4.5 Minimize Dust

General
In accordance with Part 2.2.6 of the CGP, controls and procedures will be used to minimize the generation of dust.

Specific Dust Controls

Dust Control Description

- Dust will be controlled as needed using water.

4.6 Minimize Steep Slope Disturbances

General
During construction, no work on slopes is anticipated. The work will occur in fairly flat area consisting of driveways and parking lots.

4.7 Topsoil

Not applicable – no native topsoil, only disturbing parking lot/driveway area.

4.8 Soil Compaction

Because infiltration practices will be installed, Parts 2. 2.9 and 7.2.6 of the CGP will be adhered to by focusing large machinery traffic only to the areas required for such use.

4.9 Storm Drain Inlets

Stormwater runoff is designed to discharge to existing storm drain inlets on site.

4.10 Stormwater Conveyance Channels

Stormwater conveyance channels will be constructed as part of the construction period stormwater management for this project.

4.11 Chemical Treatment

Treatment chemicals will not be used at this site.

4.12 Dewatering Practices

Dewatering practices are expected to be implemented as part of the project. Either temporary earthen sedimentation basins or temporary basin created of star bales and filter fabric will be used to receive pumped water in excavated areas when needed. The location of these temporary basins will depend on the location of the area needing to be dewatered.

4.13 Other Stormwater Controls

Catch basin protection	
Description: To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.	
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
Design Specifications	See project plans

Dust control	
Description: Watering of dry materials, including stockpiles.	
Installation	As needed
Maintenance Requirements	Not applicable
Design Specifications	Not applicable

4.14 Site Stabilization

Total Amount of Land Disturbance Occurring at Any One Time

☒ *Five Acres or less*

☐ *More than Five Acres*

Whenever earth disturbing activities have *permanently* or *temporarily ceased* on any portion of the site, soil stabilization measures must be initiated immediately (*as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased*).

Earth-disturbing activities have ***permanently ceased*** *when clearing and excavation within any area of the construction site that will not include permanent structures has been completed.*

Earth-disturbing activities have ***temporarily ceased*** *when clearing, grading, and excavation within any area of the site that will not include permanent structures will not resume (i.e., the land will be idle) for a period of 14 or more calendar days, but such activities will resume in the future. The 14 calendar day timeframe begins counting as soon as you know that construction work on a portion of your site will be temporarily ceased. In circumstances where you experience unplanned or unanticipated delays in construction due to circumstances beyond your control (e.g., sudden work stoppage due to unanticipated problems associated with construction labor, funding, or other issues related to the ability to work on the site; weather conditions rendering the site unsuitable for the continuation of construction work) and you do not know at first how long the work stoppage will continue, the requirement to immediately initiate stabilization is triggered as soon as you know with reasonable certainty that work will be stopped for 14 or more additional calendar days.*

The following types of activities may be undertaken at the site to constitute the initiation of stabilization:

1. *prepping the soil for vegetative or non-vegetative stabilization;*
2. *applying mulch or other non-vegetative product to the exposed area;*
3. *seeding or planting the exposed area;*
4. *starting any of the activities in # 1 – 3 on a portion of the area to be stabilized, but not on the entire area; and*
5. *finalizing arrangements to have stabilization product fully installed in compliance with the applicable deadline for completing stabilization as noted in Part 2.2.14 of the CGP.*

This list of examples is not exhaustive.

Stabilization activities must be completed as soon as practicable, but no later than 14 calendar days after the initiation of soil stabilization measures. For vegetative stabilization, all activities (e.g. soil conditioning, application of seed or sod, planting of seedlings or other vegetation, application of fertilizer, and, as deemed appropriate, watering, etc.) necessary to initially seed or plant the area to be stabilized. For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

Appendix H includes the Grading/Stabilization Activities log to document requirements in Part 2.2.14 of the CGP.

SECTION 5: POLLUTION PREVENTION STANDARDS

5.1 Potential Sources of Pollution

Potential Pollution Areas

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (that could be discharged if exposed to stormwater)	**Potential Problem/Solution**
Construction area	vehicle fluids, solvents	Accidental releases of vehicle fluids, tracking of debris. To be addressed by sediment and erosion controls, good housekeeping, and careful material storage, handling, and disposal.
Portable Toilets	Sewage	Accidental spills of contents. Portable toilets shall be maintained and emptied as needed. Spills/leaks shall be reported to owner of unit(s).
Fuel Tanks	Fuel oil, gasoline and other fuels	Accidental spills. Follow procedures for spill prevention and response as detailed in Section 5.2.
Staging Areas	Soil erosion, fuel oil, gasoline, vehicle fluids, antifreeze/coolant, hydraulic oil/fluids, etc.	Accidental releases/spills. To be addressed by good housekeeping, and careful material storage, handling, and disposal.
Waste storage in Containers	Construction demolition debris, trash	Accidental releases of contents. To be addressed by good housekeeping practices. Any contents released shall be collected to avoid entrance into wetlands/ water bodies or transport off-site.
Dewatering operations	Soil erosion, sediment	Erosion of soils and turbid water from dewatering operations have the potential to discharge to wetlands. Sediment and erosion controls to address.

Potential Pollutant Descriptions

Material	Storm water Pollutants
Gasoline	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel fuel	Petroleum distillate, oil and grease, naphthalene, xylenes
Antifreeze/coolant	Ethylene glycol, propylene glycol, heavy metals (Cu, Pb, Zn)
Hydraulic fluid	Mineral Oil
Soil/sediments	Soil, sediment

5.2 Spill Prevention and Response

This section describes procedures to prevent and respond to leaks, spills, and other releases.

The following good housekeeping and material management practices will be followed to reduce the risk of spills or other accidental exposure of hazardous materials to storm water runoff:

- Store quantities of materials required for the project and not more,
- Store materials onsite in a neat, orderly manner in appropriate labeled containers,
- Store materials indoors or under cover,
- Follow manufacturers' recommendations for proper use and disposal of materials,
- Monitor all onsite vehicles for leaks and perform preventive maintenance to reduce the potential for leaks,
- Conduct vehicle fueling and maintenance activities in a controlled or covered area or off-site, when possible,
- Use drip pans or absorbents under or around leaky vehicles.
- Manufacturers' recommended methods for spill cleanup shall be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Adequate supplies of spill kit materials and equipment shall be kept in the hazardous material storage area and any on-site fueling and maintenance areas on-site. Spill kit equipment and materials shall include but not be limited to: spill pads, absorbent booms, brooms, dust pans, mops, rags, gloves, goggles, speedi-dri, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

If an emergency spill or release occurs, site personnel will report the spill or release to the Contractor's Site Health and Safety Officer (SHSO), the Resident Engineer, and/or site management and, as needed, evacuate the area.

All employees shall receive Awareness Level training as part of their hazard communication training. Only employees trained at the First Responder Operations Level of 29 CFR 1910.120(q) will be authorized to respond in a defensive manner to emergency spills or releases of fuel and other materials.

If a spill occurs, the SHSO and/or site management shall be contacted and the SHSO and/or site management with assistance from appropriately trained personnel will contain the spill. If necessary the SHSO and/or site management will contact an emergency response contractor and will also notify the

Engineer and all other authorities and agencies in accordance with state and local regulations. Absorptive materials and other supplies will be used as needed to clean up and prevent the spill from spreading. The source of the spill shall be eliminated immediately. Water shall not be used to wash the spill down. Recycled oil and oily wastes shall be disposed in accordance with all applicable federal, state, tribal, and local requirements.

In the event that an accident or some other incident, such as an explosion, a release to groundwater or the environment, or an exposure to toxic chemical levels as described in 310 CMR 40.1600, Revised Massachusetts Contingency Plan, occurs during the course of the project, notify the Massachusetts Department of Environmental Protection, (Northeast Region) in Wilmington **(978) 694-3200** and all other appropriate federal, state, and local authorities and agencies in accordance with 310 CMR 40.0333.

The local Fire Department should be notified of any releases or incidents at **911** for emergencies.

5.3 Fueling and Maintenance of Equipment or Vehicles

Discharges of fuels, oils, or other chemicals used in vehicle equipment operation and maintenance are prohibited.

If vehicle fueling and maintenance activities are completed onsite, an effective means of eliminating the discharge of spilled or leaked chemicals, including fuel, must be provided. Examples of effective controls include, but are not limited to, locating activities away from surface waters and stormwater inlets or conveyances, providing secondary containment *(e.g., spill berms, decks, spill containment pallets)* and cover where appropriate, and/or having spill kits readily available.

- Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;
- Use drip pans and absorbents under or around leaky vehicles;
- Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements;
- Clean up spills or contaminated surfaces immediately, using dry clean up measures where possible, and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
- Do not clean surfaces by hosing the area down.
- If applicable, the Operator shall comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR 112 and Section 311 of the Clean Water Act.

5.4 Washing of Equipment and Vehicles

In accordance with CGP Parts 2.3.2 and 7.2.6, equipment and vehicle washing will not be conducted on this project site.

5.5 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

In accordance with Parts 2.3.3 and 7.2.6 of the CGP, this section describes the storage, handing, and disposal of construction products, materials, and wastes.

5.5.1 Building Products

Building products, such as asphalt sealants, roofing materials, adhesives, concrete admixtures, etc., will be used as part of this project. Products will be stored in their original containers until used.

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

Pesticides, herbicides, insecticides, fertilizers, and landscape materials will not be used as part of this project.

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

Chemicals will be stored in water-tight containers, which will be covered by plastic sheeting, temporary roofs, or other suitable means to prevent the products from being contacted by rainwater. If cover is not provided, then secondary containment (e.g., spill berms, decks, and spill containment pallets) shall be used, and spill kits shall be readily accessible.

Spills shall be cleaned up immediately in accordance with the Spill Prevention and Response Plan in Section 5.2 of this SWPPP.

5.5.4 Hazardous or Toxic Waste

No hazardous or toxic wastes will be used at this site for this project.

5.5.5 Construction and Domestic Waste

In accordance with Part 2.3.3 of the CGP, this section describes how construction and domestic waste (e.g. packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials, etc.) will be managed.

At a minimum, on work days, waste will be cleaned up and disposed of in designated waste containers and any overflows from the container will be cleaned up immediately.

5.5.6 Sanitary Waste

In accordance with Part 2.3.3.f of the CGP, portable toilets will be positions so that they are secure and will not be tipped or knocked over.

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

In accordance with Parts 2.3.4 and 7.2.6 of the CGP, if water from the washout and cleanout of paint, concrete, form release oils, curing compounds, and other construction materials will be discharged, these discharges will be eliminated, at a minimum through the following practices:

- Directing all washwater into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation.
- Handling washout or cleanout wastes as follows:
    - Do not dump liquid wastes in storm sewers (drainage system)
    - Dispose of liquid wastes properly; and
    - Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes;

- Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

5.7 Fertilizers

In accordance with Parts 2.3.5 and 7.2.6 of the CGP, fertilizers will be applied at the site at a rate and in amounts consistent with manufacturer's specifications. The fertilizer will be applied at the appropriate time of year and not before heavy rains or to frozen grounds.

SECTION 6: INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

6.1 Inspection Personnel and Procedures

Personnel Responsible for Inspections

In accordance with Part 3.2, 4, 5 and 7.27, all personnel conducting inspections will be a "qualified person" (a person knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of the CGP).

contractor and contact information to be determined

Inspection Schedule

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)

Standard Frequency:
☐ Every 7 days ☒ Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge
Increased Frequency (if applicable): (Not applicable)
For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3 ☐ Every 7 days and within 24 hours of a 0.25" rain
Reduced Frequency (if applicable) (Not applicable)
For stabilized areas ☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month;
For stabilized areas on "linear construction sites" (not applicable) ☐ Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain
For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought (not applicable) ☐ Once per month and within 24 hours of a 0.25" rain Insert beginning and ending dates of the seasonally-defined dry period for your area or the valid period of drought: ▪ Beginning date of seasonally dry period: ▪ Ending date of seasonally dry period:
For frozen conditions where earth-disturbing activities are being conducted ☒ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: December 1 ▪ Ending date of frozen conditions: March 15

Rain Gauge Location (if applicable)

The Spring Street weather station in Boxford, MA will be used (Station ID KMABOXFO37) as a rain gauging station for this project. Data are available online:
https://www.wunderground.com/dashboard/pws/KMABOXFO37?cm_ven=localwx_pwsdash

Winter Inspections

During frozen conditions, if earth-disturbing conditions are being conducted, site inspections can be changed to once a month. If no earth disturbing work is being conducted, erosion control inspections may be temporarily ceased and re-started after gaining permission from the Amesbury planning board.

Inspection Report Forms

A copy of the Inspection Report Forms is included in **Appendix D.**

6.2 Corrective Action

Corrective actions are actions you take to:

- Repair, modify, or replace any stormwater control used at the site;
- Clean up and properly dispose of spills, releases, or other deposits; or
- Remedy a permit violation.

In all circumstances, all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events, will be completed immediately (in the same day as the condition is found).

For any of the following conditions, a new or modified control will be installed and made operational, or repair will be completed, by **no later than 7 calendar days from the time of discovery.** If it is infeasible to complete the installation or repair within 7 calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7 calendar day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as practicable after the 7-day timeframe.

- A required stormwater control was never installed, was installed incorrectly, or not in accordance with the requirements of the CGP; or
- You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements of the CGP. In this case, you must notify your EPA Regional Office by the end of the next work day. You are required to submit your notification through EPA's electronic NOI system, or "eNOI", at www.epa.gov/npdes/cgpenoi; or
- One of the prohibited discharges in Part 2.3.1 of the CGP is occurring or has occurred.

Where your corrective actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 7 calendar days of completing corrective action work.

For each corrective action taken, a Corrective Action Report must be completed within 24 hours of discovering the occurrence. Within ***7 calendar days of discovering the occurrence of one of the triggering conditions at your site, you must complete a report of the following:***

- Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
- A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and
- Notice of whether SWPPP modifications are required as a result of the condition identified or corrective action.

Signature Requirements. Each corrective action report must be signed and certified.

Personnel Responsible for Corrective Actions

Contractor and contact information to be determined

Corrective Action Forms

A copy of the Corrective Actions Forms is included in **Appendix E**.

6.3 Delegation of Authority

In accordance with Appendix I, Section 11 of the CGP, individuals or positions may be delegated authority to sign the inspection and corrective action reports.

Appendix J includes the delegation of authority and the names of the duly authorized representatives/positions.

SECTION 7: TRAINING

In accordance with Part 6 and Part 7.2.8 f the CGP, prior to the commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, the following personnel will be trained to understand the requirements of the CGP and their specific responsibilities with respect to those requirements:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
- Personnel responsible for the application and storage of treatment chemicals (if applicable);
- Personnel who are responsible for conducting inspections; and
- Personnel who are responsible for taking corrective actions

These personnel will be trained to understand the following if related to the scope of their job duties:

- The location of all stormwater controls on the site, and how they are to be maintained;
- The proper procedures to follow with respect to pollution prevention requirements; and
- When and how to conduct inspections, record applicable findings, and take corrective actions.

Documentation of training is included in **Appendix I.**

Quality Assurance

Excavation work in will be conducted in compliance with governing authority requirements which have jurisdiction over the work being conducted.

Testing & Inspection Service: During earthwork operations, a geotechnical consultant and testing laboratory will be hired by the contractor to conduct and analyze soil samples and inspection services for quality control purposes.

Test Reports: All test reports will be submitted by the contractor to the engineer. A copy of the reports will also be submitted to the property owner. These reports will include:
1. Gradation reports on each material to be used.
2. Moisture density curve for each type of fill and native soil encountered.
3. Field density test reports.

Quality Control

Quality Control Testing During Construction: A testing service will be retained by the contractor to investigate and test subgrades and fill layers. Test results from the service which confirm proper compaction and placement will be obtained before further construction work can occur.

Field density tests will be performed in accordance with ASTM D-2922 (nuclear method), using Troxler moisture-density gauge Model 3411B or 3401B or approved equal.
1. Foundation and Footing Subgrade: At least one (1) field density test for each 2,000 square feet of foundation slab will be conducted for each stratum of soil on which footings will be placed.
2. Paved Areas and Building Slab Subgrade: a minimum of one field density test of subgrade for every 2,000 square feet of paved area or building slab will be taken. In no case shall less than three tests be conducted.
3. Foundation Wall Backfill: A minimum of one field density tests, at bearing elevation of each 100 linear feet of wall will be conducted.
4. The contractor shall provide additional compaction and testing at no additional expense to owner if the engineer determines that, based on the supplied testing services reports and inspections, that subgrade or fills are below specified density.

Daily Personal Responsibilities and Operation Management Procedures

An on-site inspector will be selected to work closely with the engineer to insure that all erosion and sedimentation controls are in place and working properly. During construction, the erosion and sedimentation controls will be inspected daily. Section 6 of this SWPPP contains additional site inspection information.

Environmental Monitoring Plan
As part of the USEPA Nation Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP), the site will be monitored for stormwater erosion issues at the construction site. The Best Management Practices (BMP's) installed to help prevent erosion, sedimentation and dust generation, will be monitored daily to ensure compliance with the CGP. Site monitoring is also discussed in the project stormwater report that was submitted to the Amesbury conservation commission as part of the wetlands Notice of Intent permit submittal.

Revegetation and Erosion Monitoring and Maintenance Plan
The applicant has submitted a landscape planting plan to the Amesbury planning board as part of their project review.

SECTION 8: CERTIFICATION AND NOTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: **Contractor to be determined** Title: ______________________

Signature: ______________________ Date: ______________

[Repeat as needed for multiple construction operators at the site.]

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – Copy of 2017 CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Inspection Form

Appendix E – Corrective Action Form

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Log

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix A – Site Maps / Plans

So as not to duplicate information, site plans are included as Appendix E of the Earthwork Permit supplemental information package. The final SWPPP will include these plans.

Appendix B – Copy of 2017 CGP

National Pollutant Discharge Elimination System
General Permit for Discharges from
Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) general permit, are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on **February 16, 2017**.

This permit and the authorization to discharge expire at 11:59pm, **February 16, 2022.**

Signed and issued this 11th day of January 2017

Deborah Szaro,
Acting Regional Administrator, EPA Region 1

Signed and issued this 11th day of January 2017

Javier Laureano, Ph.D.,
Director, Clean Water Division, EPA Region 2

Signed and issued this 11th day of January 2017

Jose C. Font,
Acting Director, Caribbean Environmental Protection Division, EPA Region 2.

Signed and issued this 11th day of January 2017

Dominique Lueckenhoff,
Acting Director, Water Protection Division, EPA Region 3

Signed and issued this 11th day of January 2017

César A. Zapata,
Deputy Director, Water Protection Division, EPA Region 4

Signed and issued this 11th day of January 2017

Christopher Korleski,
Director, Water Division, EPA Region 5

Signed and issued this 11th day of January 2017

William K. Honker, P.E.,
Director, Water Division, EPA Region 6

Signed and issued this 11th day of January 2017

Karen Flournoy,
Director, Water, Wetlands, and Pesticides Division, EPA Region 7

Signed and issued this 11th day of January 2017

Darcy O'Connor,
Assistant Regional Administrator, Office of Water Protection, EPA Region 8

Signed and issued this 11th day of January 2017

Kristin Gullatt
Deputy Director, Water Division, EPA Region 9

Signed and issued this 11th day of January 2017

Daniel D. Opalski,
Director, Office of Water and Watersheds, EPA Region 10

CONTENTS

1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

1.1 ELIGIBILITY CONDITIONS

1.1.1 You are an "operator" of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an "operator" is any party associated with a construction project that meets either of the following two criteria:

a. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications *(e.g., in most cases this is the owner of the site);* or

b. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions *(e.g., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this is the general contractor (as defined in Appendix A) of the project)*.

Where there are multiple operators associated with the same project, all operators must obtain permit coverage.[1] Subcontractors generally are not considered operators for the purposes of this permit.

1.1.2 Your site's construction activities:

a. Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale that will ultimately disturb one or more acres of land; or

b. Have been designated by EPA as needing permit coverage under 40 CFR 122.26(a)(1)(v) or 40 CFR 122.26(b)(15)(ii);

1.1.3 Your site is located in an area where EPA is the permitting authority (see Appendix B);

1.1.4 Discharges from your site are not:

a. Already covered by a different NPDES permit for the same discharge; or

b. In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.[2,3]

1.1.5 You are able to demonstrate that you meet one of the criteria listed in Appendix D with respect to the protection of species that are federally listed as endangered or threatened under the Endangered Species Act (ESA) and federally designated critical habitat;

[1] If the operator of a "construction support activity" (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of liability between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

[2] Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2012 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

[3] Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

1.1.6 You have completed the screening process in Appendix E relating to the protection of historic properties; and

1.1.7 You have complied with all requirements in Part 9 imposed by the applicable state, Indian tribe, or territory in which your construction activities and/or discharge will occur.

1.1.8 For "new sources" (as defined in Appendix A) only:

a. EPA has not, prior to authorization under this permit, determined that discharges from your site will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that will not cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard.

b. Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water[4] will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.

1.1.9 If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) unless and until you notify your applicable EPA Regional Office (see Appendix L) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

1.2 TYPES OF DISCHARGES AUTHORIZED[5]

1.2.1 The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):

a. Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR 122.26(b)(14) or 122.26(b)(15)(i);

[4] Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water to which you discharge is identified by a state, tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

[5] See "Discharge" as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

b. Stormwater discharges designated by EPA as needing a permit under 40 CFR 122.26(a)(1)(v) or 122.26(b)(15)(ii);

c. Stormwater discharges from construction support activities *(e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas)* provided that:

   i. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;

   ii. The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites;

   iii. The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and

   iv. Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas.

d. Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

1.2.2 The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:

a. Discharges from emergency fire-fighting activities;

b. Fire hydrant flushings;

c. Landscape irrigation;

d. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;

e. Water used to control dust;

f. Potable water including uncontaminated water line flushings;

g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) *(e.g., paint or caulk containing polychlorinated biphenyls (PCBs));*

h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;

i. Uncontaminated air conditioning or compressor condensate;

j. Uncontaminated, non-turbid discharges of ground water or spring water;

k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and

l. Construction dewatering water discharged in accordance with Part 2.4.

1.2.3 Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

1.3 PROHIBITED DISCHARGES[6]

1.3.1 Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4;

1.3.2 Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

1.3.3 Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;

1.3.4 Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

1.3.5 Toxic or hazardous substances from a spill or other release.

To prevent the above-listed prohibited non-stormwater discharges, operators must comply with the applicable pollution prevention requirements in Part 2.3.

1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)

All "operators" (as defined in Appendix A) associated with your construction site, who meet the Part 1.1 eligibility requirements, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in **Table 1** prior to commencing construction activities.

Exception: If you are conducting construction activities in response to a public emergency *(e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency.

1.4.1 Prerequisite for Submitting Your NOI

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

1.4.2 How to Submit Your NOI

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2017 CGP, unless you received a waiver from your EPA Regional Office.

To access NeT, go to https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting.

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[6] EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

Waivers from electronic reporting may be granted based on one of the following conditions:

a. If your operational headquarters is physically located in a geographic area (*i.e., ZIP code or census tract*) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or

b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix J.

1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.

Type of Operator	NOI Submittal Deadline[7]	Permit Authorization Date[8]
Operator of a new site (*i.e., a site where construction activities commence on or after February 16, 2017*)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an existing site (*i.e., a site with 2012 CGP coverage where construction activities commenced prior to February 16, 2017*)	No later than **May 17, 2017**.	
New operator of a permitted site (*i.e., an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site"*)	At least 14 calendar days before the date the transfer to the new operator will take place.	
Operator of an "emergency-related project" (*i.e., a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services*)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

[7] If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

[8] Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

1.4.4 Modifying your NOI

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix J.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

a. You terminate permit coverage consistent with Part 8; or

b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2022; or

c. You fail to submit an NOI for coverage under a revised or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way.[9] At a minimum, the notice must include:

a. The NPDES ID (*i.e., permit tracking number assigned to your NOI*);

b. A contact name and phone number for obtaining additional construction site information;

c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [*include the appropriate CGP Regional Office contact information found at https://www.epa.gov/npdes/contact-us-stormwater#regional*];" and

d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations."

[9] If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.[10]

2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS

You must design, install, and maintain stormwater controls required in Parts 2.2 and 2.3 to minimize the discharge of pollutants in stormwater from construction activities. To meet this requirement, you must:

2.1.1 Account for the following factors in designing your stormwater controls:

a. The expected amount, frequency, intensity, and duration of precipitation;

b. The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and

c. The soil type and range of soil particle sizes expected to be present on the site.

2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.[11]

2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.

a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (*e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection*) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.[12]

b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

[10] For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for its (their) installation/implementation. See Part 7.2.6.

[11] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2 and 2.3.

[12] Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

2.1.4 Ensure that all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.[13]

b. If at any time you find that a stormwater control needs routine maintenance, you must immediately initiate the needed maintenance work, and complete such work by the close of the next business day.

c. If at any time you find that a stormwater control needs repair or replacement, you must comply with the corrective action requirements in Part 5.

2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances.

a. **Compliance Alternatives.** For any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:

   i. Provide and maintain a 50-foot undisturbed natural buffer; or

   ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or

   iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

   See Appendix G, Part G.2 for additional conditions applicable to each compliance alternative.

b. **Exceptions.** See Appendix G, Part G.2 for exceptions to the compliance alternatives.

2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infeasible.

2.2.3 Install sediment controls along any perimeter areas of the site that will receive pollutant discharges.[14]

a. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.

b. **Exception**. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible *(e.g., due to a limited or restricted right-of-way),*

[13] Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

[14] Examples of perimeter controls include filter berms, silt fences, vegetative strips, and temporary diversion dikes.

implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

2.2.4 Minimize sediment track-out.

a. **Restrict vehicle use to properly designated exit points;**

b. Use appropriate stabilization techniques[15] at all points that exit onto paved roads.

   i. **Exception**: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls[16] are implemented to minimize sediment track-out;

c. Implement additional track-out controls[17] as necessary to ensure that sediment removal occurs prior to vehicle exit; and

d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S.[18]

2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:

a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated;

b. Install a sediment barrier along all downgradient perimeter areas;[19]

c. For piles that will be unused for 14 or more days, provide cover[20] or appropriate temporary stabilization (consistent with Part 2.2.14);

d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

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[15] Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

[16] Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (*e.g., karst areas; steep slopes)*.

[17] Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

[18] Fine grains that remain visible *(i.e., staining)* on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

[19] Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

[20] Examples of cover include tarps, blown straw and hydroseeding.

2.2.6 Minimize dust. On areas of exposed soil, minimize the generation of dust through the appropriate application of water or other dust suppression techniques.

2.2.7 Minimize steep slope disturbances. Minimize the disturbance of "steep slopes" (as defined in Appendix A).

2.2.8 Preserve native topsoil, unless infeasible.[21]

2.2.9 Minimize soil compaction.[22] In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:

a. Restrict vehicle and equipment use in these locations to avoid soil compaction; and

b. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.

2.2.10 Protect storm drain inlets.

a. Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater flow from your site to a water of the U.S., provided you have authority to access the storm drain inlet;[23] and

b. Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

2.2.11 Minimize erosion of stormwater conveyance channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters. Use erosion controls and velocity dissipation devices[24] within and along the length of any stormwater conveyance channel and at any outlet to slow down runoff to minimize erosion.

2.2.12 If you install a sediment basin or similar impoundment:

a. Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Part 2.2.1;

b. Design the basin or impoundment to avoid collecting water from wetlands;

c. Design the basin or impoundment to provide storage for either:

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[21] Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case, it may not be feasible to preserve topsoil.

[22] Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

[23] Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

[24] Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

ii. The calculated volume of runoff from a 2-year, 24-hour storm (see Appendix H); or

iii. 3,600 cubic feet per acre drained.

d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;[25]

e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and

f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

2.2.13 If using treatment chemicals (*e.g., polymers, flocculants, coagulants*):

a. **Use conventional erosion and sediment controls before and after the application of treatment chemicals.** Chemicals may only be applied where treated stormwater is directed to a sediment control *(e.g., sediment basin, perimeter control)* before discharge.

b. **Select appropriate treatment chemicals**. Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated *(i.e., the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area)*.

c. **Minimize discharge risk from stored chemicals.** Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures *(e.g., spill berms, decks, spill containment pallets)*, or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means *(e.g., storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill)*.

d. **Comply with state/local requirements.** Comply with applicable state and local requirements regarding the use of treatment chemicals.

e. **Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier.** Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.

f. **Ensure proper training.** Ensure that all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training. Among other things, the training must cover proper dosing requirements.

g. **Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals.** If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as

[25] The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

conditioned by your authorization to ensure that the use of such chemicals will not cause an exceedance of water quality standards.

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from exposed portions of the site in accordance with Parts 2.2.14a and 2.2.14b.

a. **Stabilization Deadlines:**[26]

Total Amount of Land Disturbance Occurring At Any One Time[27]	**Deadline**
i. **Five acres or less (≤5.0)** **Note: this includes sites disturbing more than five acres (>5.0) total over the course of a project, but that limit disturbance at any one time *(i.e., phase the disturbance)* to five acres or less (≤5.0)**	• Initiate the installation of stabilization measures immediately[28] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[29] and • Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.[30]

[26] EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

[27] Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

1. The total area of disturbance for a project is five (5) acres or less.
2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to "free up" land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

[28] The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in # 1 – 3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

[29] The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

[30] If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

Total Amount of Land Disturbance Occurring At Any One Time[27]	Deadline
ii. **More than five acres (>5.0)**	• Initiate the installation of stabilization measures immediately[31] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[32] and • Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.[33]

iii. **Exceptions:**

(a) Arid, semi-arid, and drought-stricken areas (as defined in Appendix A)**.** If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used:

(i) Immediately initiate and, within 14 calendar days of a temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;

(ii) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and

(iii) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.

(b) Operators that are affected by unforeseen circumstances[34] that delay the initiation and/or completion of vegetative stabilization:

(i) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;

(ii) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and

(iii) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.

(c) Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

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[31] See footnote 27

[32] See footnote 28

[33] See footnote 29

[34] Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

b. **Final Stabilization Criteria** (for any areas not covered by permanent structures)**:**

i. Establish uniform, perennial vegetation *(i.e., evenly distributed, without large bare areas)* that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or

ii. Implement permanent non-vegetative stabilization measures[35] to provide effective cover.

iii. **Exceptions:**

(a) **Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.

(b) **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** The Part 2.2.14b final stabilization criteria does not apply.

(c) **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed *(e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials)*.

2.3 POLLUTION PREVENTION REQUIREMENTS[36]

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

2.3.1 For equipment and vehicle fueling and maintenance:

a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;[37]

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[35] Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

[36] Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

[37] Examples of effective means include:

- Locating activities away from waters of the U.S. and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the U.S.;
- Providing secondary containment (*e.g., spill berms, decks, spill containment pallets*) and cover where appropriate; and
- Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;

c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;

d. Use drip pans and absorbents under or around leaky vehicles;

e. Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and

f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

2.3.2 For equipment and vehicle washing:

a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;[38]

b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and

c. For storage of soaps, detergents, or solvents, provide either (1) cover *(e.g., plastic sheeting, temporary roofs)* to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

2.3.3 For storage, handling, and disposal of building products, materials, and wastes:

a. *For building materials and building products*[39], provide either (1) cover (*e.g., plastic sheeting, temporary roofs*) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

b. *For pesticides, herbicides, insecticides, fertilizers, and landscape materials:*

   i. In storage areas, provide either (1) cover (*e.g., plastic sheeting, temporary roofs*) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and

   ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).

c. *For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals*:

   i. Store chemicals in water-tight containers, and provide either (1) cover *(e.g., plastic sheeting, temporary roofs)* to minimize the exposure of these containers to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas *(e.g., having a spill kit available on site and ensuring personnel are available to respond expeditiously in*

[38] Examples of effective means include locating activities away from waters of the U.S. and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

[39] Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

the event of a leak or spill), or provide secondary containment *(e.g., spill berms, decks, spill containment pallets)*; and

ii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

d. *For hazardous or toxic wastes*:[40]

i. Separate hazardous or toxic waste from construction and domestic waste;

ii. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;

iii. Store all outside containers within appropriately-sized secondary containment (*e.g., spill berms, decks, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas *(e.g., storing chemicals in a covered area, having a spill kit available on site);*

iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements;

v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and

vi. Follow all other federal, state, tribal, and local requirements regarding hazardous or toxic waste.

e. *For construction and domestic wastes*:[41]

i. Provide waste containers *(e.g., dumpster, trash receptacle)* of sufficient size and number to contain construction and domestic wastes;

ii. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover *(e.g., a tarp, plastic sheeting, temporary roof)* to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants *(e.g., secondary containment)*;

iii. On business days, clean up and dispose of waste in designated waste containers; and

iv. Clean up immediately if containers overflow.

[40] Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

[41] Examples of construction and domestic waste include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or building materials.

f. *For sanitary waste*, position portable toilets so that they are secure and will not be tipped or knocked over, and located away from waters of the U.S. and stormwater inlets or conveyances.

2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation;

b. Handle washout or cleanout wastes as follows:

   i. Do not dump liquid wastes in storm sewers or waters of the U.S.;

   ii. Dispose of liquid wastes in accordance with applicable requirements in Part 2.3.3; and

   iii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3; and

c. Locate any washout or cleanout activities as far away as possible from waters of the U.S. and stormwater inlets or conveyances, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

2.3.5 For the application of fertilizers:

a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6.b.ix;

b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;

c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;

d. Never apply to frozen ground;

e. Never apply to stormwater conveyance channels; and

f. Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

2.3.6 Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. State, tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants in ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, in accordance with Part 1.2.2.[42]

2.4.1 Treat dewatering discharges with controls to minimize discharges of pollutants;[43]

2.4.2 Do not discharge visible floating solids or foam;

2.4.3 Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering water is found to contain these materials;

2.4.4 To the extent feasible, use vegetated, upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using waters of the U.S. as part of the treatment area;

2.4.5 At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11;

2.4.6 With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and

2.4.7 Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional state or tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality

[42] Uncontaminated, clear (non-turbid) dewatering water can be discharged without being routed to a control.

[43] Appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (*e.g., bag or sand filters*), and passive treatment systems that are designed to remove sediment. Appropriate controls to use downstream of dewatering controls to minimize erosion include vegetated buffers, check dams, riprap, and grouted riprap at outlets.

standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

3.2 DISCHARGE LIMITATIONS FOR SITES DISCHARGING TO SENSITIVE WATERS[44]

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, you must comply with the inspection frequency specified in 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14.a.iii.(c).[45]

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards, including for it to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL, or if coverage under an individual permit is necessary.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

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[44] Sensitive waters include waters that are impaired and Tier 2, Tier 2.5, and Tier 3 waters.

"Impaired waters" are those waters identified by the state, tribe, or EPA as not meeting an applicable water quality standard and (1) requires development of a TMDL (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). Your construction site will be considered to discharge to an impaired water if the first water of the U.S. to which you discharge is an impaired water for the pollutants contained in the discharge from your site. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available both within the electronic NOI form in NeT, and at https://water.epa.gov/polwaste/npdes/stormwater/discharge.cfm.

Tiers 2, 2.5 and 3 refer to waters either identified by the state as high quality waters or Outstanding National Resource Waters under 40 CFR 131.12(a)(2) and (3). For the purposes of this permit, you are considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water of the U.S. to which you discharge is identified by a state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3. For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

EPA may determine on a case-by-case basis that a site discharges to a sensitive water.

[45] If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

a. Implement controls[46] to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and

b. Ensure that disposal of such materials is performed in compliance with applicable state, federal, and local laws.

4 SITE INSPECTION REQUIREMENTS

4.1 PERSON(S) RESPONSIBLE FOR INSPECTING SITE

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a "qualified person."[47]

4.2 FREQUENCY OF INSPECTIONS.[48]

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sensitive waters or qualify for a Part 4.4 reduction in the inspection frequency:

4.2.1 At least once every seven (7) calendar days; *or*

4.2.2 Once every 14 calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge.[49] To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

4.3 INCREASE IN INSPECTION FREQUENCY FOR SITES DISCHARGING TO SENSITIVE WATERS.

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2), instead of the inspection frequency specified in

[46] Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

[47] A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

[48] Inspections are only required during the site's normal working hours.

[49] "Within 24 hours of the occurrence of a storm event" means that you must conduct an inspection within 24 hours once a storm event has produced 0.25 inches within a 24-hour period, even if the storm event is still continuing. Thus, if you have elected to inspect bi-weekly in accordance with Part 4.2.2 and there is a storm event at your site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the end of the storm.

Part 4.2, you must conduct inspections in accordance with the following inspection frequencies:

Once every seven (7) calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

4.4 REDUCTIONS IN INSPECTION FREQUENCY

4.4.1 Stabilized areas.

a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month in any area of your site where the stabilization steps in 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.

b. **Exception.** For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event of 0.25 inches or greater. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a Inspections must continue until final stabilization is visually confirmed following a storm event of 0.25 inches or greater.

4.4.2 Arid, semi-arid, or drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

4.4.3 Frozen conditions:

a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;

ii. Land disturbances have been suspended; and

iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:

i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and

ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

4.5 AREAS THAT MUST BE INSPECTED

During your site inspection, you must at a minimum inspect the following areas of your site:

4.5.1 All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;

4.5.2 All stormwater controls (including pollution prevention controls) installed at the site to comply with this permit;[50]

4.5.3 Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;

4.5.4 All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater;

4.5.5 All points of discharge from the site; and

4.5.6 All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

4.6 REQUIREMENTS FOR INSPECTIONS

During your site inspection, you must at a minimum:

4.6.1 Check whether all stormwater controls *(i.e., erosion and sediment controls and pollution prevention controls)* are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges;

[50] This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

4.6.2 Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;

4.6.3 Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3;

4.6.4 Check for signs of visible erosion and sedimentation *(i.e., sediment deposits)* that have occurred and are attributable to your discharge at points of discharge and, if applicable, the banks of any waters of the U.S. flowing within or immediately adjacent to the site;

4.6.5 Identify any incidents of noncompliance observed;

4.6.6 If a discharge is occurring during your inspection:

a. Identify all discharge points at the site; and

b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.

4.6.7 Based on the results of your inspection, complete any necessary maintenance under Part 2.1.4 and corrective action under Part 5.

4.7 INSPECTION REPORT

4.7.1 You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:

a. The inspection date;

b. Names and titles of personnel making the inspection;

c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any necessary maintenance or corrective actions;

d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of rainfall measuring 0.25 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and

e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.

4.7.2 Each inspection report must be signed in accordance with Appendix I, Part I.11 of this permit.

4.7.3 You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.

4.7.4 You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

4.8 INSPECTIONS BY EPA

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls that are not on site to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

4.8.1 Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;

4.8.2 Access and copy any records that must be kept under the conditions of this permit;

4.8.3 Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and

4.8.4 Sample or monitor for the purpose of ensuring compliance.

5 CORRECTIVE ACTIONS

5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.

You must take corrective action to address any of the following conditions identified at your site:

5.1.1 A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or

5.1.2 A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or

5.1.3 Your discharges are causing an exceedance of applicable water quality standards; or

5.1.4 A prohibited discharge has occurred (see Part 1.3).

5.2 CORRECTIVE ACTION DEADLINES

For any corrective action triggering conditions in Part 5.1, you must:

5.2.1 Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events;

5.2.2 When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day;

5.2.3 When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

5.3 CORRECTIVE ACTION REQUIRED BY EPA

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

5.4 CORRECTIVE ACTION REPORT

For each corrective action taken in accordance with this Part, you must complete a report in accordance with the following:

5.4.1 Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.

5.4.2 Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.

5.4.3 Each corrective action report must be signed in accordance with Appendix I, Part I.11 of this permit.

5.4.4 You must keep a copy of all corrective action reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.

5.4.5 You must retain all corrective action reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

6 STAFF TRAINING REQUIREMENTS

Each operator, or group of multiple operators, must assemble a "stormwater team" to carry out compliance activities associated with the requirements in this permit.

6.1 Prior to the commencement of construction activities, you must ensure that the following personnel[51] on the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements:

a. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);

b. Personnel responsible for the application and storage of treatment chemicals (if applicable);

c. Personnel who are responsible for conducting inspections as required in Part 4.1; and

d. Personnel who are responsible for taking corrective actions as required in Part 5.

[51] If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit.

For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

6.2 You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.

6.3 At a minimum, members of the stormwater team must be trained to understand the following if related to the scope of their job duties *(e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections*):

a. The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
b. The location of all stormwater controls on the site required by this permit and how they are to be maintained;
c. The proper procedures to follow with respect to the permit's pollution prevention requirements; and
d. When and how to conduct inspections, record applicable findings, and take corrective actions.

6.4 Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

7.1 GENERAL REQUIREMENTS

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.[52, 53] The SWPPP must be kept up-to-date throughout coverage under this permit.

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[52] The SWPPP does not establish the effluent limits that apply to your site's discharges; these limits are established in this permit in Parts 2 and 3.

[53] You have the option of developing a group SWPPP where you are one of several operators at your site. For instance, if both the owner and the general contractor of the construction site are operators and thus are both required to obtain a permit, the owner may be the party undertaking SWPPP development, and the general contractor (or any other operator at the site) can choose to use this same SWPPP, as long as the SWPPP addresses the general contractor's (or other operator's) scope of construction work and functions to be performed under the SWPPP. Regardless of whether there is a group SWPPP or several individual SWPPPs, all operators would be jointly and severally liable for compliance with the permit.

Where there are multiple operators associated with the same site through a common plan of development or sale, operators may assign to themselves various permit-related functions under the SWPPP provided that each SWPPP, or a group SWPPP, documents which operator will perform each function under the SWPPP. However, dividing the functions to be performed under each SWPPP, or a single group SWPPP, does not relieve an individual operator from liability for complying with the permit should another operator fail to implement any measures that are necessary for that individual operator to comply with the permit, e.g., the installation and maintenance of any shared controls. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not cause a violation and/or render any other operators' controls and/or any shared controls ineffective. All operators who rely on a shared control to comply with the permit are jointly and severally liable for violations of the permit resulting from the failure to properly install, operate and/or maintain the shared control.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

7.2.1 All Site Operators. Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.

7.2.2 Stormwater Team. Identify the personnel (by name or position) that are part of the stormwater team, as well as their individual responsibilities, including which members are responsible for conducting inspections.

7.2.3 Nature of Construction Activities.[54] Include the following:

a. A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;

b. The size of the property (in acres or length in miles if a linear construction site);

c. The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);

d. A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c);

e. The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;

f. A description and projected schedule for the following:

   i. Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (*i.e., excavating, cutting and filling*), final grading, and creation of soil and vegetation stockpiles requiring stabilization;

   ii. Temporary or permanent cessation of construction activities in each portion of the site;

   iii. Temporary or final stabilization of exposed areas for each portion of the site; and

   iv. Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.

g. A list and description of all pollutant-generating activities[55] on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (*e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels*) associated with that activity, which could be discharged in stormwater from your construction site. You must take

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[54] If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

[55] Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations.

into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;

h. Business days and hours for the project;

i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency *(e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, information substantiating its occurrence *(e.g., state disaster declaration or similar state or local declaration)*, and a description of the construction necessary to reestablish affected public services.

7.2.4 Site Map. Include a legible map, or series of maps, showing the following features of the site:

a. Boundaries of the property;

b. Locations where construction activities will occur, including:

   i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;

   ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));

   iii. Locations where sediment, soil, or other construction materials will be stockpiled;

   iv. Any water of the U.S. crossings;

   v. Designated points where vehicles will exit onto paved roads;

   vi. Locations of structures and other impervious surfaces upon completion of construction; and

   vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).

c. Locations of all waters of the U.S. within and one mile downstream of the site's discharge point. Also identify if any are listed as impaired, or are identified as a Tier 2, Tier 2.5, or Tier 3 water;

d. Areas of federally listed critical habitat within the site and/or at discharge locations;

e. Type and extent of pre-construction cover on the site (*e.g., vegetative cover, forest, pasture, pavement, structures*);

f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;

g. Stormwater and authorized non-stormwater discharge locations, including:

   i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets;[56] and

   ii. Locations where stormwater or authorized non-stormwater will be discharged directly to waters of the U.S.

h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;

[56] The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

i. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and

j. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

7.2.5 Non-Stormwater Discharges. Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

7.2.6 Description of Stormwater Controls.

a. For each of the Part 2.2 erosion and sediment control effluent limits, Part 2.3 pollution prevention effluent limits, and Part 2.4 construction dewatering effluent limits, as applicable to your site, you must include the following:

   i. A description of the specific control(s) to be implemented to meet the effluent limit;

   ii. Any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);[57]

   iii. Routine stormwater control maintenance specifications; and

   iv. The projected schedule for stormwater control installation/implementation.

b. You must also include any of the following additional information as applicable.

   i. **Natural buffers and/or equivalent sediment controls** (see Part 2.2.1 and Appendix G). You must include the following:

      (a) The compliance alternative to be implemented;

      (b) If complying with alternative 2, the width of natural buffer retained;

      (c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;

      (d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;

      (e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and

      (f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a water of the U.S.

   ii. **Perimeter controls for a "linear construction site"** (see Part 2.2.3). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

   Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3a requirement that sediment be removed

[57] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

before it has accumulated to one-half of the above-ground height of any perimeter control.

iii. **Sediment track-out controls** (see Parts 2.2.4b and 2.2.4c). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.

iv. **Sediment basins** (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.

v. **Treatment chemicals** (see Part 2.2.13), you must include the following:

(a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;

(b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;

(c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards;

(d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;

(e) Information from any applicable Safety Data Sheet (SDS);

(f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;

(g) A description of how chemicals will be stored consistent with Part 2.2.13c;

(h) References to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and

(i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.

vi. **Stabilization measures** (see Part 2.2.14). You must include the following:

(a) The specific vegetative and/or non-vegetative practices that will be used;

(b) The stabilization deadline that will be met in accordance with Part 2.2.14.a.i-ii;

(c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period and the schedule you will follow for initiating and completing vegetative stabilization; and

(d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.

vii. **Spill prevention and response procedures** (see Part 1.3.5 and Part 2.3). You must include the following:

(a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and

(b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.

You may also reference the existence of Spill Prevention Control and Countermeasure (SPCC) plans developed for the construction activity under Part 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.[58]

viii. **Waste management procedures** (see Part 2.3.3). Describe the procedures you will follow for handling, storing and disposing of all wastes generated at your site consistent with all applicable federal, state, tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.

ix. **Application of fertilizers** (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.

7.2.7 Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit. Also include:

a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;

b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;

c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;

d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and

e. Any maintenance or inspection checklists or other forms that will be used.

[58] Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

7.2.8 Staff Training. Include documentation that the required personnel were, or will be, trained in accordance with Part 6.

7.2.9 Compliance with Other Requirements.

a. **Threatened and Endangered Species Protection.** Include documentation required in Appendix D supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.

b. **Historic Properties.** Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.

c. **Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls.** If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable state agency[59] or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR 144 -147. Such controls would generally be considered Class V UIC wells:

   i. Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);

   ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and

   iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

7.2.10 SWPPP Certification. You must sign and date your SWPPP in accordance with Appendix I, Part I.11.

7.2.11 Post-Authorization Additions to the SWPPP. Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;

b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (*i.e., permit tracking number*);

c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

7.3 ON-SITE AVAILABILITY OF YOUR SWPPP

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a state, tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

[59] For state UIC program contacts, refer to the following EPA website: https://www.epa.gov/uic.

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.[60]

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

7.4 SWPPP MODIFICATIONS

7.4.1 You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:

a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;

b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;

c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;

d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:

   i. A copy of any correspondence describing such measures and requirements; and

   ii. A description of the controls that will be used to meet such requirements.

e. To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls implemented at the site; and

f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

7.4.2 You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.10 above) and a brief summary of all changes.

7.4.3 All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix I, Part I.11.b.

7.4.4 Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

[60] Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR Part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

8.1 MINIMUM INFORMATION REQUIRED IN NOT

8.1.1 NPDES ID (*i.e., permit tracking number)* provided by EPA when you received coverage under this permit;

8.1.2 Basis for submission of the NOT (see Part 8.2);

8.1.3 Operator contact information;

8.1.4 Name of site and address (or a description of location if no street address is available); and

8.1.5 **NOT certification.**

8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You must terminate CGP coverage only if one or more of the following conditions has occurred:

8.2.1 You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met the following requirements:

a. For any areas that (1) were disturbed during construction, (2) are not covered over by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14b;

b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;

c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable; and

d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or

8.2.2 You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or

8.2.3 Coverage under an individual or alternative general NPDES permit has been obtained.

8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOT for the 2017 CGP.

To access NeT, go to https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting.

Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix K.

8.4 DEADLINE FOR SUBMITTING THE NOT

You must submit your NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES

The provisions in this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and areas in certain states subject to construction projects by Federal Operators. States, Indian country, and areas subject to construction by Federal Operators not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

9.1 EPA REGION 1

9.1.1 NHR100000 State of New Hampshire

a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for an Alteration of Terrain (AoT) permit from DES pursuant to RSA 485- A:17 and Env-Wq 1500. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule.

b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site http://des.nh.gov/ by using the One Stop Data Mapper at http://des.nh.gov/onestop/gis.htm. If it is determined that the groundwater to be dewatered is near a remediation or other waste site you must apply for the Remediation General Permit (see https://www3.epa.gov/region1/npdes/rgp.html.)

c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at least once per week during weeks when discharges occur. Samples must be analyzed for total suspended solids (TSS) or turbidity and must meet monthly average and daily maximum limits of 50 milligrams per liter (mg/L) and 100 mg/L, respectively for TSS or 33 mg/l and 67 mg/l, respectively for turbidity. TSS (a.k.a. Residue, Nonfilterable) or turbidity sampling and analysis must be performed in accordance with Tables IB and II in 40 CFR 136.3 (http://www.ecfr.gov/cgi-bin/text-idx?SID=0243e3c4283cbd7d8257eb6afc7ce9a2&mc=true&node=se40.25.136_13&rgn=div8). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.

d. Construction site owners and operators must consider opportunities for post-construction groundwater recharge using infiltration best management practices (BMPs) during site design and preparation of the SWPPP. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GAI or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04(e), including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.26). For design considerations for infiltration measures see Volume II of the NH Stormwater Manual.

e. Appendix F contains a list of Tier 2, or high quality waters. Although there is no official list of tier 2 waters, it can be assumed that all NH surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see Surface Water Quality - Watershed Report Cards at http://des.nh.gov/organization/divisions/water/wmb/swqa/report_cards.htm) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU. A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.

f. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown in Part 9.1.4 (g).

    i. A site map required in Part 7.2.4, showing the type and location of all post-construction infiltration BMPs utilized at the facility or the reason(s) why none were installed;

    ii. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2).

iii. Records of sampling and analysis of TSS required for construction dewatering discharges (see Part 9.1.4 (c)).

g. All required or requested documents must be sent to:

NH Department of Environmental Services, Wastewater Engineering Bureau,
Permits & Compliance Section
P.O. Box 95
Concord, NH 03302-0095

9.2 EPA REGION 3

9.2.1 DCR100000 District of Columbia

a. The permittee must comply with the District of Columbia Water Pollution Control Act of 1984, as amended, (D.C. Official Code §8-103.01 *et seq.*) and its implementing regulations in Title 21, Chapters 11 and 19 of the District of Columbia Municipal Regulations. Nothing in this permit will be construed to preclude the institution of any legal action or relieve the permitee from any responsibilities, liabilities, or penalties established pursuant to District of Columbia laws and regulations.

b. The permittee must comply with the District of Columbia Stormwater Management, and Soil Erosion and Sediment Control in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.

c. The permittee must comply with the District of Columbia Flood Management control in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.

d. The Department may request a copy of the Stormwater Pollution Prevention Plan (SWPPP) and the permittee is required to submit the SWPPP to the Department with 14 days of such request. The Department may conduct an inspection of any facility covered by this permit to ensure compliance with District's law requirements including water quality.

9.2.2 DER10F000 Areas in the State of Delaware subject to construction by a Federal Operator

a. Federal agencies engaging in construction activities must submit, to DNREC, a sediment and stormwater management (S&S) plan and obtain approval from DNREC in accordance with 7 Del. C. §4010, 7 DE Admin. Code 5101, and 7 DE Admin. Code 7201.

b. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.

c. Federal agencies engaging in construction activities must certify that all responsible personnel involved in the construction project will have attended the blue card training prior to initiation of any land disturbing activity – *see* 7 Del. C. §§ 4002 & 4014 and 7 DE Admin. Code 5101.

9.3 EPA REGION 5

9.3.1 MNR10I000 Indian country within the State of Minnesota

9.3.1.1 Fond du Lac Band of Lake Superior Chippewa. The following conditions apply only to discharges on the Fond du Lac Band of Lake Superior Chippewa Reservation:

a. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent (NOI) to EPA. The SWPPP can be submitted electronically to richardgitar@FDLREZ.com or by hardcopy sent to:

    Fond du Lac Reservation
    Office of Water Protection
    1720 Big Lake Road
    Cloquet, MN 55720

   CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving.

b. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.
c. The turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff.
d. Turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling.
e. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters in which no ambient turbidity data exists.
f. This Certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in §105 b.3. of the Fond du Lac Water Quality Standards (Ordinance #12/98, as amended). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit from EPA for stormwater discharges from large and small construction activities.
g. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, and commercial.
h. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management

agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size.

i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

9.3.1.2 Grand Portage Band of Lake Superior Chippewa. The following conditions apply only to discharges on the Grand Portage Band of Lake Superior Chippewa Reservation:

a. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification"). This Certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing as such.

b. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance). As such, appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation (as defined in the Water Resources Ordinance). All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.

c. The 2017 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2017 CGP. The monitoring plan must be prepared and incorporated into the Stormwater Pollution Prevention Plan (the "SWPPP"). A copy of the SWPPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPPP should be sent to:

   Grand Portage Environmental Resources Board
   P.O. Box 428
   Grand Portage, MN 55605

   Copies of the Notice of Intent and Notice of Termination required under the CGP must be submitted to the Board at the address above at the same time they are submitted to the EPA.

d. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards.

e. Discharges that the Board has determined to be or that may reasonably be expected to be contributing to a violation of Water Quality Standards or Applicable Federal Standards are not authorized by this Certification.

f. The Board retains full authority provided by the Water Resources Ordinance to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions.

g. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

9.3.2 WIR10I000 Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community

9.3.2.1 Bad River Band of Lake Superior Tribe of Chippewa Indians: The following conditions apply only to discharges on the Bad River Band of the Lake Superior Tribe of Chippewa Indians Reservation:

a. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, or historical sites, or properties that may be eligible for listing as such.[61, 62]

b. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (or Tier 3 water).[63] Outstanding Tribal Resource Waters, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River.[64]

c. Projects utilizing cationic treatment chemicals[65] within the Bad River Reservation boundaries are not eligible for coverage under the CGP.[66]

d. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS).[67]

e. An operator proposing to discharge to an Outstanding Resource Water (or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Outstanding Resource Waters, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweiler River, Tyler Forks, Bell Creek, and Vaughn Creek.[68] The antidegradation

[61] Bad River Band of Lake Superior Tribe of Chippewa Indians Water Quality Standards adopted by Resolution No. 7-6-11-441 (hereafter, Tribe's WQS).

[62] 36 C.F.R. § 800.16(l)(2).

[63] Tribe's WQS: See provisions E.3.ii. and E.4.iv.

[64] Tribe's WQS: See provision E.2.iii.

[65] See definition of cationic treatment chemicals in Appendix A of the CGP.

[66] Tribe's WQS: See provisions E.6.ii.a. and E.6.ii.c.

[67] See footnote 61.

[68] Tribe's WQS: See provision E.2.ii.

demonstration materials described in provision E.4.iii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

f. An operator proposing to discharge to an Exceptional Resource Water (or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Exceptional Resource Waters, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water).[69] The antidegradation demonstration materials described in provision E.4.ii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

g. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.[70]

h. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or wetlands@badriver-nsn.gov.

i. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities.[71, 72] The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

[69] Tribe's WQS: See provision E.2.i.

[70] Tribe's WQS: See provision E.7.iii.

[71] See footnote 61.

[72] See footnote 62.

Bad River Tribe's Natural Resources Department
Attn: Tribal Historic Preservation Officer (THPO)
P.O. Box 39
Odanah, WI 54861

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA.

j. The THPO must be provided 30 days to comment on the project.[73]

k. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.[74]

l. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI: [75]

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

m. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion: [76]

Bad River Tribe's Natural Resources Department
P.O. Box 39
Odanah, WI 54861

n. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.[77]

9.3.2.2 Lac du Flambeau Band of Lake Superior Tribe of Chippewa Indians: The following conditions apply only to discharges on the Lac du Flambeau Band of the Lake Superior Tribe of Chippewa Indians Reservation:

a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office, for the Traival environmental review process, at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Lac du Flambeau
Tribal Land Management

[73] 36 C.F.R. § 800.3(c)(4).

[74] 36 C.F.R. § 800.3(b).

[75] See footnote 61.

[76] See footnote 61.

[77] See footnote 61.

P.O. Box 279
Lac du Flambeau, WI 54538

CGP applicants are encouraged to work with the LdF Water Resources Program in the identification of all proposed receiving waters.

b. Copies of the NOI and the Notice of Termination (NOT) must be sent to the LdF Water Resources Program at the same time they are submitted to EPA.

c. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Lac du Flambeau Reservation. This includes, but is not limited to, the prevention of any discharge that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Lac du Flambeau Reservation for any of the uses designated in the Water Quality Standards of the Lac du Flambeau Reservation.

d. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Lac du Flambeau Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Lac du Flambeau reservation, including groundwater.

e. This certification does not authorize impacts to cultural, historical, or archeological features or sties, or properties that may be eligible for such listing.

f. Due to the significant ecological and cultural importance of the Lac du Flambeau Reservation, any operator requesting a permit for a point source discharge of pollutants (i.e., discharge) associated with the Stormwater Discharge will need a stormwater pollution prevention plan in place that does not violate Lac du Flambeau Water Quality Standards to protect Reservation Waters.

9.4 EPA REGION 6

9.4.1 NMR100000 State of New Mexico, except Indian country

a. If construction dewatering activities are anticipated at a site, permittees must complete the following steps:

   i. Investigative information must be documented in the facility SWPPP.

   ii. Refer to the GWQB Mapper at https://gis.web.env.nm.gov/GWQB/ AND the PSTB Mapper (Go Mapper) at https://gis.web.env.nm.gov/GoNM/ and check if the following sources are located within the noted distance from your anticipated construct site groundwater dewatering activity:

Project Location Relative to a Source of Potential Groundwater Contamination	***Constituents likely to be required for testing***
Within 0.5 mile of an open Leaking Underground Storage Tank (LUST) site	*BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) plus additional parameters depending on site conditions.**

Project Location Relative to a Source of Potential Groundwater Contamination	***Constituents likely to be required for testing***
Within 0.5 mile of an open Voluntary Remediation site	*All parameters listed in Appendix A (or an alternate list approved by the NMED SWQB)***
Within 0.5 mile of an open RCRA Corrective Action Site	
Within 0.5 mile of an open Abatement Site	
Within 0.5 mile of an open Brownfield Site	
Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.	

**For further assistance determining whether dewatering may encounter impacted groundwater, the permittee may contact the NMED Ground Water Quality Bureau at: 505-827-2965.*

***EPA approved-sufficiently sensitive methods must be used - approved methods are listed in 40 CFR Part 136.3.*

iii. If dewatering activities are anticipated, information on flow and potential to encounter impacted groundwater must be provided directly to NMED at the following address:

Program Manager, Point Source Regulation Section
NMED Surface Water Quality Bureau
PO Box 5469, Santa Fe, NM 87502

Information may also be emailed - the contact information for the program manager is located on the website at: www.env.nm.gov/swqb/PSR.

iv. Permittee must test the quality of the water being considered for discharge. Permittees must contact the Point Source Regulation Section Program Manager for information on constituents that must be monitored.

v. Permittee must send test result data to EPA Region 6 and the NMED Surface Water Quality Bureau. If the test data exceed standards, it cannot be discharged from the construction site into surface waters under this permit. Discharge to surface waters must be conducted under a separate NPDES individual permit to ensure proper treatment and disposal.

vi. If disposal will be to the ground surface or in an unlined pond, the permittee must submit an NO/ to the NMED Ground Water Quality Bureau.

b. Operators are not eligible to obtain authorization under this permit for all new and existing storm water discharges to outstanding national resource waters (ONRWs) (also referred to as "Tier 3" waters.)

i. Although state WQS provide for temporary and short-term degradation of water quality in an ONRW under very limited circumstances if approved by the Water Quality Control Commission as specified at 20.6.4.8.A NMAC, the approval process required for these activities does not lend itself for use for projects covered under this general permit. This condition is necessary to ensure that no degradation is allowed in ONRWs by requiring proposed storm water discharges to be reviewed under the individual permit process. Tier 3 waters are defined in Appendix F of the proposed permit.

c. Operators who intend to obtain authorization under this permit for new and existing storm water discharges from construction sites must satisfy the following condition: The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure that applicable standards in 20.6.4.NMAC, including the antidegradation policy, or TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs. For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriate soil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generally accepted (by professional erosion control specialists) soil loss prediction tools.

  i. For all sites, the operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, pre-development conditions.

  ii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g. CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP. The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.

d. State regulations at 20.6.2.1203 NMAC state: *With respect to any discharge from any facility of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, the following notifications and corrective actions are required*:

  i. As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, any person in charge of the facility shall orally notify the Chief of the Ground Water Quality Bureau of the department, or his counterpart in any constituent agency delegated responsibility for enforcement of these rules as ta any facility subject to such delegation.

  Permittees can call 505-827-9329 for emergencies at any time and 505-476-6000 for non-emergencies during business hours from 5am-5pm, Monday through Friday.

e. NMED does not allow permittees to use the Equivalent Analysis Waiver.

9.4.2 NMR10I000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.

9.4.2.1 Pueblo of Isleta. The following conditions apply only to discharges on the Pueblo of Isleta Reservation:

a. CGP at 1.3 Prohibited discharges: Stormwater discharges associated with construction activity that EPA or the Pueblo of Isleta, prior to authorization under this perm it, determines will cause, have the reasonable potential to cause, or may reasonably be expected to contribute to a violation or excursion of any applicable water quality standard, including the antidegradation policy, or the impairment of a designated use of receiving waters are not authorized by this permit.

b. CGP at 1.4.1 How to Submit Your NOI: The operator shall provide a copy of the Notice of Intent ("NOI") to the Pueblo of Isleta at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of the Pueblo of Isleta. The operator shall also notify the Pueblo of Isleta when it has submitted the Notice of Termination ("NOT"). The NOI and NOT shall be sent to the Pueblo of Isleta at the following address:

   Water Quality Control Officer
   Pueblo of Isleta
   Environment Division
   PO Box 1270
   Isleta, NM 87022
   (505) 869-7565
   E-mail: POI36871@isletapueblo.com

   Overnight/Express Mail Delivery
   Pueblo of Isleta
   Environment Division
   6 Sagebrush St.
   Albuquerque, NM 87105

c. CGP at 1.5 Requirement to post a notice of your permit coverage: Amend to read: "You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site…"

d. CGP at 7.2.6 Description of stormwater controls: The SWPPP will be considered to be incomplete if the operator has not coordinated requirements under this Part with the Pueblo of Isleta Public Services Department.

e. CGP I.12.6.1 at pg.I-6 of 8. The Pueblo of Isleta requests notification within 10 hours (rather than 24 hrs.) if health or the environment become endangered.

f. CGP at I.12.2 Anticipated noncompliance: Amend to read: "You must give advance notice to EPA and the Pueblo of Isleta at the address indicated in 1.4.1(a) of any planned changes in the permitted facility or activity which may results in noncompliance with permit requirements."

g. CGP at I.12.6.1: Any noncompliance for projects within the exterior boundaries of the Pueblo of Isleta which may endanger health or the environment shall be reported directly to the EPA Regional Office [(see contacts at https://www.epa.gov/npdes/contact-us-stormwater#regional) I and to the Pueblo of Isleta Water Quality Control Officer. Any information must be provided orally with n 12 hours of the time you become aware of the circumstances. Other requirements of this Part for a written submission apply. Electronic communication (E-mail) shall be provided as soon as practical. Verbal notice shall be provided to:

Water Quality Control Officer
Pueblo of Isleta
E-mail: POI36871@isletapueblo.com
(505) 869-7565
(505) 263-5425 cellular
(505) 869-3030 Police Dispatch

h. CGP at 2.2 Erosion and sediment control requirements: Erosion and sediment controls shall be designed to retain sediment on-site.

i. CGP at 2.2 Under Sediment control requirements, Standard Permit Condition Duty to Mitigate Volumes of sediment at or over (five) 5 cubic yards must be removed and placed for disposal within a tribally approved sediment Disposal Site, located on Pueblo of Isleta lands. CGP 2.2 at pg. 8.

j. Under Minimize erosion, a permittee must secure permission from the Pueblo or affected Pueblo of Isleta land assignment owner if a dissipation device needs to be placed up- or down- elevation of a given construction site. CGP 2.2.11 at pg. 11.

k. CGP at 2.3.6 Emergency spill notification requirements: You must notify the Pueblo of Isleta Water Quality Control Officer and National Response Center (NRC) [at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302] as soon as you have knowledge of the release. Verbal and electronic notice shall be provided as specified in I.12.6.1

l. CGP at C.3 Equivalent analysis waiver: Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta Water Quality Control Officer at the address indicated in 1.4.1 (a).

9.4.2.2 Pueblo of Sandia. The following conditions apply only to discharges on the Pueblo of Sandia Reservation:

a. Only those activities specifically authorized by the CGP are authorized by the Pueblo of Sandia's Water Quality certification. The Pueblo of Sandia's Water Quality Certification does not authorize impact to cultural properties, historical sites or properties that may be eligible as such.

b. Copies of all Notices of Intent (NOI) submitted to the EPA must also be sent concurrently to the Pueblo of Sandia at the following address. Discharges are not authorized by this permit unless an accurate and complete NOI has been submitted to the Pueblo of Sandia, either by mail or electronically.

Regular U.S. Delivery Mail:
Pueblo of Sandia Environment Department
Attention: Scott Bulgrin, Water Quality Manager
481 Sandia Loop
Bernalillo, New Mexico 87004

Electronically:
sbulgrin@sandiapueblo.nsn.us

c. Any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident written reports should likewise be routed to the Pueblo of Sandia at the above address.

d. The Stormwater Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia Environment Department either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Pueblo staff time to become familiar with the project site, prepare for construction site inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in the delay or denial of the construction project.

e. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards not authorized by this certification.

f. An "Authorization to Proceed Letter" with site specific mitigation requirements may be sent out to the permittee when a review of the NOI and SWPPP, on a case- by-case basis is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.

g. The Pueblo of Sandia will not allow Small construction Waivers (Appendix C) or the Rainfall Erosivity Waiver (Appendix C.1) to be granted for any small construction activities.

h. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to EPA.

i. Copies of all NOT submitted to the EPA must also be sent concurrently to the Pueblo of Sandia through the mail or electronically.

   Regular U.S. Delivery Mail:
   Pueblo of Sandia Environment Department
   Attention: Scott Bulgrin, Water Quality Manager 481 Sandia Loop
   Bernalillo, New Mexico 87004

   Electronically:
   sbulgrin@sandiapueblo.nsn.us

j. The Pueblo of Sandia may require the permittee to perform water quality monitoring for pH, turbidity, and total suspended solids (TSS) during the permit term if the discharge is to a surface water leading to the Rio Grande for the protection of public health and the environment.

9.4.2.3 Pueblo of Santa Ana. The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:

a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Santa Ana (the Pueblo), at the same time it is submitted to the U.S. Environmental Protection Agency (EPA), for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.

b. The operator shall provide a copy of the Stormwater Pollution Prevention Plan (SWPPP), at the same time that an NOI is submitted to the EPA, to the Pueblo for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.

c. The operator shall provide a copy of the SWPPP, copies of inspections reports, and copies of corrective action reports to the Pueblo at the address below for review, upon request.

d. The NOI, SWPPP and Notice of Termination (NOT) shall be sent to the Pueblo at the following address:

Pueblo of Santa Ana Department of Natural Resources,
Attention: Water Quality Program Specialist
2 Dove Road
Santa Ana Pueblo, NM, 87004

e. Discharges are not authorized by this permit unless an accurate and complete NOI and SWPPP have been submitted to the Pueblo. Failure to provide an accurate and complete NOI and SWPPP may result in a denial of the discharge permit or groundbreaking or construction delay.

f. The operator will not proceed with site work until authorized by the Pueblo. The Pueblo requires review of the complete and final SWPPP by the Pueblo before authorization to proceed. The Pueblo will provide an "authorization to proceed" notice after review and approval of the SWPPP.

g. Before submitting a NOT, permittees must certify to the Pueblo's Department of Natural Resources in writing that requirements for site stabilization have been met, and any temporary erosion control structures have been removed. Documentation of the Pueblo's review that such requirements have been reviewed and met will be provided for the permittee to add to the permittee's NOT submission to EPA. Copies of all NOT submitted to the EPA must also be sent to the Pueblo at the address provided above.

9.4.2.4 Pueblo of Santa Clara. The following conditions apply only to discharges on the Pueblo of Santa Clara Reservation:

a. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Santa Clara Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency.

b. A copy of the Storm water Pollution Prevention Plan shall be made available to the Pueblo of Santa Clara staff upon request.

9.4.2.5 Pueblo of Tesuque. The following conditions apply only to discharges on the Pueblo of Tesuque Reservation:

a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Tesuque Governor’s Office and Environment Department at same time it is submitted to the Environmental Protection Agency, for projects occurring within the exterior boundaries of our tribal lands. The operator shall also notify the Pueblo of Tesuque Governor's Office and Environment Department when it submitted the Notice of Termination. The NOI and NOT shall be sent to the Pueblo of Tesuque Governor's Office and Environment Department at the following address:

Pueblo of Tesuque
Office of the Governor
Route 42 Box 360-T
Santa Fe, NM 87506 or
email: governor@pueblooftesuque.org

b. The operator shall also provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Pueblo of Tesuque Environment Department.

9.4.2.6 Taos Pueblo. The following conditions apply only to discharges on the Taos Pueblo Reservation:

a. The operator shall provide a copy of the Notice of Intent (NOI) to the Taos Pueblo Governor's Office, War Chief's Office and Environmental Office, at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of Taos Pueblo. The operator shall also notify Taos Pueblo when it has submitted the Notice of Termination (NOT). The NOI and NOT shall be sent to the Taos Pueblo at the following addresses:

   i. Taos Pueblo Governor's Office
   P.O. Box 1846
   Taos NM 87571

   ii. Taos Pueblo War Chief's Office
   P.O. Box 2596
   Taos NM 87571

   iii. Environmental Office
   Attn: Program Manger
   P.O. Box 1846
   Taos NM 87571

b. Taos Pueblo requests that in the event Indian artifacts or human remains are inadvertently discovered on projects occurring near or on Taos Pueblo lands that consultation with the tribal Governor's Office occur at the earliest possible time.

c. The operator shall provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Taos Pueblo Environmental Office for review and copy, upon request.

9.4.2.7 Ohkay Owingeh. The following conditions apply only to discharges on the Ohkay Owingeh Reservation:

a. Prior to commencement of any construction activity on Ohkay Owingeh Lands requiring permit coverage under EPA's Construction General Permit, the operator(s) shall submit to Ohkay Owingeh Office of Environmental Affairs, a copy of the electronic "Notice of Intent," submitted to the Environmental Protection Agency, immediately following EPA's electronic notification that the NOI has been received. A copy of the Stormwater Pollution Prevention Plan(s) must be made available to the Ohkay Owingeh Office of Environmental Affairs upon the tribe's request either electronically or hard copy. Operator(s) shall also submit to Ohkay Owingeh Office of Environmental Affairs a copy of the electronic Notice of Termination (NOT) submitted to the Environmental Protection Agency. Documents shall be submitted to Ohkay Owingeh at the following address:

Ohkay Owingeh Office of Environment Affairs
Attention: Environmental Programs Manager
P.O. Box 717
Ohkay Owingeh, New Mexico 87566
Office # 505.852.4212
Fax # 505.852.1432
Electronic mail: naomi.archuleta@ohkay.org

b. Ohkay Owingeh will not allow the Rainfall Erosivity Waivers (see Appendix C) to be granted for any small construction activities.

c. All vegetation used to prevent soil loss, seeding or planting of the disturbed area(s) to meet the vegetative stabilization requirements must utilize native seeds/vegetation commonly known to the area. All temporary erosion control structures, such as silt fences must be removed as soon as stabilization requirements are met.

9.4.3 OKR10I000 Indian country within the State of Oklahoma

9.4.3.1 Pawnee Nation. The following conditions apply only to discharges within Pawnee Indian country:

a. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety
P.O. Box 470
Pawnee, OK 74058
Or email to mmatlock@pawneenation.org

b. The Storm Water Pollution Prevention Plan must be available to Departmental inspectors upon request.

c. The Department must be notified at 918.762.3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.

9.4.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).

a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.

b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.

c. In order to company with Oklahoma's Water Quality Standards, these conditions and restrictions also apply to any construction projects located wholly or partially on Indian Country lands within the State of Oklahoma.

9.5 EPA REGION 8

9.5.1 MTR10I000 Indian country within the State of Montana

9.5.1.1 The Confederated Salish and Kootenai Tribes of the Flathead Nation. The following conditions apply only to discharges on the Confederated Salish and Kootenai Tribes of the Flathead Nation Reservation:

a. Permittees must submit the Stormwater Pollution Prevention Plan (SWPPP) to the Confederated Salish and Kootenai Tribes at least 30 days before construction starts.

b. Before submitting the Notice of Termination (NOT), permittees must clearly demonstrate to an appointed Tribal staff person during an onsite inspection that requirements for site stabilization have been met.

c. The permittee must send a copy of the Notice of Intent (NOI) and the NOT to CSKT.

d. Permittees may submit their SWPPPs, NOIs and NOTs electronically to: clintf@cskt.org.

e. Written SWPPPs, NOIs and NOTs may be mailed to:

Clint Folden, Water Quality Regulatory Specialist
Confederated Salish and Kootenai Tribes
Natural Resources Department
P.O. Box 278
Pablo, MT 59855

9.6 EPA REGION 9

9.6.1 CAR10I000 Indian country within the State of California

9.6.1.1 Twenty-Nine Palms Band of Mission Indians. The following conditions apply only to discharges on the Twenty-Nine Palms Band of Mission Indians Reservation:

a. At the time the applicant submits its Notice of Intent (NOI) to the EPA, the applicant must concurrently submit written notification of the NOI and a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Twenty-Nine Palms Band of Mission Indians at the address below:

Tribal Environmental Coordinator
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA 92236

b. The applicant must also concurrently submit to the Tribal Environmental Coordinator written notification of any other forms or information submitted to the EPA, including waivers, reporting, and Notice of Termination (NOT).

c. Permitted entities under the CGP must keep the Tribal EPA informed of authorized discharges under the CGP by submitting written information about the type, quantity, frequency and location, intended purpose, and potential human health and/or environmental effects of their activities. These requirements are pursuant to Section 4 of the Twenty-Nine Palms Band of Mission Indians Water Pollution Control Ordinance (022405A). This information may be submitted to Tribal EPA in the form of Stormwater Pollution Prevention Plans (SWPPPs), monitoring reports, or other reports as required under the CGP. Spills, leaks, or unpermitted discharges must be reported in writing to Tribal EPA within 24 hours of the incident.

9.6.2 GUR100000 Island of Guam. The following conditions apply only to discharges on the Island of Guam:

a. Any earth-moving operations which require a permit must be obtained from the Department of Public Works (DPW) with clearance approval from various Government of Guam Agencies including Guam EPA prior to the start of any earth-moving activity.

b. In the event that the construction sites are within the Guam Sole Source Aquifer, the construction site owner and operator must consider opportunities to facilitate groundwater recharge for construction and post-construction implementing infiltration Best Management Practices. Stormwater disposal systems shall be designed and operated within the boundaries of the project. Stormwater systems shall not be permitted within any Wellhead Protection Zone unless the discharge meets the Guam Water Quality Standards within the zone. Waters discharged within the identified category G-2 recharge zone shall receive treatment to the degree required to protect the drinking water quality prior to it entering the category G-1 resource zone.

c. All conditions and requirements set forth in the 22 Guam Administrative Rules and Regulations (GARR), Division II, Water Control, Chapter 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR) that are more protective than the CGP regarding construction activities must be complied with.

d. All standards and requirements set forth in the 22 GARR, Division II, Water Control, Chapter 5, *Guam Water Quality Standards (GWQS) 2001 Revisions*, must be complied with to include reporting GWQS exceedance to Guam EPA.

e. All operators/owners of any property development or earth moving activities shall comply with the erosion control pre-construction and post-construction BMP design performance standards and criteria set forth in the 2006 CNMI and Guam Stormwater Management Manual.

f. All conditions and requirements regarding dewatering activities set forth in 22 Guam Administrative Rules and Regulations Chapter 7, Water Resources Development and Operating Regulations must be complied with to include securing permits with Guam EPA prior to the start of any dewatering activities.

g. If a project to be developed is covered under the Federal Stormwater Regulations (40 CFR Parts 122 & 123), a Notice of Intent (NOI) to discharge stormwater to the surface and marine waters of Guam must be submitted to the U.S. EPA and a copy furnished to Guam EPA, pursuant to Section 10, 104(B)(5)(d) 22GAR, Division II, Chapter 10.

h. Guam EPA shall apply the Buffer Requirements listed in Appendix G of the CGP NPDES Permit for construction activities as it pertains to Waters of the U.S. in Guam. Guam EPA shall also apply the same buffer requirements for sinkholes in Guam.

i. When Guam EPA, through its permit review process, identifies that the proposed construction activity is close proximity to marine waters, contractors and owners will be informed that any activity that may impair water quality are required to stop during peak coral spawning periods as per the Guam Coral Spawning Construction Moratoriums.

j. The Proposed Construction General Permit must set appropriate measures and conditions to protect Guam's Threatened and Endangered Species and Outstanding Resource Waters of exceptional recreational or ecological significance as determined by the Guam EPA Administrator as per *Guam Water Quality Standards 2001 Revisions,* §5102, Categories of Waters, D. Outstanding Resource Waters.

k. When Guam EPA through its permit review process identifies that proposed construction activity is in close proximity to any Section 303d impaired waters, which includes marine waters and surface waters, shall ensure that construction activity does not increase the impaired water's ambient parameters.

l. When Rainfall Erosivity and TMDL Waivers reflected in the CGP, Appendix C, are submitted to the U.S. EPA, Guam EPA will review waivers on a project by project basis.

m. Prior to submission of the Notice of Termination (NOT) to the U.S. EPA, permittees must clearly demonstration to Guam EPA that the project site has met all soil stabilization requirements and removal of any temporary erosion control as outlined in the GSESCR.

9.7 EPA REGION 10

9.7.1 IDR100000 State of Idaho, except Indian country

a. *Idaho's Antidegradation Policy*. The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

   1. Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05).
   2. Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
   3. Tier III Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

   DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

b. *Pollutants of Concern.* The primary pollutants of concern associated with stormwater discharges from construction activities are sediment, typically measured as total suspended solids and turbidity. Other potential pollutants include the following:

phosphorus, nitrogen, pesticides, organics, metals, PCBs, petroleum products, construction chemicals, and solid wastes.

c. *Receiving Water Body Level of Protection.* The CGP provides coverage to construction activities throughout the entire State of Idaho. Because of the statewide applicability, all of the jurisdictional waters within Idaho could potentially receive discharges either directly or indirectly from activities covered under the CGP. DEQ applies a water body by water body approach to determine the level of antidegradation a water body will receive.

All waters in Idaho that receive discharges from activities authorized under the CGP will receive, at minimum Tier I antidegradation protection because Idaho's antidegradation policy applies to all waters of the state. Water bodies that fully support their aquatic life or recreational uses are considered to be *high quality waters* and will receive Tier II antidegradation protection.

Although Idaho does not currently have any Tier III designated outstanding resource waters (ORWs) designated, it is possible for a water body to be designated as an ORW during the life of the CGP. Because of this potential, the antidegradation review also assesses whether the permit complies with the outstanding resource water requirements of Idaho's antidegradation policy.

To determine the support status of the receiving water body, persons filing a Notice of Intent (NOI) for coverage under this general permit must use the most recent EPA-approved Integrated Report, available on Idaho DEQ's website: http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report/.

High quality waters are identified in Categories 1 and 2 of the Integrated Report. If a water body is in either Category 1 or 2, it is a Tier II water body.

Unassessed waters are identified as Category 3 of DEQ's Integrated Report. These waters require a case-by-case determination to be made by DEQ based on available information at the time of the application for permit coverage. If a water body is unassessed, the applicant is directed to contact DEQ for assistance in filing the NOI.

Impaired waters are identified in Categories 4 and 5 of the Integrated Report. Category 4(a) contains impaired waters for which a TMDL has been approved by EPA. Category 4(b) contains impaired waters for which controls other than a TMDL have been approved by EPA. Category 5 contains waters which have been identified as "impaired," for which a TMDL is needed. These waters are Tier I waters, for the use which is impaired. With the exception, if the aquatic life uses are impaired for any of these three pollutants—dissolved oxygen, pH, or temperature—and the biological or aquatic habitat parameters show a health, balanced biological community, then the water body shall receive Tier II protection, in addition to Tier I protection, for aquatic life uses (IDAPA 58.01.02.052.05.c.i.).

DEQ's webpage also has a link to the state's map-based Integrated Report which presents information from the Integrated Report in a searchable, map-based format: http://www.deq.idaho.gov/assistance-resources/maps-data/.

Water bodies can be in multiple categories for different causes. If assistance is needed in using these tools, or if additional information/clarification regarding the support status of the receiving water body is desired, the operator is directed to make contact with the appropriate DEQ regional office of the State office in the table below:

Regional and State Office	**Address**	**Phone Number**	**Email**
Boise	1445 N. Orchard Rd., Boise 83706	208-373-0550	Kati.carberry@deq.idaho.gov
Coeur d'Alene	2110 Ironwood Parkway, Coeur D'Alene 83814	208-769-1422	June.bergquist@deq.idaho.gov
Idaho Falls	900 N. Skyline, Suite B., Idaho Falls 83402	208-528-2650	Troy.saffle@deq.idaho.gov
Lewiston	1118 "F" St., Lewiston 83501	208-799-4370	Mark.sellet@deq.idaho.gov
Pocatello	444 Hospital way, #300 Pocatello 83201	208-236-6160	Lynn.vanevery@deq.idaho.gov
Twin Falls	650 Addison Ave., W., Suite 110, Twin Falls 83301	208-736-2190	Balthasar.buhidar@deq.idaho.gov
State Office	1410 N. Hilton Rd., Boise 83706	208-373-0502	Nicole.deinarowicz@deq.idaho.gov

d. *Turbidity Monitoring.* The permittee must conduct turbidity monitoring during construction activities and thereafter on days where there is a direct discharge of pollutants from an unstabilized portion of the site which is causing a visible plume to a water of the U.S.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field (preferred method), but grab samples may be collected and taken to a laboratory for analysis. If the permittee can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, a sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date and time must be recorded prior to monitoring downstream of the project area. A sample must also be taken immediately downstream from any point of discharge and *within* any visible plume. The turbidity, location, date and time must be recorded. The downstream sample must be taken immediately following the upstream sample in order to obtain meaningful and representative results.

Results from the compliance point sampling or observation[78] must be compared to the background levels to determine whether project activities are causing an exceedance of state WQS. If the downstream turbidity is 50 NTUs or more than the upstream turbidity, then the project is causing an exceedance of WQS. *Any exceedance of the turbidity standard must be reporting to the appropriate DEQ regional office within 24 hours. The following six (6) steps should be followed to ensure compliance with the turbidity standard:*

1. If a visible plume is observed, quantify the plume by collecting turbidity measurements from within the plume and compare the results to Idaho's instantaneous numeric turbidity criterion (50 NTU over the background).
2. If turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring as long as the plume is visible. If turbidity exceeds background turbidity by more than 50 NTU instantaneously then stop all earth disturbing construction activities and proceed to step 3.
3. Take immediate action to address the cause of the exceedance. That may include inspection the condition of project BMPs. If the BMPs are functioning to their fullest capability, then the permittee must modify project activities and/or BMPs to correct the exceedance.
4. Notify the appropriate DEQ regional office within 24 hours.
5. Possibly increase monitoring frequency until state water quality standards are met.
6. Continue earth disturbing construction activities once turbidity readings return to within 50 NTU instantaneously and 25 NTU for more than ten consecutive days over the background turbidity.

Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The report must describe all exceedances and subsequent actions taken, including the effectiveness of the action.

e. *Reporting of Discharges Containing Hazardous Materials or Petroleum Products.* All spills of hazardous material, deleterious material or petroleum products which may impact waters (ground and surface) of the state shall be immediately reported. Call 911 if immediate assistance is required to control, contain or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office in the table below during normal working hours or Idaho State Communications Center after normal working hours. If the spilled volume is above federal reportable quantities, contact the National Repose Center.

For immediate assistance: Call 911

National Response Center: (800) 424-8802

Idaho State Communications Center: (208) 632-8000

[78] A visual observation is only acceptable to determine whether BMPs are functioning properly. If a plume is observed, the project may be causing an exceedance of WQS and the permittee must collect turbidity data and inspect the condition of the projects BMPs. If the BMPs appear to be functioning to their fullest capability and the turbidity is 50 NTUs or more than the upstream turbidity, then the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).

Regional office	Toll Free Phone Number	Phone Number
Boise	888-800-3480	208-373-0321
Coeur d'Alene	877-370-0017	208-769-1422
Idaho Falls	800-232-4635	208-528-2650
Lewiston	977-547-3304	208-799-4370
Pocatello	888-655-6160	208-236-6160
Twin Falls	800-270-1663	208-736-2190

9.7.2 IDR10I000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)

9.7.2.1 Shoshone-Bannock Tribes. The following conditions apply only to discharges on the Shoshone-Bannock Reservation:

f. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Shoshone-Bannock Tribes Water Resources Department at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Shoshone-Bannock Tribes Water Resources Department the acknowledgement of receipt of the NOI from the EPA within 7 calendar days of receipt from the EPA.

9.7.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator. The following conditions apply only to discharges on federal facilities in the State of Washington:

a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.

b. Prior to the discharge of stormwater and non-storm water to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

c. Permittees who discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter Identified in 303{d) Listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130 or EPA 180.1	25 NTUs at the point where the stormwater is discharged from the site.
High pH	pH	Su	pH meter	In the range of 6.5 – 8.5

d. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA approved listing of impaired waters that exists on February 16, 2017, or the date when the operator's complete permit application is received by EPA, whichever is later.

e. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.

   i. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements establish by the applicable TMDL.

   ii. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.

   iii. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.

   iv. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

   v. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to February 16, 2017, or prior to the date the operator's complete NOI is received by EPA, whichever is later.

9.7.4 WAR10I000 Indian country within the State of Washington

9.7.4.1 Confederated Tribes of the Colville Reservation. The following conditions apply only to discharges on the Colville Indian Reservation (CIR) and on other Tribal trust lands or allotments of the Confederated Tribes of the Colville Reservation:

a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

   Environmental Trust Department
   Confederated Tribes of the Colville Reservation
   PO Box 150
   Nesepelem, WA 99155

b. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be sent to the ETD at the same time they are submitted to EPA.

c. Discharges to Omak Creek, the Okanogan River, and Columbia River downstream of Chief Joseph Dam may affect threatened or endangered species, and shall only be permitted in adherence with Appendix D of the CGP.

d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Chapter 4-8 Water Quality Standards of the Colville Law and Order Code, as amended.

e. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the CIR. All spills must be reported to the appropriate emergency management agency and the ETD, and measures shall be taken immediately to prevent the pollution of waters of the CIR, including groundwater.

f. Stormwater site inspections shall be conducted at least once every 7 calendar days, within 24-hours of the occurrence of a rain event of 0.25 inches or greater in a 24-hour period, and daily during periods of saturated ground surface or snowmelt with accompanying surface runoff.

g. Results of discharge sampling must be reported to the ETD within 7 days of sample collection. All sample reporting must include the date and time, location, and individual performing the sampling.

h. Any corrective action reports that are required under the CGP must be submitted to the ETD at the above address within one (1) working day of the report completion.

i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or proprieties that may be eligible for such listing.

9.7.4.2 Lummi Nation. The following conditions apply only to discharges on the Lummi Reservation:

a. The Lummi Nation reserves the right to modify this 401 certification if the final version of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (CGP) on tribal lands in the State of Washington (Permit No. WAR10I000) is substantively different than the draft version of the proposed permit that was made available for public comments during April 2016. The Lummi Nation will determine if the final version of the NPDES CGP is substantively different than the draft version following review of the final version once the EPA makes it available.

b. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.

c. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.

d. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).

e. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.

f. Each operator shall submit a signed hard copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.

g. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager
2665 Kwina Road
Bellingham, WA 98226-9298

9.7.4.3 Makah Tribe. The following conditions apply only to discharges on the Makah Reservation:

a. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.

b. The operator shall submit a Storm Water Pollution Prevention Plan to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.

c. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.

d. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Aaron Parker
Makah Fisheries Management Water Quality Specialist
(360) 645-3162
Cell 206-356-0319
Aaron.parker@makah.com
PO Box 115
Neah Bay WA 98357

9.7.4.4 Puyallup Tribe of Indians. The following conditions apply only to discharges on the Puyallup Tribe of Indians Reservation:

a. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to lower water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures. The Tribe may also impose additional controls on a site-specific basis, or request EPA to require the operator obtain coverage under an individual permit, if information in the NOI or from other sources indicates that the operator's discharges are not controlled as necessary to meet applicable water quality standards.

b. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.

c. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor (char.naylor@puyalluptribe.com) and Russ Ladley (russ.ladley@puyalluptribe.com) by email or at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians
3009 E. Portland Avenue
Tacoma, WA 98404
ATTN: Russ Ladley and Char Naylor

d. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Resource Protection Manager (russ.ladley@puyalluptribe.com) and Char Naylor (char.naylor@puyalluptribe.com) for review.

e. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Russ Ladley and Char Naylor at the address listed above.

f. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to tribal waters.

g. The permittee shall conduct benchmark monitoring for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH monitoring as well. Monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.13-20) of the Washington State Construction Stormwater General Permit, effective January 1, 2016, shall apply, as applicable.

h. The permittee shall notify Char Naylor (253-680-5520) and Russ Ladley (253-680-5560) prior to conducting inspections at construction sites generating storm water discharged to tribal waters.

i. Treat dewatering discharges with controls necessary to minimize discharges of pollutants in order to minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or other storage areas. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.

   To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11 of EPA's 2016 General Construction Stormwater Permit. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

j. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the site's earth disturbances. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

9.7.4.5 Spokane Tribe of Indians. The following conditions apply only to discharges on the Spokane Tribe Reservation:

a. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;

b. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.

c. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.

d. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA.

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board
c/o. Brian Crossley
P0 Box 480
Wellpinit WA 99040
(509)626-4409
crossley@spokanetribe.com

9.7.4.6 Swinomish Indian Tribal Community. The following conditions apply only to discharges on the Swinomish Reservation:

a. Owners and operators seeking coverage under this permit who intend to discharge to Regulated Surface Waters must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.

b. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.

c. Owners and operators must also submit to the DEP Changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.

9.7.4.7 Tulalip Tribes. The following conditions apply only to discharges on the Tulalip Reservation:

a. This certification does not exempt and is provisional upon compliance with other applicable statues and codes administered by federal and Tulalip tribal agencies. Pursuant to Tulalip Tribes code of law, the operator must also obtain a land use permit from the Tulalip Tribes Planning Department as provided in Title 7 of the Tulalip Tribal Code (http://www.codepublishing.com/WA/Tulalip/?Tulalip02/Tulalip0205.html).

b. Each CGP operator shall be responsible for achieving compliance with Tulalip Tribes Water Quality Standards.

c. Each CGP operator shall submit their Stormwater Pollution Prevention Plan (SWPPP) to the:

Tulalip Natural & Cultural Resources Department
Tulalip Tribes
6406 Marine Drive
Tulalip, WA 98271

Appendix C – Copy of NOI and EPA Authorization email

Appendix D – Copy of Inspection Form

General Information (see reverse for instructions)					
Name of Project		**CGP Tracking No.**		**Inspection Date**	

Inspector Name, Title & Contact Information	
Present Phase of Construction	
Inspection Location (if multiple inspections are required, specify location where this inspection is being conducted)	

Inspection Frequency *(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply.)*

Standard Frequency: ☐ Weekly ☐ Every 14 days and within 24 hours of a 0.25" rain

Increased Frequency: ☐ Every 7 days and within 24 hours of a 0.25" rain (for areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3)

Reduced Frequency:
- ☐ Once per month (for stabilized areas)
- ☐ Once per month and within 24 hours of a 0.25" rain (for arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought)
- ☐ Once per month (for frozen conditions where earth-disturbing activities are being conducted)

Was this inspection triggered by a 0.25" storm event? ☐ Yes ☐ No

If yes, how did you determined whether a 0.25" storm event has occurred?

☐ Rain gauge on site ☐ Weather station representative of site. Specify weather station source:

Total rainfall amount that triggered the inspection (in inches)**:**

Unsafe Conditions for Inspection

Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.1.5? ☐ Yes ☐ No

If "yes", complete the following:
- Describe the conditions that prevented you from conducting the inspection in this location:
- Location(s) where conditions were found:

Instructions for Filling Out "General Information" Section

Name of Project
Enter the name for the project.

CGP Tracking No.
Enter the tracking number that was assigned to your NOI application for permit coverage.

Inspection Date
Enter the date you conducted the inspection.

Inspector Name, Title & Contact Information
Provide the name of the person(s) (either a member of your company's staff or a contractor or subcontractor) that conducted this inspection. Provide the inspector's name, title, and contact information as directed in the form.

Present Phase of Construction
If this project is being completed in more than one phase, indicate which phase it is currently in.

Inspection Location
If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter "Entire Site." If necessary, complete additional inspection report forms for each separate inspection location.

Inspection Frequency
Check the box that describes the inspection frequency that applies to you. Note that you may be subject to different inspection frequencies in different areas of your site. If your project does not discharge to a "sensitive water" (i.e., a water impaired for sediment or nutrients, or listed as Tier 2, 2.5, or 3 by your state or tribe) and you are not affected by any of the circumstances described in CGP Part 4.1.4, then you can choose your frequency based on CGP Part 4.1.2 – either weekly, or every other week <u>and</u> within 24 hrs of a 0.25 in storm event. For any portion of your site that discharges to a sensitive water, your inspection frequency for that area is fixed under CGP Part 4.1.3 at weekly <u>and</u> within 24 hrs of a 0.25 inch storm event. If portions of your site are stabilized, are located in arid, semi-arid, or drought-stricken areas, or are subject to frozen conditions, consult CGP Part 4.1.4 for the applicable inspection frequency. Check all the inspection frequencies that apply to your project.

Was This Inspection Triggered by a 0.25 Inch Storm Event?
If you were required to conduct this inspection because of a 0.25 inch (or greater) rain event, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event.

Unsafe Conditions for Inspection
Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. See CGP Part 4.1.5. These conditions should not regularly occur, and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as "Entire site"

Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.1) (see reverse for instructions)				
Type/Location of E&S Control **[Add an additional sheet if necessary]**	**Repairs or Other Maintenance Needed?***	**Corrective Action Required?***	**Date on Which Maintenance or Corrective Action First Identified?**	**Notes**
1.	☐Yes ☐No	☐Yes ☐No		
2.	☐Yes ☐No	☐Yes ☐No		
3.	☐Yes ☐No	☐Yes ☐No		
4.	☐Yes ☐No	☐Yes ☐No		
5.	☐Yes ☐No	☐Yes ☐No		
6.	☐Yes ☐No	☐Yes ☐No		
7.	☐Yes ☐No	☐Yes ☐No		
8.	☐Yes ☐No	☐Yes ☐No		
9.	☐Yes ☐No	☐Yes ☐No		
10.	☐Yes ☐No	☐Yes ☐No		

*** Note:** The permit differentiates between conditions requiring repairs and maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition and requires repairs if controls are not operating as intended. Corrective actions are triggered only for specific, more serious conditions, which include: 1) A required stormwater control was never installed, was installed incorrectly, or not in accordance with the requirements in Part 2 and/or 3; 2) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 3) One of the prohibited discharges in Part 2.3.1 is occurring or has occurred; or 4) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.2. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at www.epa.gov/npdes/stormwater/swppp. See Part 5 of the permit for more information.

Instructions for Filling Out the "Erosion and Sediment Control" Table

Type and Location of E&S Controls

Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.1.2. Include also any natural buffers established under CGP Part 2.1.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a surface water. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group "Inlet Protection Measures", "Perimeter Controls", and "Stockpile Controls" together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether repairs or maintenance or corrective action are necessary, and in the notes section you must describe the specifics about the problem you observed.

Repairs or Other Maintenance Needed?

Answer "yes" if the E&S control requires a repair of any kind (due to normal wear and tear, or as a result of damage) or requires maintenance in order for the control to continue operating effectively. At a minimum, maintenance is required in the following specific instances: (1) for perimeter controls, whenever sediment has accumulated to ½ or more the above-ground height of the control (CGP Part 2.1.2.2.b); (2) where sediment has been tracked-out onto the surface of off-site streets or other paved areas (CGP Part 2.1.2.3.d); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.1.2.9.b); and (4) for sediment basins, as necessary to maintain at least ½ of the design capacity of the basin (CGP Part 2.1.3.2.b). Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "yes" if work to fix the problem is still ongoing from the previous inspection.

Corrective Action Needed?

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.2.1): (1) a required E&S control was never installed, was installed incorrectly, or not in accordance with the corresponding CGP Part 2 or 3 requirement; (2) you become aware that the inadequacy of the E&S control has led to an exceedance of an applicable water quality standard; or (3) EPA requires corrective action for an E&S control as a result of a permit violation found during an inspection carried out under Part 4.2. If you answer "yes", you must take corrective action and complete a corrective action report, found at www.epa.gov/npdes/stormwater/swppp. Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes

For each E&S control and the area immediately surrounding it, note whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Describe any problem conditions you observed such as the following, and why you think they occurred as well as actions (e.g., repairs, maintenance, or corrective action) you will take or have taken to fix the problem:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)
7. E&S control is no longer working due to lack of maintenance

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If repairs, maintenance, or corrective action is required, briefly note the reason. If repairs, maintenance, or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Condition and Effectiveness of Pollution Prevention (P2) Practices (CGP Part 2.3) (see reverse for instructions)				
Type/Location of P2 Practices **[Add an additional sheet if necessary]**	**Repairs or Other Maintenance Needed?***	**Corrective Action Required?***	**Date on Which Maintenance or Corrective Action First Identified?**	**Notes**
1.	☐Yes ☐No	☐Yes ☐No		
2.	☐Yes ☐No	☐Yes ☐No		
3.	☐Yes ☐No	☐Yes ☐No		
4.	☐Yes ☐No	☐Yes ☐No		
5.	☐Yes ☐No	☐Yes ☐No		
6.	☐Yes ☐No	☐Yes ☐No		
7.	☐Yes ☐No	☐Yes ☐No		
8.	☐Yes ☐No	☐Yes ☐No		
9.	☐Yes ☐No	☐Yes ☐No		
10.	☐Yes ☐No	☐Yes ☐No		

*** Note:** The permit differentiates between conditions requiring repairs and maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition and requires repairs if controls are not operating as intended. Corrective actions are triggered only for specific, more serious conditions, which include: 1) A required stormwater control was never installed, was installed incorrectly, or not in accordance with the requirements in Part 2 and/or 3; 2) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 3) One of the prohibited discharges in Part 2.3.1 is occurring or has occurred; or 4) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.2. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at www.epa.gov/npdes/stormwater/swppp. See Part 5 of the permit for more information.

Instructions for Filling Out the "Pollution Prevention (P2) Practice" Table

Type and Location of P2 Controls
Provide a list of all pollution prevention (P2) practices that are implemented at your site. This list must include all P2 practices required by Part 2.3.3, and those that are described in your SWPPP.

Repairs or Other Maintenance Needed?
Answer "yes" if the P2 practice requires a repair of any kind (due to normal wear and tear, or as a result of damage) or requires maintenance in order for the control to continue operating effectively. Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program.

Corrective Action Needed?
Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.2.1): (1) a required P2 practice was never installed, was installed incorrectly, or not in accordance with the corresponding CGP Part 2 requirement; (2) you become aware that the inadequacy of the P2 practice has led to an exceedance of an applicable water quality standard; (3) one of the "prohibited discharges" listed in CGP Part 2.3.1 is occurring or has occurred, or (4) EPA requires corrective action for a P2 practice as a result of a permit violation found during an inspection carried out under Part 4.2. If you answer "yes", you must take corrective action and complete a corrective action report (see www.epa.gov/npdes/stormwater/swppp). Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?
Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes
For each P2 control and the area immediately surrounding it, note whether the control is properly installed, whether it appears to be working to minimize or eliminate pollutant discharges, and whether maintenance or corrective action is required. Describe problem conditions you observed such as the following, and why you think they occurred, as well as actions you will take or have taken to fix the problem:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 practice is no longer working due to lack of maintenance

If repairs, maintenance, or corrective action is required, briefly note the reason. If repairs, maintenance, or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Stabilization of Exposed Soil (CGP Part 2.2) (see reverse for instructions)			
Stabilization Area **[Add an additional sheet if necessary]**	**Stabilization Method**	**Have You Initiated Stabilization?**	**Notes**
1.		☐ YES ☐ NO If yes, provide date:	
2.		☐ YES ☐ NO If yes, provide date:	
3.		☐ YES ☐ NO If yes, provide date:	
4.		☐ YES ☐ NO If yes, provide date:	
5.		☐ YES ☐ NO If yes, provide date:	

Description of Discharges (CGP Part 4.1.6.6) (see reverse for instructions)	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? ☐ Yes ☐ No **If "yes", provide the following information for each point of discharge:**	
Discharge Location **[Add an additional sheet if necessary]**	**Observations**
1.	Describe the discharge: At points of discharge and the channels and banks of surface waters in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge: At points of discharge and the channels and banks of surface waters in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Instructions for Filling Out the “Stabilization of Exposed Soil” Table

Stabilization Area
List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented.

Stabilization Method
For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

Have You Initiated Stabilization
For each area, indicate whether stabilization has been initiated.

Notes
For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.

Instructions for Filling Out the “Description of Discharges” Table

You are only required to complete this section if a discharge is occurring at the time of the inspection.

Was a Stormwater Discharge Occurring From Any Part of Your Site At The Time of the Inspection?
During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If there is a discharge, answer “yes” and complete the questions below regarding the specific discharge. If there is not a discharge, answer “no” and skip to the next page.

Discharge Location (repeat as necessary if there are multiple points of discharge)
Location of discharge. Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

Describe the discharge. Include a specific description of any noteworthy characteristics of the discharge such as color; odor; floating, settled, or suspended solids; foam; oil sheen; and other obvious pollution indicators.

Are there visible signs of erosion or sediment accumulation? At each point of discharge and the channel and streambank in the immediate vicinity, visually assess whether there are any obvious signs of erosion and/or sediment accumulation that can be attributed to your discharge. If you answer “yes”, include a description in the space provided of the erosion and sediment deposition that you have found, specify where on the site or in the surface water it is found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue.

Contractor or Subcontractor Certification and Signature

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: ______________________________ **Date:**

Printed Name and Affiliation: ______________________________

Certification and Signature by Permittee

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Permittee or
"Duly Authorized Representative": ______________________________ **Date:**

Printed Name and Affiliation: ______________________________

Instructions for Signature/Certification

Each inspection report must be signed and certified to be considered complete.

Contractor or Subcontractor Signature and Certification
Where a contractor or subcontractor is relied on to carry out the inspection and complete the inspection report, you should require the inspector to sign and certify each report. Note that this does not relieve the permitted operator of the requirement to sign and certify the inspection report as well.

Signature and Certification by Permittee
At a minimum, the inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency*: Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Appendix E – Copy of Corrective Action Form

Corrective Action Report Form – Field Version

Purpose
This Corrective Action Report Form is designed to assist you in preparing corrective action reports for EPA's 2012 Construction General Permit (CGP). If you are covered under EPA's 2012 CGP, this form will enable you to create a corrective action report that complies with the minimum reporting requirements of Part 5.4 of the permit.

You are only required to fill out this form if one of the corrective action triggering conditions in Part 5.2.1 or 5.3 occurs on your site. Routine maintenance and repairs are generally not considered to be a corrective action triggering condition. Corrective actions are triggered only for specific, more serious conditions that are identified below in the "Overview of Corrective Action Requirements."

If you are covered under a state CGP, this form may be helpful in developing a report that can be used for that permit; however it will need to be modified to meet the specific requirements of the permit. If your permitting authority requires you to use a specific corrective action report form, you should not use this form.

Notes
While EPA has made every effort to ensure the accuracy of all instructions and guidance contained in the Corrective Action Report Form, the actual obligations of regulated construction activities are determined by the relevant provisions of the permit, not by the form. In the event of a conflict between the Corrective Action Report Form and any corresponding provision of the 2012 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Corrective Action Report Form at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at cgp@epa.gov.

Overview of Corrective Action Requirements
Construction operators covered under the 2012 CGP are required to conduct corrective actions and report on progress made in correcting the problem condition(s) in accordance with the following requirements:

Corrective Action Triggering Conditions (Parts 5.2.1 and 5.3)
Corrective action is required whenever any of the following conditions occur at your site:

- A required stormwater control was never installed, was installed incorrectly, or not in accordance with the requirements in Part 2 and/or 3;
- The stormwater controls (e.g., erosion and sediment controls or pollution prevention controls) that have been installed and maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1 of the permit;
- A Part 2.3.1 prohibited discharge has occurred or is occurring; or
- Any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.2.

Deadlines for Completing Corrective Actions (Part 5.2.1)
You must complete corrective action (e.g., installing and making operational any new or modified control, correcting errors in installation, preventing, mitigating, or cleaning up spills or leaks making repairs) by no later than 7 calendar days from the time of discovery of the condition. If infeasible to complete the installation or repair within 7 calendar days, you must document why it is infeasible and document your schedule for completing the corrective action as soon as practicable.

Deadlines for Documenting Corrective Actions in a Report (Part 5.4)
You are required to complete a corrective action report for each of corrective action you take in accordance with the following deadlines.

- Within 24 hours of discovering the occurrence of a corrective action triggering condition, you must document the following:
  - The condition identified at your site;

- The nature of the condition identified; and
- The date and time of the condition identified and how it was identified

- Within 7 calendar days of discovering a triggering condition, you must document the following:
  - Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
  - A summary of stormwater controls modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and
  - Notice of whether SWPPP modifications are required as a result of the condition identified or corrective action.

Instructions for Using This Report Form
This Field Version of the Corrective Action Report Form is intended to be used in the field and filled out by hand. If you will be filling out the Corrective Action Report Form electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Corrective Action Report Form available at www.epa.gov/npdes/stormwater/swppp. The Electronic Version includes text fields with instructions for what to enter.

The following tips for using this form will help you ensure that the minimum permit requirements are met:

- **Review the corrective action requirements.** Before you fill out this corrective action report form, read the CGP's Part 5 corrective action requirements. This will ensure that you have a working understanding of the permit's underlying corrective action requirements.

- **Complete a separate report for each condition that triggers corrective action.** For each triggering condition on your site, you will need to fill out a separate corrective action report form.

- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the form be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the corrective action report form, you leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)

- **Sign and certify each corrective action report.** Each corrective action report form must be signed and certified by the permittee to be considered complete. Where your corrective actions are carried out by a contractor or subcontractor, it is recommended that you also have the form signed and certified by the inspector, in addition to the signature and certification required of the permitted operator. The form includes a signature block for both parties.

- **Include the corrective action report form with your SWPPP.** Once your form is complete, make sure to include a copy of the corrective action report form in your SWPPP in accordance with Part 7.2.12.4 of the CGP.

- **Retain copies of all corrective action reports with your records.** You must retain copies of your corrective action reports in your records in accordance with the requirements in Part 5.4.4 of the 2012 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

Section-by-Section Instructions
You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions were written in order to provide you with more details in terms of what EPA expects to be documented in these reports.

Section A – Initial Report (CGP Part 5.4.1) (Complete this section within 24 hours of discovering the condition that triggered corrective action)					
Name of Project		**CGP Tracking No.**		**Today's Date**	
Date Problem First Discovered		**Time Problem First Discovered**			
Name and Contact Information of Individual Completing this Form					

What site conditions triggered the requirement to conduct corrective action *(check the box that applies)*:

- ☐ A required stormwater control was never installed, was installed incorrectly, or not in accordance with the requirements in Part 2 and/or 3
- ☐ The stormwater controls that have been installed and maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1 of the permit
- ☐ A Part 2.3.1 prohibited discharge has occurred or is occurring
- ☐ EPA requires corrective action as a result of permit violations found during an EPA inspection carried out under Part 4.2

Provide a description of the problem:

Deadline for completing corrective action (*Enter date that is either: (1) no more than 7 calendar days after the date you discovered the problem, or (2) if it is infeasible to complete work within the first 7 days, enter the date that is as soon as practicable following the 7th day)*:

If your estimated date of completion falls after the 7-day deadline, explain (1) why you believe it is infeasible to complete work within 7 days, and (2) why the date you have established for making the new or modified stormwater control operational is the soonest practicable timeframe:

Section B – Corrective Action Progress (CGP Part 5.4.2)
(Complete this section no later than 7 calendar days after discovering the condition that triggered corrective action)

Section B.1 – Why the Problem Occurred

Cause(s) of Problem **(Add an additional sheet if necessary)**	**How This Was Determined and the Date You Determined the Cause**
1.	**1.**
2.	**2.**

Section B.2 – Stormwater Control Modifications to be Implemented to Correct the Problem

List of Stormwater Control Modification(s) Needed to Correct Problem **(Add an additional sheet if necessary)**	**Date of Completion**	**SWPPP Update Necessary?**	**Notes**
1.		☐Yes ☐No If yes, provide date SWPPP modified:	
2.		☐Yes ☐No If yes, provide date SWPPP modified:	

Instructions for Filling Out the Initial Report (Section A)

You must complete Section A of the report form within 24 hours of discovering the condition that triggered corrective action

Name of Project
Enter the name for the project.

CGP Tracking No.
Enter the tracking number that was assigned to your NOI application for permit coverage.

Today's Date
Enter the date you completed this form.

Date/Time Problem First Discovered
Specify the date on which the triggering condition was first discovered. Also specify the time of the discovery.

Name/Contact Information
Provide the individual's name, title, and contact information as directed in the form.

Site Condition That Triggered Corrective Action
Under the CGP, corrective action is required when one of 3 triggering conditions occurs at your site. See CGP Parts 5.2.1 and 5.3. Check the box that corresponds to the condition that triggered this corrective action.

Description of the Site Condition
Provide a summary description of the condition you found that triggered corrective action under CGP Part 5.2.1 and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map. If you have already provided this explanation in an inspection report, you can refer to that report.

Deadline for Completing Corrective Action
This deadline is fixed in CGP Part 5.2.1. For all projects, the deadline is either: (1) no more than 7 calendar days after the date you discovered the problem, or (2) if it is infeasible to complete work within the first 7 days, as soon as practicable following the 7th day. If your estimated date of completion falls after the 7-day deadline consistent with (2), above, explain (a) why you believe it is infeasible to complete work within 7 days, and (b) why the date you have established for making the new or modified stormwater control operational is the soonest practicable timeframe:

Instructions for Filling Out the Corrective Action Progress Table (Section B)

You must complete Section B of the report form no later than 7 calendar days after discovering the condition that triggered corrective action.

Section B.1 – Why the Problem Occurred
After you have had the opportunity to examine the problem more closely, provide details as to what you believe to be the cause of the problem, and specify the follow-up actions you took (along with the dates of such actions) to diagnose the problem. This is consistent with CGP Part 5.4.2.1.

Section B.2 – Stormwater Control Modifications to be Implemented
Provide a list of modifications you plan to make to your stormwater controls to correct the problem and the date you completed such work. Keep in mind that your work must be completed within the timeline specified in Section A for the completion of corrective action work.

Also, if a SWPPP modification is necessary consistent with Part 7.4.1.1 in order to reflect changes implemented at your site, indicate the date you modified your SWPPP. Keep in mind that SWPPP changes must be made within 7 days of discovering the problem that triggered this corrective action.

Space is provided for you to include additional notes or observations regarding the change that you implemented at your site to correct the problem.

Section C – Certification and Signature (CGP Part 5.4.3)
Section C.1 – Certification and Signature by Contractor or Subcontractor

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: ____ **Date:**

Printed Name and Affiliation: ____

Section C.2 – Certification and Signature by Permittee

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Permittee or
"Duly Authorized Representative": ____ **Date:**

Printed Name and Affiliation: ____

Instructions for Signature and Certification (Section C)

Each corrective action report must be signed and certified to be considered complete.

Section C.1 – Contractor or Subcontractor Signature and Certification

Where a contractor or subcontractor is relied on to complete this report and the associated corrective action, you should require the individual(s) to sign and certify each report. Note that this does not relieve you of the requirement to sign and certify the report as well.

Section C.2 – Signature and Certification by Permittee

At a minimum, the corrective action report form must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency*: Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Appendix F – SWPPP Amendment Log

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Appendix G – Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: ____

Project Title: 24 South Hunt Road, Amesbury, MA______________________

Operator(s): **contractor to be determined**______________________

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: ____

Address: ____

Telephone Number: ______________________

Type of construction service to be provided: ______________________

____

____

Signature: ______________________

Title: ______________________

Date: ______________________

Appendix H – Grading and Stabilization Activities Log

Date Grading Activity Initiated	**Description of Grading Activity**	**Description of Stabilization Measure and Location**	**Date Grading Activity Ceased** (Indicate Temporary or Permanent)	**Date When Stabilization Measures Initiated**
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE

Appendix I – SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name: **31 Spofford Road, Boxford, MA**

Project Location: **31 Spofford Road, Boxford, MA**

Instructor's Name(s):

Instructor's Title(s):

Course Location: ______________________________ Date: ________________

Course Length (hours): __________________________

Stormwater Training Topic: *(check as appropriate)*

- ☐ **Sediment and Erosion Controls**
- ☐ **Stabilization Controls**
- ☐ **Pollution Prevention Measures**
- ☐ **Emergency Procedures**
- ☐ **Inspections/Corrective Actions**

Specific Training Objective:____

____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		

Appendix J – Delegation of Authority Form

Delegation of Authority

I, ______________________ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit (CGP), at the __________________________________ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

______________________________________ (name of person or position)
______________________________________ (company)
______________________________________ (address)
______________________________________ (city, state, zip)
______________________________________ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix I of EPA's CGP, and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix I.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ____

Company: ____

Title: ____

Signature: ____

Date: ____

Appendix K – Endangered Species Documentation

<BOL>Path:</BOL> \\wse03.local\WSE\Depts\Water\Water Resources Group\GIS - Constraints Mapping\Boxford\Harry Lee Cole School & Spofford Pond School\31 Spofford Road\NHESP.mxd <BOL>User:</BOL> GasparA <BOL>Saved:</BOL> 3/18/2020 8:49:21 AM <BOL>Opened:</BOL> 2/3/2021 1:20:12 PM

N W E S

300 150 0 300 Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Spofford Pond School

NHESP Habitats

NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

NHESP Certified Vernal Pools

NHESP Potential Vernal Pools

FIGURE 1

Spofford Pond School
Boxford, MA

NHESP Map

Weston & Sampson

Appendix L – Historic Properties Documentation

<BOL>Path:</BOL> \\wse03.local\WSE\Depts\Water\Water Resources Group\GIS - Constraints Mapping\Boxford\Harry Lee Cole School & Spofford Pond School\31 Spofford Road\Human Receptor.mxd <BOL>User:</BOL> GasparA <BOL>Saved:</BOL> 2/3/2021 1:24:15 PM <BOL>Opened:</BOL> 2/3/2021 3:21:14 PM

N
W E
S

300 150 0 300
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Spofford Pond School
- State Registry of Historic Places

FIGURE 2

Spofford Pond School
Boxford, MA

Historic Site Map

Weston & Sampson

APPENDIX I

PLANS

SEE PLANS ATTACHED SEPARATELY